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EDITORIAL

COVID-19: The Next Steps for the World

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Since December 2019, COVID-19 is impacting the health, economy, education, and well-being of every country in the world. The total number of reported COVID-19 cases will soon surpass 100 million and the death toll will be more than 20 million. At this moment, the top 10 countries with the most reported number of cases currently are the USA, India, Brazil. Russia, UK, France, Turkey, Italy, Spain, and Germany. These countries altogether represent 31.7% of the world's population. However, they reported 65.5% of the total COVID-19 cases and 58.9% of total deaths. For containing the spread of SARS-CoV-2, the virus that causes COVID-19, Malaysia was one of the most successful countries in the world. However, since September 2020, the situation in Malaysia started changing, and at this moment Malaysia is reporting more than 2,500 new cases per day. During the past year, all the countries in the world acted fast and took different initiatives to reduce transmission of SARS-CoV-2, find effective drugs that can improve the clinical outcomes of COVID-19, and invent vaccines that can give immune protection. The first vaccine that was approved was invented by Pfizer/BioNTech and in December 2020, within one year of the beginning of the pandemic, the UK was the first country to start mass vaccination. As reported by the World Health Organization (WHO) in January 2021, more than 50 COVID-19 vaccines were in different phases of clinical trial and five vaccines received certain national regulatory approval for mass vaccination. However,

given all these developments the COVID-19 pandemic is still making a devastating impact on the whole world and the pandemic is not going to over soon. Therefore, we need to discuss what we can do now to deal with the pandemic and ensure the health and well-being of the citizens of the world.

Steps Recommended by WHO

In April 2020, WHO released six steps that can be used by any country to keep the SARS-CoV-2 transmission at manageable levels. Depending on the level of transmission, many countries in the world have imposed different types of restrictions. These steps can guide the countries to take necessary actions to life restrictions and resume economic and social life. Therefore, these steps are relevant to the world. The six steps recommended by WHO are:

1. Transmission of the coronavirus or SARS-CoV-2 is under control.
2. The health system can detect, test, isolate, and treat every case and trace every contact.
3. The risk of outbreak hotspots is minimized in vulnerable settings like health facilities.
4. Workplaces, schools, and other essential places have preventative measures in place.
5. Measures are in place to manage the risk of importing new cases.
6. Communities are fully educated, engaged, and empowered to live under a new normal.

Undoubtedly, it is a tall ask for any country in the world to fulfil all these conditions but the countries can do their best to attain them. The first step is about minimizing the transmission of the virus. The world now knows the routes of transmission and effective ways to reduce transmission. The universal use of quality face mask, appropriate hand hygiene, and social distancing are still the measures that have the most impact on the reduction of transmission.

Though no health system in any country in the world will be able to detect, test, isolate and treat every case and trace every contact, the world has witnessed successful efforts in countries like New Zealand, Singapore, South Korea, Bhutan, Taiwan, Vietnam, Thailand, etc. As COVID-19 can cause very mild and undetectable infections in a large proportion of cases it is virtually impossible to detect and test every case. A more realistic option is the detection of all symptomatic cases, their contacts and isolate them. This strategy will slow the transmission of SARS-CoV-2 and can lead to a condition known as suppression (when a COVID-19 patient spreads the disease to less than one person on average). This approach will also flatten the epidemic curve meaning that the new cases will occur over a long period and the health sector will be able to cope with the demand for healthcare.

The third step highlights that outbreak risk should be minimized in special settings like health facilities and nursing homes. This can be done by careful handling of patients, care providers, users, visitors, and suppliers and by ensuring appropriate personal protective equipment (PPE). WHO has guidelines for the rational use of personal protective equipment for COVID-19 and these guidelines should be strictly followed.

The fourth step is about the preventive measures in schools, workplaces, and other essential places. In all countries in the world, COVID-19 preventive measures are in place on a different scale. For example, crowded workplaces are working in shifts and many employees are working from home. In the case of schools, though the risk of death of the small children is very low, all the children, teachers, and parents of the small children should take necessary precautions. All of them should wear face masks, there should be facilities for hand-washing and the schools should be cleaned and disinfected every day. Any symptomatic children should be isolated and home quarantined. If the children live

with their grandparents, the grandparents should be relocated to safer places before the children start going to schools. All workplaces should also take similar preventive measures. Every hour, there can be a hand-washing break for 10 minutes and the workplace should also have proper facilities for hand-washing soaps, hand sanitisers, face masks, bins with lids, and a proper disposal system for these items. There should be a temperature check every day during the entry of the workers using hand-held devices. Evidence suggests that the mortality risk is higher among people 60 years or older. However, given the poor metabolic health of the people in many developing countries, it will not be advisable for a person above 50 years old to go to the workplace until the risk of infection is over. Employees in this age group can continue to work from home.

The fifth WHO criterion is about managing the risk of importing new cases. The world is still having travel restrictions in various forms. The countries need to continue the travel restrictions depending on the situation in the country. All arriving people should have a COVID-19 negative pass and should be quarantined for 14 days. The entry restriction guidelines should be periodically reviewed and revised. Non-essential domestic and international travels should be avoided and the national guidelines for PPE use during travel should be followed.

The sixth and last condition is about the community. The WHO recommends that communities are fully educated, engaged, and empowered to live under a new normal. The hand-washing practices, availability of soaps and hand sanitisers at home and workplaces, travel bans, touch-free doors and elevators are going to stay as part of the new normal. In many countries, the media is playing a key role to make sure that people in the country practise the COVID-19 prevention recommendations, e.g. hand-washing practices, use of sanitisers/ soaps, wear face masks, etc. Studies from many countries reported that communities still have misconceptions about COVID-19 prevention practices and the proportion of people with such misconceptions is higher among women than men. Moreover, a significant proportion of people do not practise the recommended behaviours though they know about them. Therefore, along with the media, the government health workforce, and other non-government organizations, schoolchildren, law-enforcing agencies, etc. can take proactive measures to educate, engage and empower people so that everyone is aware of the prevention practices and practise them all the time.

Vaccines: The New Hope

As mentioned earlier, the mass vaccination for the prevention of COVID-19 began in December 2020. By 14 January 2021, 32.4 million doses of different types of vaccines were administered in 45 countries of the world. Among these doses, 10.8 million, 9 million, and 3.1 million doses were administered in the USA, China, and the UK, respectively. The efficacy of these vaccines range between 50% to 95% and millions of doses of different vaccines are now being manufactured for mass vaccination. Though we do not know much about the duration of immune protection from these vaccines, the vaccines should be treated as lights of hope to end the COVID-19 pandemic. However, there should be an equitable distribution of vaccines in all the countries of the world. So far, vaccine administration has been limited mainly to high- and middle-income countries and therefore, urgent action should be taken to make vaccines available to all countries in the world.

COVID-19 and Research: Endpoints

COVID-19 also gives us an opportunity for a large number of social, behavioural, economic and biological researches. All the countries in the world should form research cells for COVID-19 so that the research cells can guide different types of studies. As COVID-19 is likely to be responsible for subsequent

waves, discovery research (understanding the burden, impact of COVID-19 and the SARS-CoV-2 itself), development research (e.g. development and testing of new treatment combinations, prevention technologies, tests for detection of SARS-CoV-2, and vaccine research) and delivery research (operations and implementation research to improve the delivery of the interventions) should continue. The research cells should also collect, collate, and review evidence from different parts of the world and make country-specific recommendations. Accordingly, there should be an environment that all the policy decisions are guided by science and data. The world will have to continue the fight against this virus in all possible ways until humankind wins the fight.

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REVIEW ARTICLE

Irrational Use of Drugs

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ABSTRACT

Irrational use of drugs could be detrimental issues in the practices of healthcare communities. This problem arises either because of the wrong prescription or inappropriate self-medication. Faulty prescribing practices and incorrect self-medication will lead to an ineffective treatment regime. Still, they can also be unsafe as these may exacerbate or prolong the illness and distress the patients. In turn, these will incur unnecessary treatment costs. The most typical issues in the irrational use of drugs are the patient's lack of information about the medicine and inadequate proper consultation from physicians. Lack of regulation in the appropriate use and supply of drugs by the relevant enforcement agencies could also be the problem in the irrational use of drugs. Ulceration and inflammation due to the irrational use of NSAIDs, antibiotics, and unhealthy lifestyle may contribute to the novel therapeutic strategy challenges. The ability to purchase the drugs without a doctor's prescription of nonsteroidal anti-inflammatory drugs (NSAIDs) was also the landmark event that became the most widely used medications for the anti-inflammatory, analgesic, and antipyretic effects. Inadequate knowledge from both drug providers and patients may contribute to the most recognized influential factors in the irrational use of drugs in various countries. The recommendation should introduce an appropriate educational intervention that can be designed to promote rational prescribing. Proper regulation on prescription practices by policymakers and physicians could be the way to ensure the standard of rational usage of drugs have compliant with the healthcare communities.

INTRODUCTION

Drugs have been used for many centuries to cure or control diseases and symptoms since medical technology advances. The irrational prescribing, like overuse or misuse of drugs, could often cause significant adverse effects. These bad practices are not easy to overcome and cure, but prevention is possible by improving the teaching methods of pharmacotherapy on rational prescribing (de Vries et al., 1995; Chowdhury, 1991). If the irrational use of drugs is not discouraged, this could reduce the quality of drug therapy that could increase morbidity and mortality.

Factors Influencing the Irrational Use of Drugs

Various factors have been determined to influence the irrational use of the drug. These include patient, prescriber or physician, drug supplying system, and drug regulation. The most common issues in the irrational use of drugs are patients' lack of information about the medicine and improper consultation from physicians. The misleading belief that there is a pill for every illness leads the patient to seek the use of drugs. Additionally, some patients often find prescribed drugs to be more relevant to their demands and expectations than drugs' rational use. Prescriber or physician's limited training, experience, and lack of knowledge on drug information have heavily contributed to the injudicious prescription of medications. In some circumstances, the irrational use of drugs could be due to the unreliable drug supplying system. For example, a shortage of the essential drug supply may lead to the prescription of non-essential medications or supplying the expired drugs that diminish the effectiveness of the treatment regime (World Health Organization [WHO], 2016).

The Problem of Irrational Use of Drugs

Deficiency of regulation in the proper use and supply of drugs by the relevant enforcement agencies could be the problem in the irrational use of drugs. This deficiency may lead to various other problems such as low quality of drug therapy that could increase patients' morbidity and mortality. Irrational use of drugs will also reduce the utilization of vital drugs as patients are prescribed wrong medications. This, in turn, will increase the healthcare cost and waste of resources. Moreover, the injudicious drug prescription and use can threaten health as unwanted adverse reactions, and the emergence of drug resistance may occur. The psychosocial impact also could be encountered as the patient comes to have confidence as "there's a medicine for every disease". This will lead to increasing demand for medicines (Alamgir & Ahmed, 2015).

Rational Use of Drugs: WHO

The definition of the rational use of medicine by the World Health Organization (WHO) indicates that the medication prescribed to the patients is appropriate to the clinical needs, in doses that meet the patient and community needs, for an adequate time at the lowest cost (Toklu, 2015). Practices of prescription medicine by physicians in developed and developing countries are numerously reported; for example, the drugs were prescribed not related to the diagnosis and erroneous use of antibiotics with the consumption in inadequate quantities (Hogerzeil, 1995). In Bangladesh, many drugs can be purchased without any proper prescription (Rahman et al., 2007). Injudicious prescription and use of drugs will increase the unnecessary cost of healthcare treatments and be detrimental to the patients.

Rational clinical decision-making and rational drug use must be considered two sides of the same coin; each one requires the other to result in a maximum benefit programme (Anwar, 1994) and (Ali & Chowdhury,1993). Therefore, the prescription of drugs requires knowledge, judgment, skill, and wisdom, and above all, a sense of responsibility (Bennett & Brown, 2008). A study conducted by Dawood et al. (2017) reported factors such as age,

gender, race, education level, health status, and income level determined their level of knowledge about medicinal use (Dawood et al., 2017). Also, researchers found that all the drugs prescribed to patients were listed in the EDL (Essential Drug List). The average percentage of drugs adequately labelled was 92.0%. The percentage of patients who had adequate knowledge of how to take their drugs was 74.9%. The percentage of the public health clinics that kept the Standard Treatment Guidelines (STG) in their premises was 95.0%, but none kept the EDL in their premises, which might affect the drug prescribing decision (Saleh & Ibrahim, 2006).

Based on the WHO guidelines (WHO, 2012), the rational use of drugs can only be achieved when appropriate drugs indication complied, as the medicine should be prescribed only when they are essential. The appropriate prescribed drugs also need to be abided based on effectiveness, safety, availability, and price, e.g. the drugs prescription for diarrhoea in children is erythromycin and never be the tetracycline. The appropriate administration of drugs also needs to be considered. It depends on the dose, route, duration, and interval. The dose is based on age, hepatic, or renal impairment. In children and old age, the dose should be reduced due to the reduction of drug metabolism capacity and vital organs' function.

Furthermore, the duration is maintained to prevent drug resistance and prevent adverse effects, e.g. the full course should be maintained in case of antibiotics. The appropriate drugs prescribed for the patient also need to comply. The patient's sensitivity to the drugs should be considered during pregnancy and lactation. Some drugs are contraindicated during this period. Moreover, the appropriate drug evaluation is also crucial as it needs to follow up on the patient's curation progress and the resistance and adverse effect of drugs. The drug should also be available when needed at reasonable prices, efficacious, safe, and acceptable (WHO, 2012).

Regardless of WHO guidelines for the rational use of drugs, it is also essential to know the common examples of irrational prescription or drug use. The drugs are prescribed with no indication of drug therapy, e.g. antibiotics for viral upper respiratory tract infection (Connor et al., 2018). However, antibiotic does not affect viral infection, use of wrong drugs for a specific condition, e.g. tetracycline in childhood diarrhoea has adverse effects on bone calcium during childhood leading to growth retardation, dental caries, etc. Again, the use of drugs with doubtful/unproven efficacy, e.g. use of anti-motility agents in diarrhoea may prevent the evacuation of bacteria from the body and exacerbate the condition, failure to provide available, safe. The effective drug, e.g. failure to vaccinate against measles and tetanus as well as the use of correct drugs with incorrect administration, doses, and duration, e.g. use of intravascular metronidazole when oral formulation should be appropriate causing the patient embarrassed, and the treatment becomes expensive.

Irrational Use of Antibiotics

Irrational use of antibiotics is a great problem in the community. This was highly found in the Tanzanian population. It includes prescription of incorrect doses, self-medication, and non-bacterial illness treatment, resulting in increased resistance to the commonly available antibiotics. The recommendation has been made to reduce the irrational use of antibiotics by strictly controlling antibiotics' accessibility in drug outlets without prescription. The supply chain of antibiotics should also be strictly controlled and monitored. Community education campaigns should be ensured by providing clear messages about how to use antibiotics appropriately with a strong emphasis on the fact that antibiotics play no role in the treatment of most upper respiratory tract symptoms (URTS) and acute diarrhoea since they are typically caused by viruses (Mboya et al., 2018).

Irrational Use of Antiulcerant

Although peptic ulcer disease due to *Helicobacter pylori* infection has been shown to have substantially declined in prevalence over the past two decades (Lanas & Chan, 2017), ulcers due to the irrational use of NSAIDs and unhealthy lifestyle possessed new therapeutic challenges. The treatment regimen for *H. pylori* consists of proton-pump inhibitors (PPI) with two antibiotics, also called PPI-based triple therapy, prescribed for 7 – 14 days. As mentioned above, the irrational use of antibiotics can cause the development of antibiotic resistance. This inline with reports by Malfertheiner et al. (2017) and Graham and Laine (2016) where the effectiveness of the regimen to eradicate *H. pylori* has declined in many countries from 90% to less than 70% over the past two decades. This occurrence contributed mainly to the fact that patients did not adhere to the proper medication prescribed.

Both NSAIDs and alcohol consumption have been shown to cause stomach ulcers, which is more common in high-income countries. However, due to ulcers caused by *H. pylori* cannot be differentiated from NSAID-caused ulcers, proper testing of *H. pylori* is recommended to avoid improper prescription of antibiotics, which can lead to drug resistance. Most often, treatment with PPI allowed more than 85% of NSAID-associated ulcers to heal after 6 – 8 weeks, provided the discontinuation of NSAID usage (Lanas & Chan, 2017). However, strict adherence to PPI treatment is needed to avoid bleeding and surgery in severe stomach ulcers. However, PPI is not free from side effects. The long-term use of PPIs is associated with a higher risk of community-acquired pneumonia, osteoporosis, and hip fractures (Arafat et al., 2017).

Prescribing Pattern of NSAIDs

The development and purchase ability without a doctor's prescription of nonsteroidal anti-inflammatory drugs (NSAIDs) were the landmark events that soon became the most widely used medications for the anti-inflammatory, analgesic, and antipyretic effects (Urrusuno et al., 2008). It was reported that analgesics with minimal anti-inflammatory effects were the most prescribed NSAIDs (94.5%) in the outpatient department (OPDs) of government hospitals and UMS Polyclinic (UPC). In contrast, analgesics with potent anti-inflammatory effects were the most prescribed NSAIDs (76%) in private polyclinic OPD (PPC). On the one hand, this might be because the more educated and higher-income groups of patients are familiar with analgesics with minimal anti-inflammatory effects, such as paracetamol, ibuprofen, aspirin, etc. Therefore, PPC prescribers may select only the costly analgesics with potent anti-inflammatory effects to meet the patients' demand for a more effective and faster cure. On the other hand, comparatively less-educated and lower-income groups of patients registered at the medical OPDs of UPC had received analgesics prescriptions with minimal anti-inflammatory effects because these medications were considerably cheaper and were mostly available in the clinic (Rahman et al., 2014). However, this was a descriptive study, so the statistical analysis was not done.

Later, data showed that more educated and a higher-income group of patients were mostly registered at the OPDs PPC, whereas a less-educated and a lower-income group of patients were generally registered at UPC in Kota Kinabalu, Sabah, Malaysia. This could be responsible for the substantial variations in NSAIDs' prescribing patterns in the OPDs of the two polyclinics (Rahman et al., 2014).

Therefore, the patients' educational and socioeconomic status may affect the prescribing pattern of NSAIDs in the medical OPDs of these two polyclinics. Like most drugs, NSAIDs are double-edged swords in terms of adverse effects. On the one hand, analgesics with minimal anti-inflammatory effects have lower risks to induce adverse effects, particularly in the gastrointestinal tract, especially with paracetamol and ibuprofen at a

low dose (Bennett & Brown, 2003) and (Bhartiy et al., 2008). However, analgesics with potent anti-inflammatory effects have higher risks to induce potent adverse effects. Thus, sporadic consumption of NSAIDs may subside the symptoms for the time being, but the actual pathology may sometimes be hindered and aggravated, complicated, and even turn to fatality in some cases (Targownik & Thomson, 2006; Chan & Graham, 2004).

The prescribers in the OPDs of PPC had to prescribe the additional drugs than the UPC prescribers to prevent the adverse effects of the potent NSAIDs, which ultimately increases the total cost of medication. This report has some similarities with the report in Bangladesh (Rahman et al., 2007). Potent NSAIDs should be avoided because the rational use of drug demands should be available as needed and affordable to most people (Chowdhury et al., 1997).

Irrational Use of Drugs in Different Countries

Irrational use of medicines was found in both Vietnam and China, but issues with polypharmacy as well as the overuse of antibiotics were more severe in Vietnam while overuse of injections was unique in China. Lack of proper knowledge from providers and patients was the most recognized influential factor (Mao et al., 2015). Researchers found a high level of polypharmacy and non-generic prescribing of antihypertensive drugs. They recommended increasing prescription drugs that are cost-effective and emphasize fixed-dose combinations (FDCs) to control blood pressure (Akunne & Adedapo, 2019). In another study, researchers from Bangladesh got almost the same result while evaluating the prescription patterns of antidepressant drugs among physicians (Islam et al., 2019). Researchers from India also reported that multivitamins are irrationally prescribed and taken as self-medication by the public. As many of the ill effects are often unnoticed and under-reported, they advised India's government to regulate the manufacture and sell these nutraceuticals to promote drugs' rational use (Krishnan et al., 2016). Therefore, pharmacology education should incorporate problem-oriented rational treatment programmes, provide rigorous supervision in prescribing during clinical training, offer higher quality in-service training, and continuous medical education to improve physicians' prescribing attitudes and skills and reduce irrational medicine use (Calikoglu et al., 2019).

Prevention of Irrational Prescribing or Way of Rational Prescribing

Based on the WHO preventive measures, irrational prescribing can be prevented by making a correct diagnosis, limiting the number of drugs, encouraging the availability of essential drugs, providing adequate training, drug information with medicine cost-effectiveness and standard treatment guidelines to the prescriber by continuing education incorporating the concept of essential drugs, the teaching of rational prescribing into the curriculum of medicine, pharmacy, dentistry, and nursing as well as provide effective public education to the consumer and on the public. Public education also needs to propagate the information on the significant improvement of medicines' rational use with information brochure as it is a useful tool to provide health-related education to the general public (Pandey & Chaudhari, 2017). The researchers of Ethiopia realised that TB programmes need to emphasise the practical and rational use of second-line drugs for newly diagnosed MDR-TB patients to prevent the emergence of pre-XDR/XDR-TB strains20 (Shibabaw et al., 2020).

CONCLUSION

In conclusion, recommendations should be made to introduce an appropriate educational intervention that can be designed to promote rational prescribing. Inappropriate use of medications is likely to harm both patients and health systems, so policymakers and physicians should try to reduce this infirmity.

CONFLICT OF INTEREST

The authors declare that they have no conflicting interests in publishing this article.

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ORIGINAL ARTICLE

Awareness and Knowledge of Nurses towards Hepatitis B Virus Infection at a Tertiary Hospital in Selangor, Malaysia

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ABSTRACT

Hepatitis B is a well-recognized occupational risk for healthcare workers. This self-administered questionnaire study was designed to assess awareness and knowledge towards hepatitis B virus infection among 140 nurses at Serdang Hospital, Selangor, Malaysia from the period of 1st April to 30th September 2017. The response rate was 97.2% (n = 140/144). A total of 71.4% of participants showed adequate awareness of hepatitis B. Most participants had heard hepatitis B with the predominant sources receiving from friends, media and education. Majority of them did serology blood test of hepatitis B before. A total of 84.3% of participants were aware of vaccine available for hepatitis B, although 78.6% got vaccinated in the past. Antiviral treatment of hepatitis B was not well noticed by most of them. Education qualification determines the awareness of hepatitis B. Regarding the knowledge, 73.6% of participants showed poor knowledge of hepatitis B. Most participants understood that hepatitis B was caused by a virus infection and the organ most affected was the liver. Surprisingly, 77.9% of them failed to recognize that cancer could be caused by hepatitis B. Majority of participants were aware that transmission of hepatitis B could be mediated via sexual intercourse, as well as childbirth. Nevertheless, 14.3% of them believed that hepatitis B was able to spread by cough and sneeze. Older age, Chinese ethnicity, and having high educational qualification were factors leading to adequate knowledge of hepatitis B. Additional attention should be emphasized to strengthen knowledge towards hepatitis B among nurses and perhaps other healthcare workers in Malaysia.

INTRODUCTION

Hepatitis B is a viral infection that mainly attacks the liver and can cause both acute and chronic disease. The World Health Organization (WHO) estimated two billion individuals had been infected by hepatitis B. In Malaysia, the prevalence of chronic hepatitis B is about 5% among the population (Mohamed et al., 2004; Merican et al., 2000). The incidence rate of hepatitis B among Malaysians was reported at 14.52 per 100,000 population with a mortality rate of 0.21 in 2018 (Ministry of Health Malaysia, 2019). Chinese has the highest prevalence of disease (Qua & Goh, 2011; Sung, 1990). Vertical transmission is recognized as the major route of transmission. It is estimated that 2.4% of pregnant women in Malaysia are infected with hepatitis B. The hepatitis B vaccination programme for children was introduced by our health ministry in 1989, which successfully reduce the number of cases of infection among Malaysians. To achieve WHO – Glasgow Declaration on Viral Hepatitis Elimination (WHO, 2015) target by 2030, the Malaysian Ministry of Health is working together with multi-sectoral organizations to formulate a strategy to eliminate viral hepatitis in this region.

Most previous studies have studied only on patients with hepatitis B (Mohamed et al., 2012), residents at certain areas (Pathmanathan & Lakshmanan, 2014; Lim and Rashwan, 2003; Changmai et al, 2013), students (Ahmad et al., 2016), or dentists (Yaacob & Samaranayake, 1989) with regard to their awareness and knowledge (A&K) for hepatitis B infection. However, studies with nurses as participants is rather limited. The consensus in local literature revealed that A&K about hepatitis B was poor, and hepatitis B vaccination was inadequately covered in Malaysia (Mohamed et al., 2012; Pathmanathan & Lakshmanan, 2014; Lim & Rashwan, 2003; Changmai et al., 2013; Ahmad et al., 2016; Yaacob Samaranayake, 1989). Healthcare workers (HCWs) especially nurses are at high risk of contracting certain blood-borne diseases including hepatitis B. There were also misperceptions by HCWs that patients with hepatitis B could be recognized by appearance, vaccination does not provide sufficient protection and no risk of cancer. This may have contributed to the unwillingness of HCWs to take extra precaution when they are attending patients. Besides this, hepatitis B virus was wrongly believed that it could be spread through activities such as cough or sneeze, which may cause some HCWs reluctance to serve patients with viral infections such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) (Philip et al., 2014). This survey was developed to better understand the current level of A&K of nurses towards hepatitis B at a tertiary hospital in Selangor, Malaysia. It is hoped that by obtaining nurses' A&K about hepatitis B, we aimed to provide better HCWs-cantered education, equipping them to better understand the disease and help them to prevent the spread of the disease.

MATERIALS AND METHODS

Study Design

This study used an empirical questionnaire to assess the level of A&K of nurses towards hepatitis B. It was conducted at a tertiary level government hospital (Serdang Hospital), located at Selangor, Malaysia. This project got approval from the ethics committee of the Clinical Research Centre, Serdang Hospital before the commencement of the study (Research ID: 35854). Data was collected from 1st April to 30th September 2017.

The study recruited Malaysian staff nurses who were at least 21 years old. The questionnaires of this study were self-administered. Participation in this research was completely voluntary and the written consents were obtained prior to the interview. All the collected data were kept anonymous and confidential.

To avoid any discussion, which may affect the validity of the study findings, the questionnaires were completed in front of the investigator. Once the questionnaire was done, a hepatitis B knowledge pamphlet was provided to the participant as a part of education. The study's sample size was calculated at 80% power and above 95% confidence level at 140.

The questionnaire was developed based on existing literature and consensus. This English-language questionnaire consisted of three sections: section 1 consisted of demographic data (gender, age, ethnicity, academic qualifications either undergraduate level or diploma level, smoking/alcoholic status, marital status and family history of hepatitis B); section 2 composed of 12 questions assessing awareness with the option "YES/NO" and one question with sub-question; and section 3 with 12 questions on knowledge with the option "YES/NO" and two questions with sub-questions. A score of one was given if respondents answer correctly, whereas incorrect answers were given a score of zero. The scoring range of level of knowledge was 12 (largest) to zero (smallest). Based on a 75% cut-off point, a cut-off level of < 7 was considered as poor whereas ≥7 was considered as adequate awareness about hepatitis B (Questions 2 and 6 were not counted in the assessment). In terms of knowledge assessment, a cut-off level of < 9 was considered as poor whereas ≥9 was considered as adequate knowledge about hepatitis B. The application of cut-off point to determine the adequacy of awareness or knowledge regarding certain illness had been used in previous studies (Malaysia (Rajamoorthy et al., 2019), Indonesia (Harapan et al., 2017), and Saudi Arabia (Almansour et al., 2017).

Results obtained were analysed using GraphPad Prism Version 8.00 for Windows, GraphPad Software, La Jolla California USA, www.graphpad.com. Chi-square test for trend was used to see whether there was an association between age and knowledge level. Paired *t*-test was employed to obtain the correlation between ethnicity and knowledge level. Fisher's extract test was carried out for categorical variables (e.g. gender and educational level). Categorical variables were expressed as numbers and percentages, and $p < 0.05$ was considered statistically significant. Descriptive statistics were also used to analyse certain data.

RESULTS

Characteristics of Socio-Demography

A total of 144 copies of questionnaire were distributed, and 140 copies were received, which showed the response rate of 97.2%. These 140 participants included 65.7% females and 34.3% males. Most of the participants were under 40 years old, with a mean age of 34.5 years. In terms of ethnicity, 64.3% of participants were Malay, followed by 17.1% Indian, 8.6% Chinese, and 10.0% others. A total of 85.7% of the participants had at least diploma qualification, with 14.3% of them with undergraduate qualification. A total of 72.9% of them denied a family history of hepatitis B. The details of demographic characteristics were shown in Table 1.

Table 1 Demographic characteristics of respondents (*n* = 140)

Age (years)	Frequency	Percentage (%)
21 – 30	66	47.1
31 – 40	56	40.0
41 – 50	18	12.9
Gender		
Male	48	34.3
Female	98	65.7
Ethnicity		
Malay	90	64.3
Chinese	12	8.6
Indian	24	17.1
Others	14	10.0
Education qualification		
Diploma level	120	85.7
Undergraduate level	20	14.3
Family history of hepatitis B		
Yes	12	8.5
No	102	72.9
Unsure	26	18.6
Total	140	100

Awareness of Respondents towards Hepatitis B

Majority of the participants were aware of hepatitis B, mainly from friends, mass media and education. Most of them had tested with hepatitis B serology blood test before. A total of 84.3% of participants had heard about the hepatitis B vaccine before, and they knew that a complete course of this vaccination was three doses. However, only 78.6% of the participants got vaccinated in the past and 27.1% realised the existing antiviral treatment specifically for hepatitis B. A total of 88.6% of the participants had experienced needle stick injury (NSI) before, and 58.6% admitted that they knew how to protect themselves from hepatitis B infection.

The details of the awareness of participants towards hepatitis B are reported in Table 2.

Table 2 Awareness of respondents about hepatitis B (*n* = 140)

	Questions	Response	Frequency	Percentage (%)
1.	Have you heard of hepatitis B?	Yes	132	94.3
		No	8	5.7
2.	How did you get to know about hepatitis B?	Friends	34	24.3
		Family	14	10.0
		Media	34	24.3
		Education	34	24.3
		Healthcare worker	24	17.1
3.	Have you ever had a blood test for hepatitis B?	Yes	112	80.0
		No	28	20.0
4.	Do you know anyone who has been tested for hepatitis B?	Yes	102	72.9
		No	38	27.1
5.	Do you know how to check for hepatitis B?	Yes	58	41.4
		No	82	58.6
6.	What are the usual symptoms of hepatitis B?	Fever	40	28.6
		Appetite loss	30	21.4
		Tea colour urine	28	20.0
		Nausea	14	10.0
		Yellow skin	28	20.0
7.	Have you heard of the hepatitis B vaccine?	Yes	118	84.3
		No	22	15.7
8.	Have you ever received hepatitis B vaccination?	Yes	110	78.6
		No	30	21.4
9.	Do you know anyone who has been vaccinated for hepatitis B?	Yes	86	61.4
		No	54	38.6
10.	Have you heard of medicine for hepatitis B?	Yes	38	27.1
		No	102	72.9
11.	Have you ever been injected by non-disposable syringe and needle?	Yes	124	88.6
		No	16	11.4
12.	Do you know how to protect yourself from hepatitis B?	Yes	82	58.6
		No	58	41.4

Out of the 140 participants, 100 (71.4%) showed adequate awareness of hepatitis B, whereas 40 (28.6%) were within the poor awareness range (Table 3).

Table 3 Level of awareness of respondents about hepatitis B (n = 140)

Awareness	Frequency	Percentage (%)
Poor awareness (scoring < 7)	40	28.6
Adequate awareness (scoring ≥ 7)	100	71.4

As seen in Table 4, only education qualification determines the awareness of hepatitis B among participants ($p < 0.0001$). The other factors including age group ($p = 0.8474$), gender ($p > 0.9999$), as well as ethnic group ($p = 0.4093$) showed no significant effect on the level of awareness.

Table 4 Demographic characteristics of respondents associated with awareness towards hepatitis B (n = 140)

Variables	Frequency, *n* (Percentage, %)	Adequate knowledge, adequate/poor	*p*-value
Age (years)			
21 – 30	66 (47.1)	50/16	$p = 0.8474$
31 – 40	56 (40.0)	35/21	
41 – 50	18 (12.9)	15/3	
Gender			
Male	48 (34.3)	34/14	$p > 0.9999$
Female	92 (65.7)	66/26	
Ethnicity			
Malay	90 (64.3)	60/30	$p > 0.9999$
Chinese	12 (8.6)	10/2	
Indian	24 (17.1)	19/5	
Others	14 (10.0)	11/3	
Education qualification			
Diploma level	120 (85.7)	81/39	$p < 0.0001$****
Undergraduate level	20 (14.3)	19/1	

****$p < 0.001$

Knowledge of Respondents towards Hepatitis B

Majority of participants understood hepatitis B was caused by a virus infection, and the primary organ affected was liver. A total of 70.0% of the participants agreed that hepatitis B was not recognized by their appearance easily. On the other hand, 77.9% of participants failed to realize that hepatitis B could progress to cancer. About the mode of transmission, most of the participants acknowledged that hepatitis B was able to spread through childbirth from mother to infant, as well as via sexual intercourse. Half of them recognized that hepatitis B could be transmitted through other routes including tattoos, body piercing, and sharing of toothbrush or razor with an infected patient. Surprisingly, 14.3% of participants claimed hepatitis B could be spread through common cold symptoms such as cough or sneeze. The summary of knowledge of participants towards hepatitis B was shown in Table 5.

Table 5 Knowledge of respondents about hepatitis B (*n* = 140)

	Questions	Response	Frequency	Percentage (%)
1.	Hepatitis B is a virus	Yes	110	78.6
		No	30	21.4
2.	What is the major organ affected due to hepatitis B?	Heart	10	7.1
		Brain	6	4.3
		Liver	114	81.4
		Kidney	6	4.3
		Lungs	4	2.9
3.	Can hepatitis B carriers be easily recognized by their appearance?	Yes	42	30.0
		No	98	70.0
4.	Can hepatitis B cause cancer?	Yes	31	22.1
		No	109	77.9
5.	Can hepatitis B spread through cough or sneeze?	Yes	20	14.3
		No	120	85.7
6.	Can hepatitis B be transmitted through childbirth?	Yes	98	70.0
		No	42	30.0
7.	Can hepatitis B be transmitted during sexual intercourse?	Yes	112	80.0
		No	28	20.0
8.	Can hepatitis B be transmitted through sharing toothbrush and razor with others?	Yes	74	52.9
		No	66	47.1
9.	Can hepatitis B be transmitted through tattoos and body piercing?	Yes	68	48.6
		No	72	51.4
10.	Can hepatitis B be transmitted through hugs, kisses, and handshakes?	Yes	38	27.1
		No	102	72.9
11.	Can hepatitis B be prevented by good hygiene?	Yes	38	27.1
		No	102	72.9
12.	Do you know the number of shots in hepatitis B vaccination?	1×	6	4.3
		2×	22	15.7
		3×	100	71.4
		4×	12	8.6

Out of the 140 respondents, 37 (26.4%) showed adequate knowledge of hepatitis B, whereas 103 (73.6%) were within the poor knowledge range (Table 6).

Table 6 Level of knowledge of respondents about hepatitis B (*n* = 140)

Knowledge	Frequency	Percentage (%)
Poor knowledge (scoring < 9)	103	73.6
Adequate knowledge (scoring ≥ 9)	37	26.4

Table 7 summarized the associations between age, ethnicity, and education level with adequate knowledge of hepatitis B. It was observed a trend of increasing knowledge level with the increase of age ($p = 0.0013$). A significant different knowledge level was identified among different ethnicities ($p = 0.0153$). Educational level significantly impacted the adequate knowledge of hepatitis B ($p = 0.0001$). On the other hand, gender does not influence the knowledge level ($p > 0.9999$).

Table 7 Demographic characteristics of respondents associated with knowledge towards hepatitis B

Variables	Frequency, *n* (Percentage, %)	Adequate knowledge, adequate/poor	*p*-value
Age (years)			
21 – 30	66 (47.1)	9/57	
31 – 40	56 (40.0)	20/36	0.0013***
41 – 50	18 (12.9)	8/10	
Gender			
Male	48 (34.3)	12/36	> 0.9999
Female	92 (65.7)	25/67	
Ethnicity			
Malay	90 (64.3)	20/70	
Chinese	12 (8.6)	8/4	0.0153*
Indian	24 (17.1)	6/18	
Others	14 (10.0)	3/11	
Education qualification			
Diploma level	120 (85.7)	20/100	0.0001****
Undergraduate level	20 (14.3)	17/3	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.005$; ****$p < 0.001$

DISCUSSION

To our best knowledge, this project was the first empirical questionnaire study assessing the A&K of the nursing staff about hepatitis B infection in Malaysia. Our findings demonstrated that the level of knowledge about hepatitis B was generally poor among nurses despite they had been educated about hepatitis B during their nursing school or hospital attachment. Our study had shown that 71.4% of participated nurses had adequate awareness of hepatitis B. However only 26.4% of them showed adequate knowledge of hepatitis B. This finding was in line with the findings from some previous studies. Ali et al. (2017) had reported that the majority of the 381 medical professionals in his study were aware of hepatitis B but lacked knowledge about hepatitis B infection. Besides this, a study conducted in Iran stated that less than half of 1,008 nurses from eight teaching hospitals had satisfactory knowledge about hepatitis B (Joukar et al., 2017).

The national immunization programme had been available in Malaysia since 1989 (Ministry of Health Malaysia, 1994). A total of 78.6% of nurses claimed that they were vaccinated before, however, there was no proper documentation to record whether they had completed the full three doses course of the vaccination. Our study had shown that about half of the nurses know how to protect themselves from hepatitis B.

Most of the respondents in this study did not realise that hepatitis B is closely related to HCC. In fact, chronic hepatitis B is the major aetiology of hepatocellular carcinoma (HCC) in Malaysia (Goh et al., 2015). In patients with chronic hepatitis B, the chance of getting HCC was a hundred times higher than in non-infected person. As well-aware of the risk of hepatitis B to progress to HCC is crucial, allowing people to practise appropriate preventive measures.

Sufficient scientific understanding of HBV transmission is essential for medical staff. In the present study, the knowledge about the transmission of hepatitis B via sexual intercourse (80.0%), through childbirth (70.0%) was high. But transmission through sharing toothbrush and razor (52.9%), and tattoos, body piercing (48.6%) was low among nurses. Surprisingly, 14.3% of respondents claimed hepatitis B was able to spread through cough or sneeze.

Undoubtedly HCW is always at the risk of HBV infection due to the occupational exposure to blood. Some local studies have shown that the incidence of NSIs still happened among HCWs (Lekhraj et al., 2010; Santhna et al., 2007). This was shown in our study as well, that up to 88.6% of the respondents had experienced NSI before. Medical staff for sure have been educated the transmission risk of blood-borne diseases such as hepatitis B, hepatitis C and HIV. Perhaps the reason for the high rate of NSI among HCW was carelessness because of heavy load at hospitals or clinics as mentioned by Shahzad et al. (2013).

Most of the respondents did not realise that hepatitis B could be prevented by keeping good hygiene. Ensuring good hygiene and avoiding contact with contaminated objects or body fluids can protect against infection with hepatitis B.

Older age was a strong indicator of better knowledge towards hepatitis B. The older the nurse was, the longer they had serviced in the hospital, the more chances they had exposed to the educations, and the more likely they had more knowledge about the disease.

The impact of higher education level on better A&K of hepatitis B had been observed in our study. hepatitis B is a complicated disease with variations. As nurses or HCWs, they have more opportunities to expose to different medical resources and to gain more information during facing the patients. However, nurses with undergraduate education level have better A&K if compared with those with diploma level. This is proven that individuals with a higher education level can achieve a better understanding of this disease. Comparatively, the association between high educational level with better HBV knowledge had been reported among residents at Puchong, Malaysia (Pathmanathan & Lakshmanan, 2014), Selangor state, Malaysia (Rajamoorthy et al., 2019), and patients with chronic hepatitis B in Singapore (Wai et al., 2005).

Being Chinese, nurses had better knowledge about hepatitis B. Our finding is coherent with a telephone-interview study involving 1,013 Asian communities in British Columbia (BC), that Chinese ethnicity had been recognized as a positive predictor of having adequate knowledge of hepatitis B (Yau et al., 2016). In Malaysia, hepatitis B was more common among Chinese. Hepatitis B was the predominant aetiology for liver cirrhosis among Chinese (58.8%), however, it was a less dominant aetiology for other ethnicities (Qua & Goh, 2011). The relatively high prevalence of Hepatitis B among Chinese Malaysians may explain their better knowledge of hepatitis B.

This study contributes to the scanty literature on hepatitis B in Malaysia. Few limitations could be identified. The sample size of this study was relatively small, and only one hospital was recruited. Consequently, the findings may not well represent the true A&K situation of all nurses across Malaysia. To improve this, the future study will aim to include a wider range of hospitals to cover a full range of ethnicity, age group, and gender. Furthermore, the nurses' working experience and if any exposure working in the area related to hepatology disciplines/ infection control should be studied as well. Besides, data recording might be inaccurate because some questions in this study were dependent on the respondents' ability to recall.

The results draw attention to the operational issue of clinical care, as well as the ability of professionals dealing with the possible spread of hepatitis B. Although many efforts had been tried in controlling hepatitis B spreading in Malaysia, further improvement can be considered. Prevention of hepatitis B transmission is entirely achievable, and it is treatable with existing medicines.

Various guidelines including Guideline on Blood-borne Viral Infections by Malaysian Medical Council (MMC) in 2011 (Ministry of Health Malaysia, 2011), and the Guidelines

for Oral Healthcare Practitioners Infected with Blood-borne Viruses, by Ministry of Health (MOH), Malaysia, in 2014 (Ministry of Health Malaysia, 2014) were established. HCWs are equipped with personal protective equipment (PPE) that include disposable gloves, surgical masks, and gowns in their clinical setting. The hepatitis B immunization programme was launched in 1989, followed by post-immunization screening which was promoted in 2006. The Sharps Injury Surveillance Programme was initiated for the notification and management of HCWs who suffered NSI at the workplace. If all the HCWs are well-educated about hepatitis B related health issues following the guidelines listed above, the spread of hepatitis B among HCWs could be better controlled. It is advised to launch nationwide awareness programmes, and campaigns among HCWs more frequently to raise their A&K status. Last but not the least, hepatitis B vaccination should be offered to all HCWs to maintain an adequate preventive level of the disease.

CONCLUSION

Overall, the staff nurses had an adequate level of awareness but an insufficient level of knowledge towards hepatitis B infection. HCWs are responsible for providing proper education as well as management of HBV infection. But HCWs are exposed to blood and they are known to have a higher risk of acquiring NSI. The lack of knowledge towards hepatitis B revealed the need for ongoing training of HCWs involved in the diagnosis and management of the disease.

CONFLICT OF INTEREST

The authors declare that they have no conflicting interests in publishing this article and there are no competing financial interests of the institutions or authors.

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ORIGINAL ARTICLE

An Audit of Dysphagia Patients Attending Speech Therapy Clinic at a Tertiary Hospital in Malaysia

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ABSTRACT

Swallowing involves 55 muscles, five cranial nerves and two cervical nerve roots. When the coordination of this reflex is disturbed, dysphagia occurs. Dysphagia refers either to the difficulty someone may have with the initial phases of a swallow or to the sensation that the foods or the liquids are being obstructed in their passage from the mouth to the stomach. The objective of the study was to identify the diagnosis of patients attending Speech Therapy clinic, in Queen Elizabeth Hospital, Kota Kinabalu, Sabah, and to identify the demography of dysphagic patients. From the 406 patients that came during the study period, 139 patients (34.2%) were diagnosed with dysphagia, followed by developmental language disorders (33.3%). Of the 139 patients diagnosed with dysphagia, most of them are within the 41 to 60 (43.2%) and above 60 (42.2%) age groups. The majority were males (66.2%). A total of 81 (58.3%) patients with dysphagia had a history of cerebrovascular accident. Dysphagia is a common disorder among patients attending Speech Therapy Clinics at Queen Elizabeth Hospital, Kota Kinabalu. Training of Speech Therapists and early dysphagia intervention leads to a better outcome.

INTRODUCTION

The swallowing process is a complex series of events, which is classified into oral, pharyngeal, and oesophageal stages (Dodds, 1989) The whole process involves 55 muscles, five cranial nerves and two cervical nerve roots. The swallowing control centre is in the medullary

area of the brain stem. It receives input from the mouth and pharynx regarding the bolus size and consistency, the respiratory centre to coordinate swallowing and breathing, and from cortical and subcortical areas of the brain; all of which results in the modulation of and duration of different phases of the pharyngeal swallow, but the sequence of events remains consistent (Kendall et al., 2000; Molfenter & Steele, 2014). The pharynx is a common pathway for ingested food or liquid and inspired air. As food and liquid pass through the pharynx, air will enter the larynx and food or liquid pass over and around the larynx and continues to the oesophagus. A series of well-timed and sequential movements involving the cricopharyngeus and thyropharyngeus muscles form part of the airway protective mechanisms during a swallow. If an individual suffers from any cerebrovascular insults which hinder the process of any of these sequenced movements, dysphagia occurs (Matsuo & Palmer, 2008).

Dysphagia is defined as someone who has difficulty either with the initial phases of a swallow (oropharyngeal dysphagia) or to the sensation that the food or the liquid are somehow being obstructed in their passage from the mouth to the stomach (oesophageal dysphagia) (Malagelada et al., 2014). Dysphagia is also defined as an abnormal delay in transit of liquid and food, which may cause pain or discomfort during the passage of liquid or food while entering the stomach (Jalil et al., 2015).

There are numerous etiologies for dysphagia. For oropharyngeal dysphagia, in younger patients, it is mostly caused by muscle diseases, laryngeal webs or rings. For older patients, it is usually caused by stroke, Parkinson disease and dementia (Malagelada et al., 2014). In oesophageal dysphagia, common causes are intrinsic encroachment (e.g. rings, webs, tumours, infection, foreign bodies), Extrinsic compression (e.g. mediastinal masses, vascular compression), and motor disorders (Aslam & Vaezi, 2013).

The incidence of dysphagia is high (The Ontario Association of Speech-Language Pathologists and Audiologists [OSLA], 2016). The prevalence of dysphagia is generally reported to be more common among older patients compared to the general population (Bhattacharyya, 2014; Cabré et al., 2014; Roden & Altman, 2013) A few studies (Lindgren & Janzon, 1991; Tibbling & Gustafsson, 1991) have estimated that dysphagia may be as high as 22% in adults over 50 years of age and higher in elderly populations receiving inpatient medical treatment, where up to 30% of the patients may have symptoms of dysphagia (Layne et al., 1989). The numbers increase for residents in long-term care settings, where more than half of the residents there (68%) have dysphagia (Steele et al., 1997). There is a wide range of 13% – 38% prevalence among elderly individuals who are living independently (Kawashima et al., 2004; Serra-Prat et al., 2011)

There are no documented dysphagia prevalence data in the general population from neighbouring countries, but several studies reported condition-specific dysphagia prevalence data. Linn et al. (2015) conducted their study at Universiti Sains Malaysia's Hospital (HUSM) in Kelantan and reported a staggering 59.1% of patients with head and neck cancer also experiencing dysphagia either before, during, or after their planned oncology treatment. Similarly, Ho et al. (1999) in Singapore estimated the incidence of achalasia, a type of oesophageal dysphagia, to be at 1.8 per 100,000 in Singapore. Meanwhile, using a combination of screening tools of the repetitive saliva swallowing test (RSST), the water swallowing test (WST) and the eating assessment tool-10 (EAT-10), Tran et al. (2019) revealed that the rate of dysphagia was recorded at 16.5% among elderly patients when they were screened by RSST and WST, whilst EAT-10 reported a 24.6% of dysphagia among the similar population. The literature concludes how dysphagia is experienced across the medical diagnosis and could be a symptom towards more complicated medical conditions.

Speech and language therapist (SLTs) are professionals trained in the assessment, interventions and management of communications and swallowing disorders (Pettigrew & O'Toole. 2007). Patients can range from toddlers to the geriatric population. The SLTs will assess, diagnose and plan intervention, to help the patient.

The SLTs of Queen Elizabeth Hospital (QEH), Kota Kinabalu, Sabah generally reviews two groups of patients, adult and paediatric patients. Adult patients include patients with a history of stroke, degenerative diseases and carcinoma of the larynx. Paediatric patients on the other hand include patients with Attention Deficit Hyperactivity Disorder (ADHD), autism, Down Syndrome and cerebral palsy.

In recent years, there has been an increasing trend of referrals for patients with swallowing disorders to the Speech Therapy (ST) Clinic of Queen Elizabeth Hospital (QEH), Kota Kinabalu, Sabah. Currently, no data assess the demography of dysphagia patients in Malaysia. The only data that we have is the prevalence of dysphagia in Malaysia, which was 65.9% in patients with ischaemic stroke by Hamidon et al. (2006). This randomized prospective clinical trial study by Hamidon et al. (2006) revealed 29 of the 44 patients with acute ischaemic stroke had dysphagia after a week of stroke. There is no other known published data on the common causes of dysphagia in Malaysia.

The objectives of the study were to identify the diagnosis and demography of patients attending Speech Therapy clinic, in Queen Elizabeth Hospital, Kota Kinabalu, Sabah, and to identify the causes of dysphagia in dysphagic patients.

MATERIALS AND METHODS

Institutional Review Board (IRB)/ Ethics Committee approval was obtained from the Malaysia Research and Ethics Committee (MREC), Ministry of Health (NMRR ID NMRR-18-2954-43920). The study and data collection were conducted in accordance with the Declaration of Helsinki for human research (World Medical Association, 2018).

This was a cross-sectional study. Medical records of these patients were used for data collection. Eligibility of patients was determined by the investigators, based on the inclusion and exclusion criteria. Data collected includes age, sex, referral sources, patient's residence location, ethnicity, referral diagnosis and aetiology of dysphagia. Subject's names were kept on a password-protected database. It was linked only with a study identification number for this research. The identification number instead of patient identifiers were used on subject datasheets. All data were entered into a computer that is password protected.

The study period was between January and July 2019 at QEH, Kota Kinabalu, Sabah. Inclusion criteria were all patients referred to the SLT clinic during the study period, regardless of age and pregnancy status. Exclusion criteria were incomplete data from the medical records and patients who did not fulfil the criteria for the diagnosis of dysphagia, which means patients who are tolerating orally without complications. A sample size calculation using a level of confidence of 95% and a precision of 5% concluded a minimum sample size of 345 (Daniel, 1999). Data were analysed using SPSS version 24.0. Frequencies and percentages were used for descriptive analysis.

RESULTS

A total of 406 patients met the inclusion criteria of this study. The demographic data showed that majority of patients attending the SLT clinic at QEH were aged below 12 years old (41.2%), followed by patients above 60 (25.4%), patients aged 41 to 60 (22.9%) and patients aged 19 to 40 (8.6%). The least number of patients were from the age group of 12 to

18 years old (1.7%). Among the subjects, 269 were males (66.3%), and 137 were females (33.7 %). Most patients were from government hospitals (94.8%).

Patients that attended the clinic were mostly from Kota Kinabalu (24.1%), followed by from Penampang (7.6%) and Kota Marudu (6.4%). Most of the patients were of Dusun ethnicity (24.4%). The demographic data attending the SLT clinic of QEH is in Table 1.

Table 1 Distribution of patients attending the SLT clinic at QEH (*n* = 406)

		Frequency	Percentage (%)
Age (years)	Below 12	168	41.2
	12 – 18	7	1.7
	19 – 40	35	8.6
	41 – 60	93	22.9
	Above 60	103	25.4
Sex	Male	269	66.3
	Female	137	33.7
Referral source	Government hospitals	385	94.8
	Government clinics	14	4.2
	Private clinics	4	1.0
Patient's residence	Kota Kinabalu	98	24.1
	Kudat	24	5.9
	Keningau	21	5.2
	Tambunan	8	2.0
	Tenom	7	1.7
	Beaufort	21	5.2
	Labuan	11	2.7
	Pitas	7	1.7
	Kota Marudu	26	6.4
	Kota Belud	16	3.9
	Penampang	31	7.6
	Ranau	17	4.2
	Tuaran	23	5.7
	Putatan	23	5.7
	Tamparuli	17	4.2
	Sepanggar	8	2.0
	Lawas	1	0.2
	Papar	24	5.9
	Others	5	1.2
	Sipitang	13	3.2
	Nabawan	5	1.2
Ethnicity	Kadazan	56	13.8
	Chinese	77	19.0
	Dusun	99	24.4
	Bajau	59	14.5
	Bisaya	4	1.0
	Malay	19	4.7
	Brunei	24	5.9
	Murut	17	4.2
	Rungus	18	4.4
	Others	33	8.1
Total		406	100

n = Number of patients

From the 406 patients who attended the speech therapy clinic during the study period, the majority of them were diagnosed with dysphagia (34.2%), followed by Developmental Language Disorders (33.3%). The other diagnosis is mentioned in Table 2.

Table 2 Diagnosis of patients attending the clinic (n = 406)

Diagnosis	Frequency	Percentage (%)
Developmental Language Disorder	135	33.3
Hearing Impairment	16	3.9
Speech Sound Disorder	17	4.2
Voice Disorder	27	6.7
Dysphagia	139	34.2
Aphasia	43	10.6
Motor Speech Disorder	29	7.1
Total	406	100

n = number of patients

Of the 139 patients diagnosed with dysphagia, most of them are within the 41 to 60 (43.2%) and above 60 (42.2%) age groups. The majority were males (66.2%). A total of 81(58.3%) dysphagic patients had a history of cerebrovascular accident. The demographic data of patients with dysphagia were presented in Table 3.

Table 3 Demographic data of patients with dysphagia (*n* = 139)

		Frequency	Percentage (%)
Age (years)	Below 12	1	0.7
	12 – 18	4	2.9
	19 – 40	15	10.8
	41 – 60	60	43.2
	Above 60	59	42.4
Sex	Male	92	66.2
	Female	47	33.8
Patient's residence	Kota Kinabalu	61	43.9
	Kota Marudu	18	12.9
	Kudat	16	11.5
	Tuaran	15	10.8
	Penampang	14	10.1
	Papar	12	8.6
	Pitas	3	2.2
Ethnicity	Kadazan	31	22.3
	Chinese	29	20.9
	Dusun	28	20.1
	Bajau	24	17.3
	Brunei	10	7.2
	Rungus	5	3.6
	Others	12	8.6
Aetiology of dysphagia	Cerebrovascular accident	81	58.3
	Neurological disorders	22	15.8
	Cancer	25	18.0
	Unknown	11	7.9

n = Number of patients

DISCUSSION

The incidence of oropharyngeal dysphagia in the general population ranges between 2.3% and 16% (Chiocca et al., 2005; Cho et al., 2015; Eslick & Talley, 2008). Using the Standardised Swallowing Assessment (Perry & Love, 2001; Yang et al., 2013) described in a Korean study, the overall prevalence of dysphagia was 33.7% (95% CI, 29.1 – 38.4%) for people above 65 years of age. Barczi et al. (2000) found prevalence rates of 15% in community-dwelling and more independent individuals, and 40% of people living in institutionalised settings such as assisted living facilities and nursing homes.

Based on the findings of the current study, where dysphagia made up the largest group of new cases in the ST Clinic, several measures are suggested to improve service delivery.

In terms of professional development, SLTs need to constantly update their knowledge and skills with current evidence-based treatment strategies. This can be done by applying approved national or international guidelines, attending workshops and clinical training by experienced speech therapists.

Training should also be conducted by SLTs for members of a multidisciplinary team in basic dysphagia management. This includes doctors, nurses, family members and others who are in regular contact with the dysphagic patient. Studies show that multidisciplinary team care is important for dysphagic patients (Ribeiro et al., 2019).

Assessment and management of patients should be based on the recommended International Classification of Functioning Disability and Health (ICF) Framework by the World Health Organization (WHO), as dysphagia is usually a chronic disability and can potentially result in psychosocial consequences in addition to the obvious physical limitations. This is supported by the American Speech-Language-Hearing Association's (ASHA) Preferred Practice Patterns for the Professional of Speech-language Pathology (ASHA, 1997). ASHA advocates for dysphagia evaluation following the ICF framework, including "normal and abnormal parameters of structures and functions affecting swallowing; effects of swallowing impairments on the individual's activities (capacity and performance in everyday contexts) and participation; and contextual factors that serve as barriers to facilitators".

It is also suggested that the International Dysphagia Diet Standardisation Initiative (IDDSI) framework be implemented. The IDDSI framework (IDDSI, 2019) includes international standardised terminology and definitions for texture modified foods and thickened liquids for persons with dysphagia. This will improve interdisciplinary professional communication and enhance patient safety with standardized terminology and description of modified diet consistencies, which is an important component of dysphagia management.

Since the largest aetiology for dysphagia is stroke, it will be worthwhile to implement dysphagia screening for all acute stroke patients. This protocol has shown to reduce stroke associated pneumonia (Yeh et al., 2011). Training of ward staff in conducting appropriate dysphagia screening is necessary to implement this protocol.

There is a shortage of SLTs in Malaysia now, both in the private and government sectors. The average time for an outpatient review is around 90 days. Now, there are approximately 300 SLTs in Malaysia, with a ratio of SLTs to the population in Malaysia of one SLP to 100,000 people (Chu et al., 2019). This is a far cry from other countries like the United States, where the ratio is 51.5 SLPs to 100,000 population (ASHA, 2020) To improve the services of SLTs, especially to the rural patients of Sabah, more SLPs are needed. While waiting for the numbers to increase, speech therapy can be done via telehealth, with

the use of a computer and internet. Studies have shown that telehealth is feasible and effective (Mashima & Doarn, 2008) Currently, there are 49 hospitals and health clinics in districts, under the Ministry of Health's publicly funded healthcare system which could provide services for patients with dysphagia. Understandably, not every SLP posted at those clinics and hospitals have access to instrumental assessments for dysphagia as per the gold standard, comprising of the modified barium swallow study (MBBS) nor the fiberoptic endoscopic evaluation of swallow (FEES). They may be equipped with basic dysphagia screening expertise such as the WST or quality of life-related assessment tools like the EAT-10.

Dysphagia patients also report lower quality of life compared to the general population and also among patients without a terminal illness (Turley & Cohen S, 2009). A recent systemic review by Jones et al. (2017) also found that not only did dysphagia negatively impact the quality of life, but intervention and improvement in swallowing function resulted in improvement in the quality of life as well. It is suggested that a quality of life measure be included as part of the dysphagia assessment protocol, and these areas are looked into as part of management, to improve the quality of life of patients.

One of the limitations of this study was the study timeframe. After the understanding the importance of identifying the commonest problem seen in the ST clinic of QEH, a longer period of study is needed, preferably a full calendar year would help in illustrating the overwhelming caseload faced by the SLTs in public healthcare. This will translate into better intervention programmes with specific aims of targeting the common diagnosis faced by the health care providers. Another limitation is that all these patients are referred patients only, and therefore does not represent the percentage of patients with dysphagia in Kota Kinabalu. More training programmes need to be organized among government and private doctors, to raise the awareness of dysphagia, and the need to refer them to ST clinics for better management.

CONCLUSION

Dysphagia is a common diagnosis among patients attending ST Clinics at Queen Elizabeth Hospital, Kota Kinabalu. The majority were males in the 41 to 60 age group. The focus on services in terms of training of SLTs and other health care providers need to be addressed. Early intervention by a multi-disciplinary team is also vital to ensure optimum patient care. Early and focused intervention can produce a better treatment outcome.

CONFLICT OF INTEREST

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CASE REPORT

Kashima Operation: An Endoscopic Phonosurgery by LASER for Bilateral Vocal Cord Palsy

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Keywords: *bilateral vocal cord palsy (BVCP), bilateral abductor vocal cord palsy, posterior cordectomy, laser cordectomy, Kashima operation*

ABSTRACT

Complete or partial restriction of the vocal cords usually occurs due to cancer, neurologic causes or mechanical causes like huge neck mass, trauma to the neck, viral infection, and sometimes iatrogenic during surgery. Bilateral vocal cord palsy is a severe condition that can lead to significant problems in breathing, speaking, and swallowing. If any patient presents with stridor, it requires urgent surgical airway management followed by specific treatment. A case of viral bilateral abductor vocal cord palsy in a 41-year-old female is reported here. The patient presented with stridor, and immediate tracheostomy was done. The stridor developed first 3 months earlier followed by cold and fever for a week. The stridor worsened gradually and leads to a state of commencing immediate tracheostomy. There was no history of trauma to the neck or any neck surgery. All basic laboratory blood test was within the normal limit. The laryngoscopic examination showed both vocal cords were immobile and almost median position with a small gap at the posterior commissure. Chest and neck plain X-ray along with computed tomography scan of neck was normal which ruled out the other causes of bilateral vocal cord palsy. The patient subsequently underwent successful left posterior cordectomy by laser, and decannulation of tracheostomy was done, known as Kashima operation.

INTRODUCTION

Numerous surgical approaches are described in different works of literature to treat the patient with bilateral vocal cord palsy (BVCP).

All methods were intended to enlarge the glottic gap to facilitate normal breathing. Dennis and Kashima described a novel approach in 1989, of posterior cordectomy using laser which is popularly known as Kashima operation. By using carbon dioxide (CO_2) laser a partial posterior cordectomy is done in this procedure. Aim of the surgery is to re-establish the compromised airway due to bilateral VC palsy with minimum loss of normal vocal cord structures and preservation of quality of the voice. Kashima operation is an endoscopic technique using laser to do posterior cordectomy to re-establish breathing through paralyzed vocal cords. This surgical procedure is executed in patients with respiratory difficulty due to bilateral abductor vocal cord palsy (Brigger & Hartnick, 2002). If the nerves supplying the laryngeal muscles are affected on both sides, it may result in BVPC, causing weakness or total loss of movement of the laryngeal muscles (Hazarika et al., 2002). It usually occurs due to laryngeal and other head-neck cancer, viral infection, trauma, thyroid, other head-neck surgery, etc.

CASE PRESENTATION

A 41-year-old female presented with gradually worsening stridor for the last three months. She had a history of a common cold with fever for one week before this problem. Initially, she suffered from uncomfortable breathing with dysphonia, followed by recurrent attacks of strained or strangled breath during sleep for one month. She also complained of fatigue and lethargy but no history of weight loss or dysphagia. The patient did not have any previous history of surgery or trauma or mass in the neck. During the initial presentation in the hospital, the patient had stridor with tachypnoea but no cyanosis.

Fibre optic laryngoscopy revealed immobile and almost median positioned vocal cords with a small gap at the posterior commissure (Figure 1). There were no polyps, nodules, or any other mass seen. A computed tomography (CT) scan of the head and neck region, including thorax, was advised to exclude other causes of bilateral vocal cord palsy but declined by the patient as it was not affordable for them in a private set up. However, X-ray chest and X-ray neck AP and the lateral view was done in which no abnormality was seen.

Urgent tracheostomy was done to relieve her breathing difficulties. A diode laser-assisted Kashima operation on the left vocal cord was performed in this case two weeks later (Figure 2). Universal precaution for laser surgery was taken using a laser-compatible endotracheal tube, wearing laser-compatible goggles by surgeons and others inside the room, putting "Laser on" signage outside the operation theatre, etc. The surgery was uneventful, and the patient recovered from her breathing difficulties. The patient was prescribed a short course of oral steroid postoperatively and managed well in the otolaryngology department's general ward. Six weeks after the Kashima operation, the tracheostomy was weaned off, and the wound was closed when the epithelialization was completed. She was able to speak with mild hoarseness, and there were no episodes of aspiration.

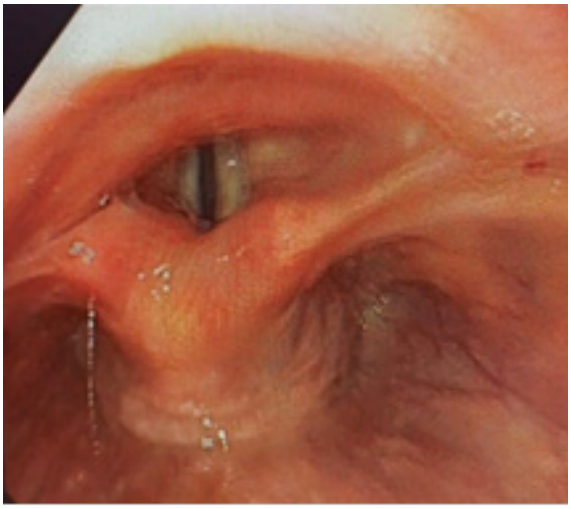

Figure 1 Pre-operative view showed bilateral vocal cords in almost median position with little phonatory gap

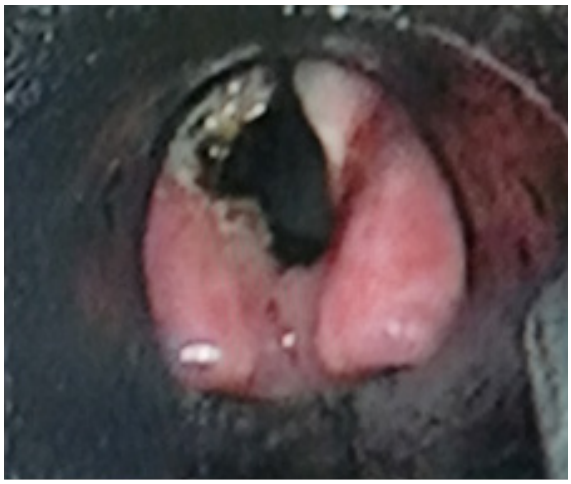

Figure 2 Postoperative view of left posterior cordectomy/ Kashima operation

DISCUSSION

The vocal cords or folds are "V" shaped bands of smooth muscle in the larynx, which abduct to open during respiration, adducts to close while swallowing and vibrate to produce the sounds while talking. Multiple intrinsic muscles control the movement of the vocal folds, innervated by recurrent laryngeal nerve and superior laryngeal nerve branch of the vagus nerve. Any lesion or injury in the vocal cords or their nerve supply may compromise breathing and speech. Paralysis of the vocal cords may lead to aspiration, which may end up developing pneumonia. If one side of the vocal cord is affected, the other side may compensate. Bilateral vocal cord palsy can be incomplete and complete. Incomplete bilateral vocal cord palsy means damage to abductor fibres bilaterally. Here the natural adductor fibres draw the cords in the midline. During inspiration, the abduction does not occur, and vocal cords cannot open, which results in severe respiratory distress. Hence it is dangerous than complete BVCP. Again, during phonation, the vocal cords remain closed. So, the patient still manages to talk (Brigger & Hartnick, 2002).

On the other hand, complete BVCP, both the abductor and adductor fibres, are affected. So, the adductor fibres cannot close the vocal cords fully. There will always be a small phonatory gap, which, during inspiration, increases little more (Hazarika et al., 2002). Thus, it does affect the voice more than respiration. In this case, there was gradually worsening towards incomplete BVCP based on the history given by the patient and clinical findings.

Acute BLVC palsy may lead to stridor, which may be life-threatening, requiring emergency intervention by the otolaryngologist. In severe bacterial infection of the upper respiratory tract, oedematous swollen vocal folds may develop, which may create airway obstruction (Lisowska et al., 2015). This patient developed recurrent stridor while sleeping due to abductor palsy bilaterally for three months but could tolerate the condition except for few constitutional symptoms. Her condition worsened three days before admission. Endotracheal intubation failed due to a lack of enough intralaryngeal space, so tracheostomy was performed as a life-saving measure. This case is unique because the infective cause of BVCP is rare, and facilities of Kashima operation in the developing countries are not common.

In the place where endoscopic procedure with laser is not available, lateralization of vocal cord with different suturing techniques, arytenoidopexy and/ or permanent tracheostomy are the treatment options. Managing a permanent tracheostomy at home is tedious, requires proper training for regular suction, cleaning, humidification and changing the tube. With tracheostomy, the patient will have difficulties while speaking. They need to occlude the tube externally while speaking or may use expensive speaking valves. With advanced technological support and well-trained personal, an endoscopic laser-assisted posterior cordectomy is a better option in this condition (Oswal & Gandhi, 2009).

In 1989, the posterior cordectomy was first proposed by Kashima and Dennis (Brigger & Hartnick, 2002). This procedure is done to

reestablish adequate airway for breathing through the natural way while reimbursing proper phonation. Currently, this technique became the treatment of choice, as it is valid and gives better salvage of the patient's symptoms and fewer complications. The repeatable procedure also can be performed if needed for recurrence. In this patient, the posterior third of the left vocal cord was ablated with diode laser until a desired 'C' shape of the airway was created. Approximately 4 mm ablation was done laterally to ensure the airway for breathing. The basic idea of classic Kashima operation is based on soft tissue resection and transection of conus elasticus to release the tension of the glottic sphincter, followed in this case. Skilled techniques are required to avoid over ablation, which will create unwanted wide spacing predispose to aspiration. To prevent this complication, some surgeons advocated unilateral cordectomy, on the other hand, few centres provide safe bilateral procedure simultaneously. A success rate of 92% with good airway and voice quality with bilateral posterior cordectomy in 22 patients with bilateral vocal cord paralysis in Egypt was reported (Hazarika et al., 2002). The common complications of aspiration, deglutition, or granuloma formation were not reported.

Unnecessary or over ablation or burn of undesired parts can be avoided with well-trained personal. One of the advantages of laser surgery is less chance of bleeding, which reduces the risk of aspiration of blood during and postoperatively as laser ablates the tissue, not cut with a cold instrument. But so far, not many similar procedures were reported. Oswal and Gandhi (2009) reported a retrospective study in India of subtotal arytenoidectomy with endoscopic laser surgery in 48 patients with bilateral abductor palsy. Saetti et al. (2003) reported a case of 34 patients with bilateral vocal cord palsy in Italy who underwent a modified Dennis-Kashima posterior cordectomy. A retrospective study between 1998 and 2014 in Poland reported about 270 patients with bilateral vocal cord palsy, who undergone laser arytenoidectomy with posterior partial cordectomy (Lisowska et al., 2015). All the studies concluded that this rapid and straightforward technique was effective, reliable for reestablishing enough glottic space for respiration, preserving good phonation quality without hampering swallowing, and low-risk complications and permits revision surgery if needed (Lisowska et al., 2015; Oswal & Gandhi, 2009; Saetti et al., 2003). If the airway space is not adequate, a repeat procedure can be done on the opposite vocal cord (Khlifa, 2005; Segas et al., 2001). Few other studies also reported satisfied postoperative outcomes with bilateral vocal fold paralysis that underwent laser posterior cordectomy (Céspedes et al., 20016; Ferri & García Purriños, 2006; Luczaj et al., 2008).

CONCLUSION

Bilateral vocal cord palsy is a rare but life-threatening condition. A well-equipped otolaryngology centre with laser facilities would be able to offer the best treatment and an excellent postoperative outcome. Laser-assisted posterior cordectomy has been widely performed in developed centres and developed countries with the advancement of facilities currently, which can be done in developing countries in a few centres.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written consent was obtained from the patient to publish the case with some related pictures. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

Knee Tuberculosis: A Challenge in Diagnosis and Treatment

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Keywords: *knee tuberculosis, tuberculosis (TB), fixed flexion deformity, total knee replacement*

ABSTRACT

Tuberculosis (TB) is an ancient disease dated back from ancient Greece time. Once rare in developed countries, now it has re-emerged due to immigration and secondary immunodeficiency. A 27-year-old lady had left knee pain for the past 4 years, went for knee diagnostic arthroscopy procedure, and diagnosed as pigmented villonodular synovitis (PVNS) of the left knee. Despite regular analgesics and physiotherapy, patient symptoms worsen. Two years after the initial treatment, the patient went for a further workout and diagnosed as knee tuberculosis, commenced on anti-TB treatment, the patient still left complicated with a stiff knee and fixed flexion deformity. Identification of knee tuberculosis during the initial phase is crucial as late diagnosis and treatment will leave the patient with debilitating complications.

INTRODUCTION

Tuberculosis (TB) forms tissue-damaging immune responses by infecting a person. The infection can disseminate via lymphatic or blood system to lymph nodes and other organs (Hunter, 2018). Bone and joint TB often showed more severe osteolytic lesions and a higher recurrent rate.

TB has a bimodal age distribution, where usually it affects the young (25 to 34 years) and elderly (36 to 60 years) (Al-Ghafli et al., 2019; Procopie et al., 2017). Male is affected more than female by gender and might be

influenced by the deterioration of immune status, due to environmental, social as well as genetic factors (Al-Ghafli et al., 2019).

The suggestive laboratory tests involve full blood count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), haemoglobin, and synovial fluid culture. The relevant radiological examination includes chest radiograph, diseased bone or joint radiograph, computed tomography (CT) scan, or magnetic resonance imaging (MRI). Surgical treatment and anti-tuberculosis drug therapy appear beneficial in treating these diseases (Qian et al., 2018). TB of the joint is a rare condition accounting for 1 – 3% of all TB cases, with hip as the most common followed by knee TB (Nguyen et al., 2020).

The patient might develop symptoms such as local pain, tenderness and limited range of motion. Systemic TB symptoms may be present in an osteoarticular TB patient. Sinus and discharge might appear in late-stage disease (Procopie et al., 2017). The mainstay therapy for osteoarticular TB is multidrug therapy (MDT) that includes ethambutol, isoniazid, rifampicin and pyrazinamide for 6 to 9 months (Pandita et al., 2020). Debridement, biopsy, synovectomy or arthrodesis are common surgical adjuncts along with chemotherapy and have specific indications tailored to the specific need of the patient (Dhillon et al., 2017).

CASE PRESENTATION

A 27-year-old Malay student presented with a sudden onset of acute left knee pain and swelling after a massage session. The pain was aching in nature and does not radiate elsewhere. She was still able to ambulate after the incident. She denied a history of trauma, knee overuse, or sport-related injury before. She denies any fever cough or night sweats. She does not have any TB contact but works with foreign workers. She did not seek medical treatment for one year until she became debilitated from the knee pain. Early MRI findings showed the left knee synovium was swollen and gross in appearance. She underwent the first arthroscopic debridement of the left knee and tissue sample was taken and sent for histopathological examination. Results showed non-caseating granulomas. She subsequently did CT thorax and patchy consolidation found at both apical and right anterior segments of the upper lobes with axillary lymph nodes enlargement of 1.5 cm. At the same time, she was investigated for connective tissue disease, but all investigation turned out to be negative. Her sputum acid-fast bacilli (AFB) and Mantoux test were negative. She was treated for pigmented villonodular synovitis. Despite multiple arthroscopic debridements, the patient still experienced pain and need to walk with walking aid. MRI of the left knee was done again after a year and the features were suggestive of synovitis. She went for physiotherapy and took regular analgesics, but symptoms did not get well.

Two years after the initial treatment, she came to our clinic patient. She complained the pain was on and off, moderate in intensity but did not require analgesia and debilitated to ambulate properly. On examination, she was a moderate build woman, not septic looking, and walked using crutches. She walked with a short limb gait by tiptoeing on the affected side (Figure 1). On inspection, there was a small punctum with serous discharge over the lateral distal thigh. There is no tenderness on palpation, no swelling and she got a limited extension of the knee by 10 degrees and flexion by 90 degrees.

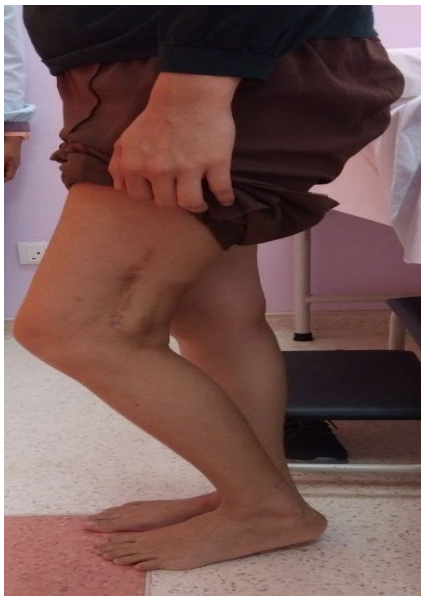

Figure 1 Left limb is shortened with flexion of the knee and equinus of the ankle

She subsequently went for left knee arthrotomy washout, right knee wound debridement and biopsy of bone and tissue. Immediately after the procedure, we started her on anti-TB treatment which comprises of intensive phase (ethambutol, isoniazid, rifampicin and pyrazinamide) for 2 months and maintenance phase (isoniazid and rifampicin) of anti-TB for 8 months. The culture was taken from her bone and thigh tissue; acid-fast stain and culture came back as positive.

After one year of anti-TB treatment, the pain subsided but the knee range of motion keep reducing despite regular physiotherapy session. Examination revealed fixed flexion deformity of 30 degrees with ankylosed knee where now the patella is non-mobile (Figure 2), and the patient had to walk using crutches and short limb gait. The X-ray finding was consistent with an active chronic infection of the knee joint and surrounding bone (Figures 3 and 4).

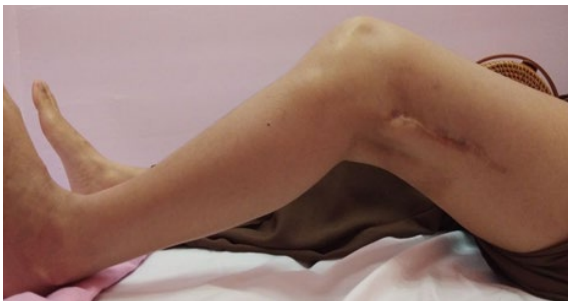

Figure 2 A 30°-fixed-flexion deformity of the left knee, note the extensive scar on the lateral aspect of the thigh from the previous operation

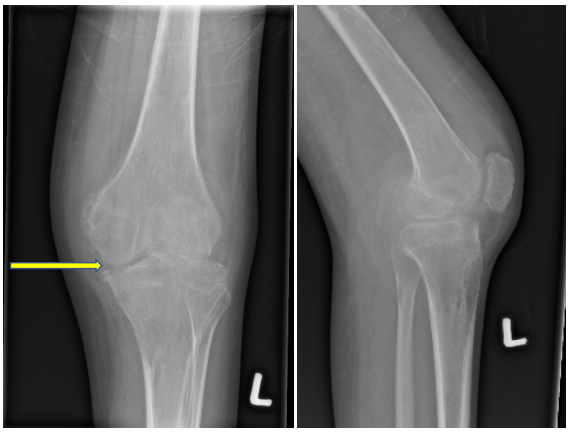

Figure 3 Knee X-ray upon presentation at our centre show joint space loss with the sclerosed distal femur and tibia bone (yellow arrow)

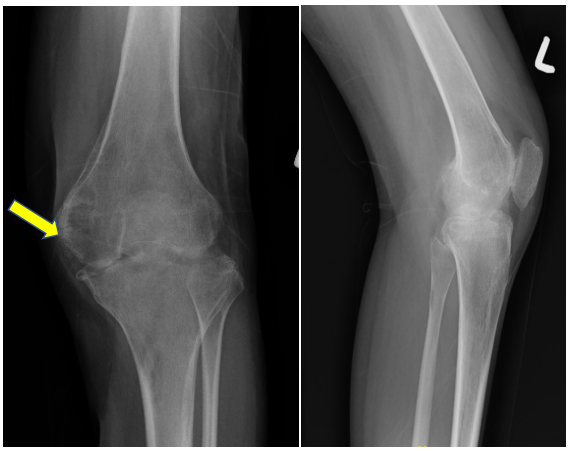

Figure 4 Repeated left knee X-ray after anti-TB treatment showed an ankylosed knee with radiolucency of the distal femoral lateral condyle (yellow arrow)

Since her admission to our centre and subsequent follow-up, her C-reactive protein and erythrocyte sedimentation rate were taken. However, the yielded result was insignificant. Currently, the patient knee is complicated by stiffness and MRI was done for pre-operative evaluation. MRI showed features of TB osteomyelitis and fibrotic tissue surrounding the joint (Figures 5 and 6). Currently, she is planned for total knee replacement once the infection resolved.

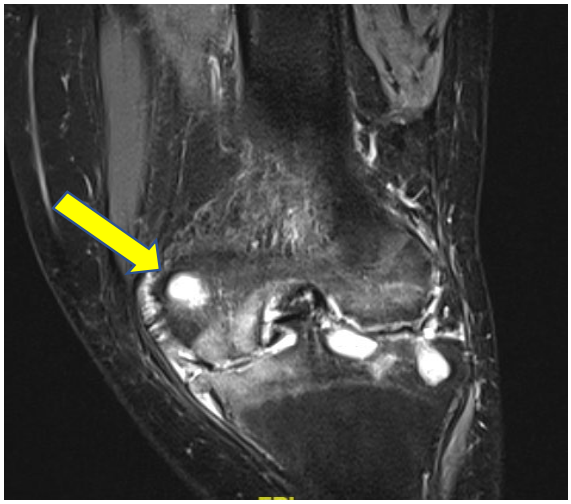

Figure 5 A 1.4 × 1.5 cm well-defined heterogeneous lesion at posterior medial femoral condyles (yellow arrow). Post-contrast study confirms cortical defect at the posteromedial area that communicates with the lesion.

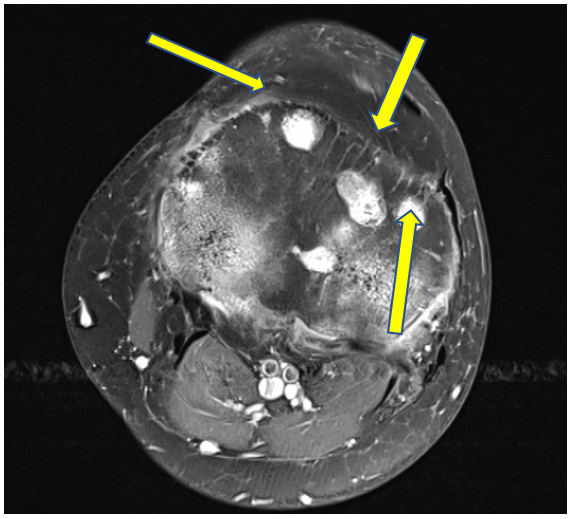

Figure 6 Yellow arrows show multiple large subchondral cysts seen at the left tibial plateau that directly communicates with joint space

DISCUSSION

Tuberculosis always mimics another type of disease and possesses a challenge to diagnose. It is not common in developed countries, once well controlled by vaccination programmes, immigration of foreign workers and low immunodeficiency status contribute to the resurgence of the disease. The incidence of extra-skeletal TB involving the knee is 8% from a total of 15 – 20% of extra-pulmonary tuberculosis cases (Pang et al., 2019).

From primary pulmonary infection, tuberculous bacilli will spread through lymph nodes and then spread via the haematogenous route to the extra-pulmonary organ. In mono-articular tuberculosis the haematogenous spread through synovial blood vessels. Once the bacilli reach the joint there will be persistent congestion and thickening of the synovial membrane and reactive joint effusion and in a later stage, it will cause marginal bone erosion and cartilage destruction (Rodriguez-Takeuchi et al., 2019). A total of 70% of extra-pulmonary TB is not associated with a primary lung infection (Pigrau-serrallach & Rodríguez-Pardo, 2013), as in our patient, she developed a primary lung lesion raising the suspicion of tuberculosis infection.

Our patient did not show any typical clinical manifestation of tuberculosis. During her first visit to our clinic, erythrocyte sedimentation rate and C-reactive protein were not significantly raised. No pulmonary signs and symptoms, no weight loss and she is a normal-built lady. This lack of systemic manifestation possesses a challenge in diagnosing her with tuberculosis. Her laboratory test such as sputum AFB and Mantoux test was negative. Definitive tissue diagnosis, e.g. biopsy with a demonstration of AFB is the gold standard in establishing the diagnosis as systemic and lung evidence involvement might not always present in the case of extra-pulmonary TB (Jetley et al., 2017). As in our patient, we proceeded with tissue

and bone biopsy and the result is positive with tuberculosis infection.

Biopsy for extra-pulmonary TB itself has shown a success rate of 65.2% (Bae et al., 2015). After the sample has been taken a polymerase chain reaction method, it has 80 – 85% sensitivity to confirm the diagnosis (Kivihya-Ndugga et al., 2004).

A plain X-ray would show periarticular osteoporosis, peripherally located osseous erosion and gradual diminution of the joint space or called as a Phemister's triad. Other radiographic features include joint effusion and osteolytic bone destruction. Occasionally, wedge-shaped areas of necrosis may be present on both sides of the affected joint. Bone sclerosis and periostitis occur late in the disease. The end-stage of tuberculous arthritis is characterized by severe joint destruction and, eventually, sclerosis and fibrous ankylosis when the active infectious stage has slowly extinguished. In contrast to pyogenic arthritis, the development of bone ankylosis is uncommon in tuberculous arthritis and when present, is more likely to be secondary to prior surgical intervention. A CT scan is particularly useful for evaluating the degree of bone destruction, sequestrum formation (although rare), and surrounding soft tissue extension (Vanhoenacker et al., 2009).

In MRI, synovial proliferation due to tuberculous arthritis is typically hypointense on T2 images which may be a very helpful sign for differentiating tuberculous arthritis from other proliferative synovial arthropathies. This relatively low signal intensity may be due to the presence of haemorrhage, inflammatory debris, fibrosis, and caseation necrosis (Suh et al., 1996).

Options for treatment once the diagnosis is confirmed must involve anti-TB chemotherapy, but surgery may be indicated to improve symptoms and quality of life in patients affected by joint infection. Treatment for TB in the first instance revolves around four reserved drugs: isoniazid, rifampicin, pyrazinamide and ethambutol. Unlike pulmonary TB, the treatment for bone and joint disease is a lengthier process, often requiring twelve to eighteen months of chemotherapy. Surgical management options include debridement, synovectomy, arthrodesis and amputation, and success has been shown with primary joint arthroplasty (Leclere et al., 2009).

Yadav et al. (2015) reported a successful single-stage total knee arthroplasty (TKA) using posterior stabilizing implant during early stages of infection, where the patient is disease-free after one year of chemotherapy (Yadav et al., 2015). Habaxi et al. (2014) reported 10 successes of TKA inactive tuberculosis of the knee where at 2 years there is no dislocation, aseptic loosening of fracture of a prosthesis with one case having a recurrence of knee TB (Habaxi et al., 2014).

It is possible to do TKA in an active TB infection primarily due to inability of *Mycobacterium* to form a biofilm. *Mycobacterium* aggregates but showed an inability to adhere to a surface (Adetunji et al., 2014). In our patient, she completed anti-TB therapy for one year but her MRI finding still showed evidence of active infection, increasing the suspicion of resistant TB. Latest culture result showed active TB infection and no evidence of resistant TB. In this patient, it is safe to prolong anti-TB treatment until the ESR level is below 40 mm/h before implanting total knee replacement (Habaxi et al., 2014).

CONCLUSION

Knee TB is a rare disease, and a high index of suspicion is needed to diagnose the disease. Its latency and dormant nature render it difficult to diagnose. For now, this patient is planned for TKA to restore her joint mobility and function of life.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written informed consent was obtained from the patient to publish the case with its related pictures. A copy of the written consent is available for review by the Chief Editor.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the patient for her permission to use her clinical history and findings.

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CASE REPORT

Cerebral Venous Thrombosis: An Unusual Cause of Complex Ophthalmoplegia in an Elderly Man

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ABSTRACT

Cerebral venous thrombosis (CVT) is a neurological condition occurring because of thrombosis involving the cerebral venous sinuses. This case report is an unusual clinical manifestation of cerebral venous thrombosis in a 76-year-old Chinese man who presented with restricted eye movement and double vision. Despite extensive investigation, there was no better explanation for his clinical symptom and sign apart from cerebral venous thrombosis which was confirmed by magnetic resonance venography (MRV) of the brain. Once cerebral venous thrombosis was diagnosed, he was initiated on anticoagulation and discharged with oral warfarin. This case emphasizes the need to consider cerebral venous thrombosis as one of the rare causes of complex ophthalmoplegia especially when typical cardiovascular risk factors are lacking in an individual.

INTRODUCTION

Cerebral venous thrombosis is a neurological disorder because of thrombosis involving the venous sinuses of the brain. Its diagnosis remains a challenging one because CVT manifestations are protean and non-specific. Hence, the diagnosis consideration depends on initial clinical suspicion of this entity (Piazza, 2012). The presentation of CVT varies from mild manifestation, for example, non-disabling headache to potential life-threatening manifestation, such as raised intracranial pressure and coma. We wished to present a case of cerebral venous thrombosis

in an elderly man who presented with ocular palsies. The diagnosis of CVT was incidentally discovered following brain vessel imaging as part of the evaluation for his complex ophthalmoplegia presentation (Sakaida et al., 2014). The case illustration is followed by a discussion on cerebral venous thrombosis based on the literature review.

CASE PRESENTATION

A 76-year-old Chinese man was referred to the medical outpatient clinic for restricted eye movement and double vision of two months without eye pain and redness. This symptom had caused him great limitation in term of daily activities and great anxiety as this was the first time he presented to medical attention in his lifetime.

He denied any weakness, abnormal sensation, or abnormal movement of his limbs. There was no headache, vomiting or instability. He had no constitutional symptoms and no preceding head injury or trauma. His social history was remarkable for 40 pack/year smoking since his younger days. Other aspects of history unremarkable.

Ocular examinations revealed asymmetrical bilateral ptosis more prominent over the left eye which did not obstruct his vision axis. There were no scars seen overlying upper lids and the surrounding skin was not erythematous. On gentle retraction of both eyelids, there was an inward deviation of both eyes, more prominent over the left eye. Dysconjugate gaze in all positions with diplopia appreciated.

Visual acuity of right eye 6/24 (pinhole: 6/24); left eye 6/18 (pinhole 6/12). The pupils were equal 3 mm in size with an intact direct and consensual light response without relative afferent pupillary defect. Anterior segment and fundus examination were unremarkable. Thyroid eye signs such as proptosis, lid lag and conjunctiva chemosis particularly over the horizontal rectus muscles insertion not noticeable. Features of myasthenia gravis such as fatigability and Cogan lid twitch were not present. His scalp was not tender, no features of jaw claudication to suggest giant cell arteritis. Otherwise, neurological assessment of other cranial nerves, limbs and coordination was non-contributory.

His blood pressure was 140/74 mmHg, heart rate was 73 beats/min and the temperature was normal. Auscultation of the lung and cardiovascular system revealed clear lung field accompanied by first and second heart sound without an obvious murmur and no carotid bruit. Blood investigations, lumbar puncture, electrocardiogram, transthoracic echocardiography, CT brain with contrast, magnetic resonance imaging/ venography/ arteriography of the brain were done (Table 1).

Table 1 Investigations done for this patient as inpatient and outpatient basis

Full blood count	Hb 12.6 g/dL, Total White $5.7\times10^9/mm^3$, Platelet $225\times10^9/mm^3$ (within normal limits)
Renal profile	Na 140 mmol/L, K 4.89 mmol/L, urea 4.3 mmol/L, creat 90 µmol/L (within normal limits)
Liver function test	Total Bilirubin 7.9 µmol/L, albumin 42.6 g/L, globulin 33.3 g/L, ALT 21.6 U/L; ALP 107 U/L (within normal limits)
Fasting lipid profile	Total Cholesterol 6.44 mmol/L (raised), Triglyceride 2.2 mmol/L (normal limit)
Fasting blood sugar/ HBA_1C	5.49mmol/L; 6.0% (normal limit)
Thyroid function test	TSH 2.51 µIU/mL, free T4 19.22 pmol/L (within normal limits)
Acute inflammatory markers	ESR 15 mm/hr (not raised) CRP 0.56 mg/L (not raised)

Biohazard screening	Hep B/ Hep C/ HIV/ VDRL: nonreactive
Diagnostic lumbar puncture	Appearance clear, total protein 0.56 g/L (raised), cell count = 0 Gram stain negative, direct smear for acid-fast bacilli negative. C&S no growth isolated, cytology: negative for malignancy
Electrocardiogram	Sinus rhythm
Transthoracic echocardiography	Ejection fraction 65%, good left-ventricular function, mild valves regurgitation, normal chambers size, no thrombus
CT brain with contrast	Multifocal cerebral old lacunar infarcts, no evidence of focal enhancing brain parenchymal lesion
Magnetic resonance imaging/ venography/ arteriography of brain (Figure 1)	Dural sinus thrombosis involving the left transverse and sigmoid sinuses extending to the left internal jugular vein. There is underlying cerebral atrophy with both centrum semiovale and left frontal old lacunar infarcts. There is no evidence of focal lesion or abnormal signal within the brain stem. Both intracranial and extracranial arteries were normal.

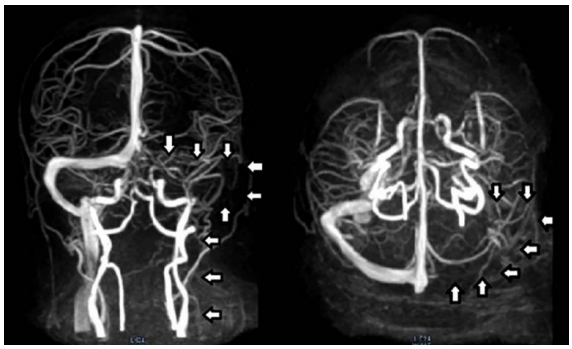

Figure 1 Magnetic resonance venography (MRV) illustrating thrombosis of the left transverse, sigmoid sinus and internal jugular vein (white arrows) in the coronal (left) and axial (right) planes

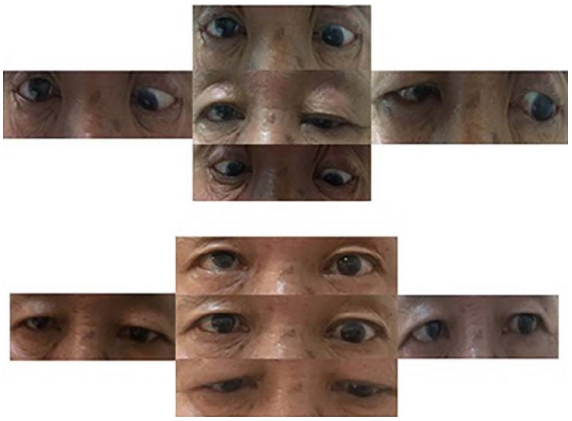

Figure 2 Ophthalmoplegia and bilateral ptosis before (upper panel) and after (lower panel) commencement of anticoagulation (at 1st month of therapy)

Treatment

Once cerebral venous thrombosis was diagnosed, he was initiated on anticoagulation and discharged with oral warfarin once INR target of 2 to 3 achieved.

Outcome and Follow-Up

The ptosis and ophthalmoplegia improved with anticoagulation therapy (Figure 2). He tolerated warfarin without any complication like bleeding. At the fourth month of treatment, his vision improved with best-corrected visual acuity of 6/12 for the right eye and 6/15 for the left eye without diplopia in all directions of gaze. He can achieve independence in activities of daily living.

DISCUSSION

This case of complex ophthalmoplegia posed a diagnostic challenge given that the initial workups were non-contributory toward a diagnosis. In fact, the diagnosis of cerebral venous thrombosis came as an incidental finding when an MRI brain was requested to look for brainstem or base of skull pathology. As the patient is an elderly man, a serious diagnosis such as malignancy with basal of skull metastasis and giant cell arthritis need to be ruled out. The most common malignancy in an elderly Chinese man that might present in this pattern would be nasopharyngeal carcinoma and we have ruled this out by

requesting our colleagues for formal ear, nose and throat assessment (Chang & Adami, 2006). Giant cell arthritis was unlikely given the lack of suggestive symptom and normal inflammatory markers. The same reason applied to other differential diagnoses like thyroid eye disease, myasthenia gravis and Miller Fischer Syndrome. Chronic progressive external ophthalmoplegia or better known as Kearns-Sayre Syndrome occurs in the younger age group with positive family history.

Cerebral venous thrombosis (CVT) is a neurological condition occurring because of thrombosis involving the cerebral venous sinuses. In more than 85% of cases, at least a predisposing risk factors like dehydration, pregnancy, postpartum period and malignancy can be identified (Piazza, 2012). However, in up to 13 per cent, there is no underlying aetiology or risk factor for CVT as exemplified by this case.

The clinical manifestation for cerebral venous thrombosis is heterogeneous with coma and death at one end and mild symptomatology in the other. The most common symptom for cerebral venous thrombosis is a headache which is reported in the range of 84.2 to 90% (Chang & Adami, 2006; Wang et al., 2015; Sakaida et al., 2014). However, in this case, the presenting symptom is double vision. From our knowledge, there is no literature which describes complex ophthalmoplegia as a manifestation of cerebral venous thrombosis apart from cavernous sinus thrombosis (Tanislav et al., 2011). Imaging had ruled out cavernous sinus thrombosis in his case. The closest resemblance to this case is the description of multiple cranial nerve palsies in the lateral sinus, jugular or posterior fossa veins thrombosis (Kuehnen et al., 1998). The ophthalmoplegia may be a false localising sign due to the high intracranial pressure resulting from thrombosis (Larner, 2003). The nerves supplying extraocular muscles may be stretched because of brain stem displacement due to the raised intracranial pressure.

CONCLUSION

This case emphasizes the need to consider cerebral venous thrombosis as one of the rare causes of complex ophthalmoplegia especially when typical cardiovascular risk factors are lacking in an individual.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written informed consent was obtained from the patient to publish the case with its related pictures. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

Reconstruction of Metacarpal Bone with Giant Cell Tumour by Metatarsal Bone: A Rare Case

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Keywords: *giant cell tumour, metacarpal bone, metatarsal bone*

ABSTRACT

Giant cell tumour (GCT) of the metacarpal bone is rare, and it behaves more aggressively with a higher recurrence rate as compared to other long bones. Modalities such as bone curettage with or without bone grafting, ray amputation, or wide resection and reconstruction have been described as surgical management for this condition. Wide resection (en block) is often preferred as it has a lower recurrence rate among the rests. Reconstruction techniques options available include vascularised or non-vascularised fibular graft, iliac crest strut graft with loss of metacarpophalangeal joint function or with metatarsal substitution resulting in a more preserved function of the hand. This case report is about a 15-year-old teenager girl with a giant cell tumor of her left second metacarpal bone, which was confirmed with a plain radiograph and magnetic resonance imaging. This case report focuses the operative technique of the metacarpal reconstruction using the third metatarsal bone. The aim was to preserve hand function and cosmesis while achieving good local control of the disease without compromising the lower limb function. The transfer of osteoarticular ligamentous complex of the third metatarsal bone for the reconstruction of the second metacarpal bone defects is a possible operative procedure that provides good cosmetic and excellent functional outcomes while not compromising the donor's foot function.

INTRODUCTION

Giant cell tumor (GCT), also known as osteoclastoma, is a relatively rare, benign osteolytic and locally aggressive tumor

(Gachhayat et al., 2019). GCT accounts for approximately 5 percent of the primary bone tumors, and the local recurrence rate tendency is considerably high (Tarun et al., 2016). It is common in the metaphyseal and epiphyseal region of the long bones; however, it may happen in the small bones of the feet and hand or the axial skeleton. GCT of the bone in hand provides some degree of possibility of pulmonary metastasis (Gachhayat et al., 2019). Giant cell tumor is commonly seen in young adults at the age of 20 to 40 years old. Giant cell tumor of the metacarpal has some different features from the long bones. It behaves more aggressively, involving the entire metacarpal bone and soft-tissue extension, and the recurrence rate is higher compared to the involvement of the long bones even after an adequate wide surgical resection performed. There is a wide pathology that is similar to the expensile lytic appearance of the bone lesion radiologically. Therefore, aneurysmal bone cyst, multiple myeloma, bone metastasis, chondroblastoma should be included in the differential diagnosis (Saikia et al., 2011).

Varieties of surgical treatment are already described in the literature, including curettage alone, curettage with bone grafting or with bone cementing, ray amputation, and en bloc resection with reconstruction[1]. The aim of the treatment of a giant cell tumor involving the metacarpal bone is to achieve adequate local control while maintaining acceptable gross and fine hand function and cosmesis (Beaton et al., 2001).

In this case, there was successful transplantation of third metatarsal bone along with the osteoarticular ligamentous complex to replace the second metacarpal bone of the left hand, where the tumour was involved. This technique allows us to maintain the functionality of the metatarsophalangeal joint of the hand while providing excellent local control.

CASE PRESENTATION

A 15-year-old girl presented with an 18-month history of pain and diffuse swelling over the left index finger at the metacarpal region (her non-dominant hand). The swelling was painless initially; however, the pain started after she sustained a low impact injury over her left hand. The pain had restricted the movement of the second metacarpophalangeal joint of the left hand. She had no history of any significant loss of appetite and weight loss.

On general physical examination, the swelling measured about 4.5cm x 3cm over the second metacarpal bone of the left hand. It had a well-demarcated margin, and the mass was not attached to the overlying skin structure, firm, and tender on palpation (Figure 1). The restriction in the movement of the second metacarpophalangeal joint due to pain led to disruption in daily activities.

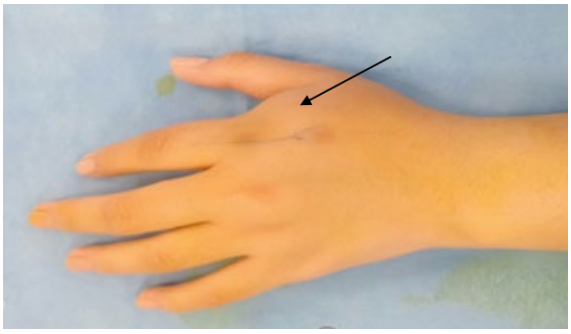

Figure 1 Pre-operative photograph of hand showing swelling in the region of the second metacarpal (arrow)

The plain radiograph showed an expansile lytic lesion, multiple bony septa with soap-bubble appearance involving the entire second metacarpal bone of the left hand. Significant cortical expansion and thinning over the second metacarpal bone was seen (Figure 2). In the non-contrasted magnetic resonance imaging of the left hand revealed a well-defined lobulated lesion in the second metacarpal bone with no evidence of infiltration to surrounding soft tissue or extension beyond the adjacent joints (Figure

3 in T1 imaging, Figure 4 in T2 imaging). The patient's routine laboratory parameters showed no abnormalities.

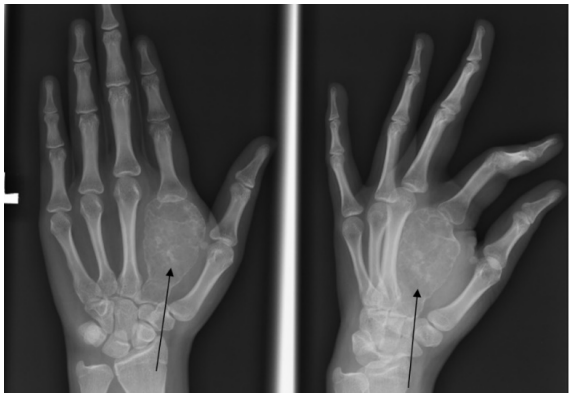

Figure 2 Antero-posterior (right) and oblique (left) view of the left hand revealing an expansile, lytic lesion with soap bubble appearance over the entire second metacarpal bone with thinning of the cortex (Arrow pointed).

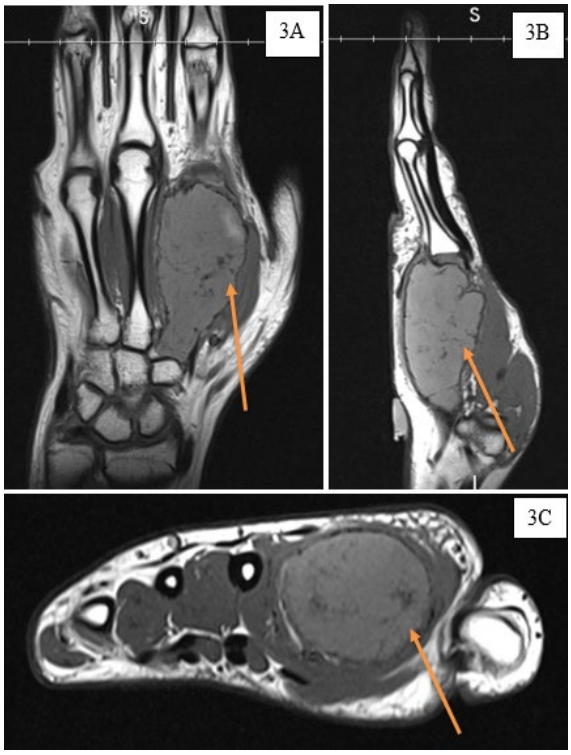

Figure 3 (Right). Pre-operative MRI. T1 coronal view (A), sagittal view (B), and transverse view (C) images were showing an isointense expansile lesion over the entire metacarpal bone of second metacarpal bone.

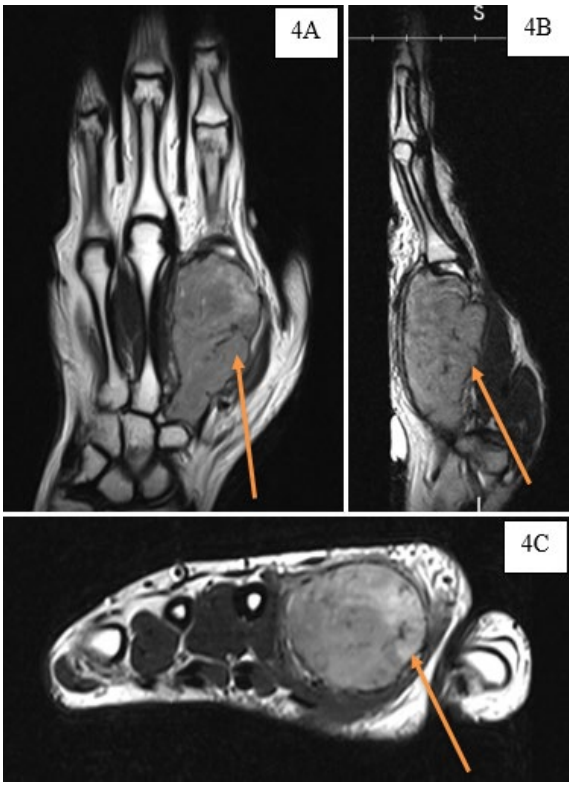

Figure 4 (Left). Pre-operative MRI. T1 coronal view (A), sagittal view (B), and transverse view (C) images were showing an expansile lesion with mixed-signal intensity.

This patient underwent en bloc resection of the tumor of the second metacarpal bone by the dorsal approach. While excising the affected bone, the distal half portion of the metacarpophalangeal joint capsule, collateral ligaments, and the whole volar plate were preserved. Subsequently, disarticulation was done at the carpometacarpal joint level. The third metatarsal bone of the left foot was harvested together with the collateral ligaments and capsule of its metatarsophalangeal joint. The metatarsal bone was osteotomised (Figure 5) according to the planned desired length for the recipient site (Figure 6). The ligaments, together with the capsule of the donor metatarsal, were plicated to their corresponding recipient ligaments and capsule to reconstruct back the metacarpophalangeal joint, providing stability to the reconstructed joint. It was further augmented with 1.3mm anchor suture. A mini

locking plate 2.0mm was used and was cut distally to form into V-shaped end to achieve intermetacarpal fusion between the base of the second and third metacarpal bones of the left hand.

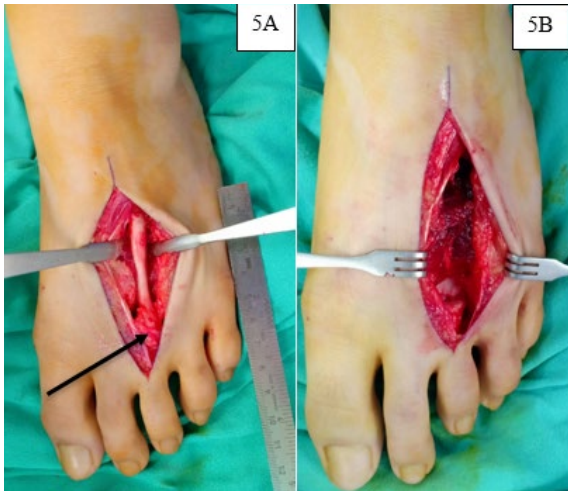

Figure 5 5A showing the left third metatarsal bone is osteotomised at the level of proximal 1/3 at the desired level, and the metatarsal head was harvested along with the capsule and the collateral ligaments (Black arrow). 5B showing the wound of the left foot after the extraction of the third metatarsal bone.

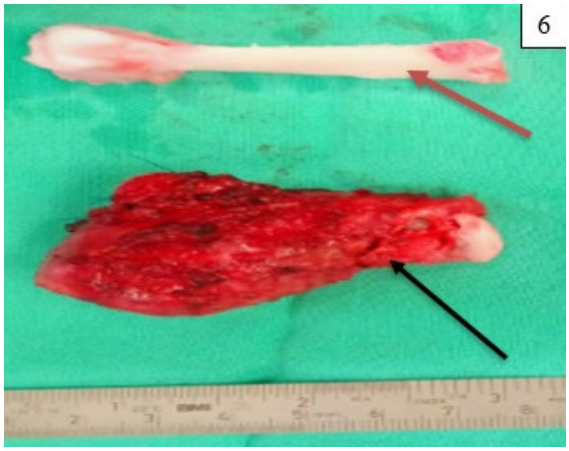

Figure 6 The donor metatarsal bone from the left foot (red arrow) with the preservation of the capsule and collateral ligaments. The proximal metatarsal bone was osteotomised at the level of the desired length. The affected second metacarpal bone (black arrow) resected entirely.

A single Kirschner-wire was inserted at the reconstructed metacarpophalangeal joint as a splint to immobilized the reconstructed joint and to facilitate the healing of the joint (Figure 7). The left foot surgical site hemostasis secured and was able to oppose the surgical wound with a drain which was removed one day postoperatively. A below elbow volar slab was applied after the fixation for two weeks while the Kirshner-wire was removed at four weeks to allow a progressive range of motion exercise.

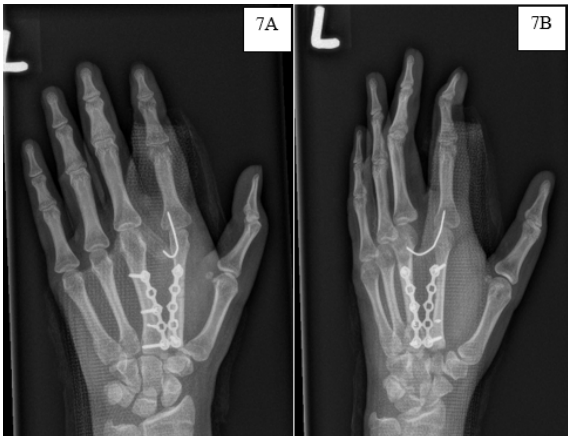

Figure 7 Plain radiograph of left the hand post-operation (7A, anteroposterior view; 7B, oblique view). A modified V-shaped mini-plate was used for fusion between the donor metatarsal and the third metacarpal. A Kirshner wire inserted over the second metacarpal-phalangeal joint.

Histopathological study of the excised second metacarpal bone confirmed the diagnosis. Multinucleated osteoclastic giant cells scattered diffusely and intermingled with fibroblast and small blood vessels; mature bony trabeculae were seen peripherally microscopically (Figure 8).

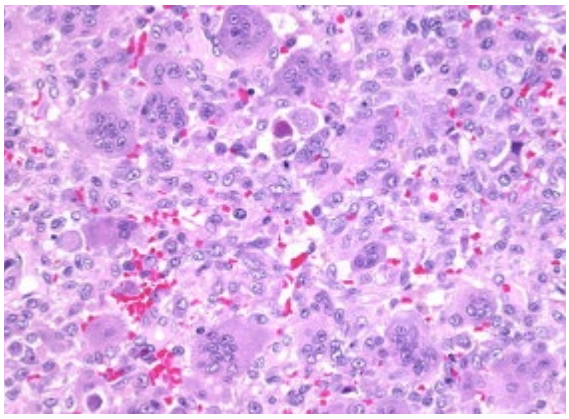

Figure 8 H&E stain microscopic stain showing numerous multinucleated giant cells scattered the entire stroma in the background of mononuclear cells.

At 3 months after surgery, the range of motion was almost full and pain-free. A thorough examination of the hand showed that 20 degrees of flexion deficit with full extension of the metacarpophalangeal joint and the range of motion of metacarpophalangeal joint were 0–70 degrees in active movement and 0 – 80 degrees in passive movement (Figure 9). The patient was assessed using DASH outcome measure[4] and achieved 30 points, which represents mild disability.

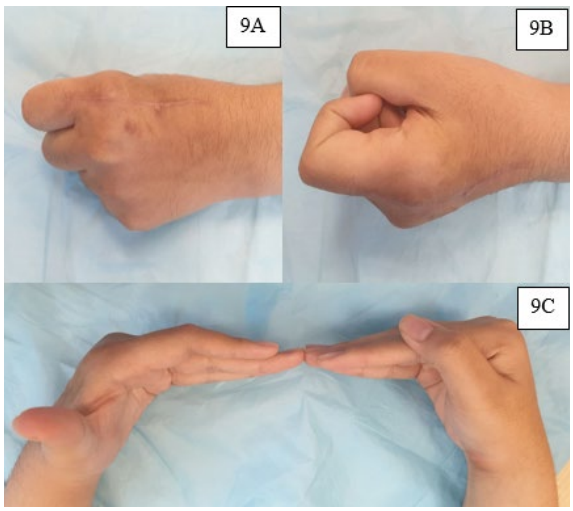

Figure 9 9A, 9B, 9C state the functional status of the left hand at three months follow-up

The patient was able to perform well with ease in spherical, hook, cylindrical, power tool, pinch, and tripod grasping. The patient also was able to ambulate, stand and run well with a well-healed surgical scar of the left foot donor site. No local and metastasis detected during follow-up.

DISCUSSION

GCT of bone comprises 20 percent of benign bone tumours. It is commonly seen in young adults between 20 to 40 years. It occurs more predominantly in females, unlike most of the other bone tumours which show male predominance. GCT of the bone affecting the hand is rare and is usually detected and diagnosed at an advanced stage with extensive bone destruction with the high recurrent rate (Matev et al., 2012). The phalanges and metacarpals are the usual site of the origin in hand. Detailed clinical evaluation, imaging studies, and histopathological investigation are required to obtain an accurate diagnosis.

GCT of bone is a distinctive neoplasm of undifferentiated cells. It is not a tumour comprising of proliferating osteoclasts or precursors of osteoclasts. The cytokine environment coupled with tumourigenic gene expression leading neoplastic GCT stromal cells a failure to differentiate into osteoblasts. The stromal cells induce a chain of osteoclastogenesis by the recruitment of osteoclasts precursors and supplying pro-osteoclastogenic cytokines (Kim et al., 2012). Pain is the chief symptom, which is related to bony destruction leading to mechanical insufficiency. A mass can be seen occasionally when the tumour progresses outside the bone or cortical destruction.

The typical radiological finding of giant cell tumors includes a well-defined lytic lesion. It is usually eccentrically located in the meta-epiphyseal region of the long bone; however, it tends to affect the central portion of the

bone when present in the hand. No periosteal reaction is seen in GCT, and the cortex is thinned (McEnery et al., 1999). Matev et al. (2012) classified it into three grades: Grade 1 shows cortical involvement minimally; Grade 2 has bulged and thinned cortex of the affected bone, whereas Grade 3 presents with the breaching of the involved cortex with soft tissue extension. Computed tomography (CT) and magnetic resonance imaging (MRI) is vital in staging and evaluating of giant cell tumour of bone. MRI proves to be more potent than CT in case of any cortical breach and soft tissue extension and also useful in detecting the fluid level, which is typical for an aneurysmal bone cyst (ABC) as its differential diagnosis (Matev et al., 2012).

Various treatment modalities were discussed and described in the literature, such as bone curettage with or without bone grafting, ray amputation, and en bloc resection with reconstruction of the affected bone. In grade 1 or 2 of GCT of bone, the standard proposed treatment modalities such as intralesional curettage and packing the cavity with bone graft; however, intralesional curettage is no longer recommended as it carries a high recurrent rate up to 90 percent (Williams et al., 2010). In grade 3 GCT of bone, en bloc resection is advocated to reduce the recurrent risk. A more technically demanding surgical treatment modality was described by Kotwal PP et al. in the year 2008 by using vascularized joint transfer for the giant cell tumor management (Kotwal et al., 2008).

As the GCT of the hand is aggressive, en bloc resection is the preferred method to prevent the recurrence. Several modalities were described in the reconstruction of the removed metacarpal bone; autografting with metatarsal bone, vascularized or non-vascularized fibular graft, silicone end prosthesis and iliac crest graft. Al Bayati MA et al. (2017) recommended the autotransplant of metatarsal bone for the destruction of the metacarpal bone with GCT with satisfactory function and cosmoses. Saikat (2016) also used the metatarsal bone to replace the GCT metacarpal bone with promising functional results.

In this case, en bloc resection of second metacarpal bone with autograft replacement was used to prevent the high recurrent rate of GCT of bone in hand without compromising much of the hand functionality and cosmetic appearance. The reconstruction of metacarpophalangeal joints involving an osteoarticular ligamentous complex of metatarsal transfer by suturing the capsule and ligaments of the donor's bone to the proximal phalanx is being presumed that the synovial membrane of the proximal phalanx would provide ample nutrition to the cartilage of the transferred metatarsal head to guarantee its survivability.

The usage of miniplate for the fusion of the carpometacarpal joint was unable to achieve as the patient's trapezoid bone was too small for the miniplate fixation. Therefore, the fusion was achieved by modifying the miniplate into the V-shaped plate and the fuse inter-metacarpal without compromising the cascade and the function of the hand. We described this technique as despite it being more technically demanding, the outcome in terms of function and cosmosis outweigh the previous treatment modalities (Maini et al., 2011).

CONCLUSION

The transfer of osteoarticular ligamentous complex of the third metatarsal bone for the reconstruction of the second metacarpal bone defects is a possible operative procedure that provides good cosmetic and excellent functional outcomes while not compromising the donor's foot function.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written informed consent was obtained from the patient to publish the case with its related pictures. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

An Unusual Case of Concurrent Dengue and Malaria Infection

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ABSTRACT

Dengue and malaria infections are common mosquito-borne infectious diseases in tropical and subtropical regions. The clinical manifestations of dengue and malaria often mimic each other, causing the predicament of early diagnosis without laboratory investigations. Concurrent dengue and malaria infection are often rare scenarios when both diseases occur in a particular patient at the same time. A high index of suspicion is therefore required to establish an early diagnosis to ensure complete success in its management. This case report is about concurrent dengue and malaria infection in a 54-year-old Pakistani man who presented with high-grade fever for three days before admission. On examination, he was febrile (38.8°C) with no other findings. His blood investigations were positive for NS1 antigen and IgM but negative for IgG. His peripheral blood film revealed the presence of *Plasmodium vivax*. He was treated for dengue fever with supportive management and started with oral Riamet (artemether and lumefantrine) along with oral primaquine 30 mg daily for two weeks' duration. Following treatment, the patient demonstrated progressive clinical improvement and was subsequently discharged back to the community clinic for the continuation of care.

INTRODUCTION

Dengue and malaria are the two most prevalent mosquito-borne infectious diseases affecting the tropical and subtropical countries (Epelboin et al., 2012; Wiwanitkit, 2011). Lately, both are still causing major public health concerns because of their respective high morbidity and mortality

rates. Clinically, their disease manifestations can be entirely similar to acute febrile illness occurring at the beginning (Selvaretnam et al., 2016). Thus, laboratory investigations are often required to enable clinicians to arrive at a definite diagnosis. Of interest, despite a high prevalence rate of both diseases in tropical and subtropical regions, very few reports or articles have been published on concurrent dengue and malaria infection. A retrospective study which was done in French Guiana revealed 17 cases of dengue and malaria co-infection among the 1723 patients who presented with acute febrile illness from the year 2004 to 2005 (Carme et al., 2009). We report a case of a foreigner who presented with acute febrile illness with specific chronological events and investigations, which lead to the definite diagnosis of concurrent dengue and malaria infection.

CASE PRESENTATION

A 54-year-old Pakistani man, with no comorbidity, presented with fever associated with chills and rigours for three days before admission. He also developed three episodes of vomiting and reduced appetite for a similar period. He had been working in Malaysia as a businessman for the past ten years. The last time he travelled back from Pakistan was one year ago, and he denied any recent history of travelling. On examination, he was febrile (38.8°C). There were no rash, lymphadenopathy, or hepatosplenomegaly. Systemic tests are unremarkable. His dengue NS1 antigen and IgM were positive on day 3 of illness or day of admission (Table 1). He had inadequate oral intake before admission. He was then treated for dengue fever with symptomatic management. Due to persistent fever, he was also screened for malaria, which is not uncommonly encountered in our region. His blood film for parasites confirmed the presence of *Plasmodium vivax* (Table 2).

Table 1 The results of dengue fever tests taken at day 3 of illness or day of admission.

Parameters	Results
Non-structural protein-1 antigen	Positive
IgM	Positive
IgG	Negative

Table 2 The results of blood film for malarial parasite (BFMP)

Parameters	Results
Species	*Plasmodium vivax*
Quantitative microscopy (asexual/ sexual)	*Plasmodium vivax* 3656/0 per µL of blood

The remaining blood investigations were shown in Table 3. The presence of trophozoites in a thick and thin blood smear is shown in Figures 1 and 2. Subsequently, a diagnosis of concurrent dengue and malarial infection was made. He was admitted to the medical ward for initiation of treatment and daily monitoring of his malaria parasites count. Oral Riamet (artemether and lumefantrine) was started as per management guideline of malaria in Malaysia year 2014 along with oral primaquine 30 mg daily for two weeks' duration (Ministry of Health Malaysia, 2014). Following the treatment initiation, he demonstrated progressive improvement both clinically and biochemically. He was then discharged back to the community clinic and remained well during follow-up.

Table 3 Blood parameters for the patient

Parameters	Results (On admission)	References
Haemoglobin	13.0	13.0 – 18.0 g/dL
White cell count	2.3	4 – 11 × 10^9/L
Platelet	90	150 – 400 × 10^{10}/L
Urea	3.2	2.8 – 7.2 mmol/L
Sodium	140	136 – 145 mmol/L
Potassium	4.1	3.5 – 5.0 mmol/L
Creatinine	80	74 – 110 umol/L
Total protein	69	66 – 83 g/L
Albumin	39	35 – 52 g/L
Globulin	32	28 – 36 g/L

Total bilirubin	20	5 – 21 µmol/L
Alanine aminotransferase (ALT)	30	< 45 U/L
Alkaline phosphatase (ALP)	40	30 – 120 U/L
G6PD	Negative	–

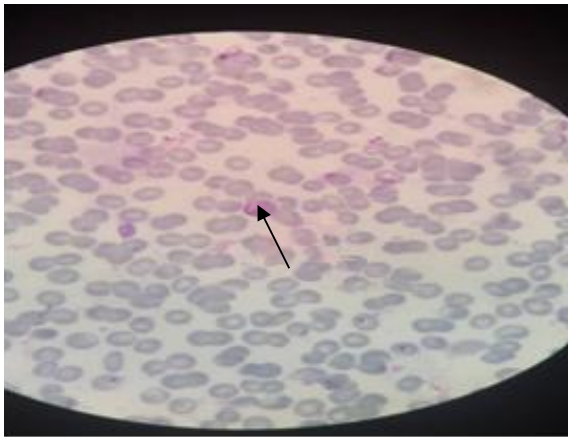

Figure 1 Thick blood smear showing the presence of trophozoite (black arrow)

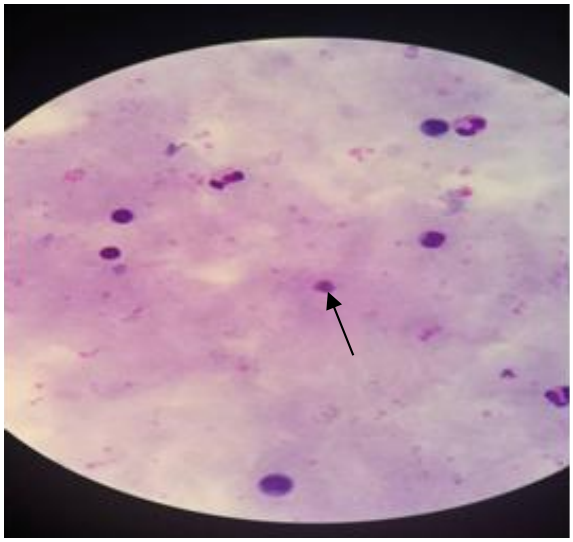

Figure 2 Thin blood smears showing the presence of trophozoite (black arrow)

DISCUSSION

This patient was found to have concomitant dengue and malaria infection. The majority of the clinicians often encounter the predicament to reach the diagnosis as the existence of another disease is often forgotten when the first diagnosis had been made.

Concurrent dengue and malaria infection were first reported in the year 2005 (Epelboin et al., 2012). It refers to a scenario when both the diseases coincide in a particular patient at a similar time (Selvaretnam et al., 2016). Both dengue and malaria infections are transmitted via animal vectors (mosquitoes), namely *Aedes* and *Anopheles,* respectively (Wiwanitkit, 2011; Malaysia Health Technology Assessment Section (MaHTAS), 2015). In general, dengue infection commonly affects the urban population, whereas malaria infection mainly affects people who live or work in the forest. This is attributed to the fact that both the diseases are spread by vectors that do not share the same habitat (Selvaretnam et al., 2016). As a result, extensive overlapping of habitat seldom happens, causing a low incidence of co-infection compared to a single infection. This coincides with findings in the report written by Carme et al. (2009) in French Guiana, which stated that the incidence of co-infection among febrile patients was only 0.99%.

In terms of clinical manifestations, concurrent infection and mono-infection often present similarly. However, the pathogenic mechanisms differ such that anaemia is the main feature of patients with malaria due to significant intravascular hemolysis (Ministry of Health Malaysia, 2014). In contrast, thrombocytopaenia is often the main predictor of dengue fever. Table 4 below demonstrates the clinical features of mono-infection versus co-infection (Carme et al., 2009; Ministry of Health Malaysia, 2014).

Table 4 The clinical differences of both dengue and malaria infection

Features	Dengue	Malaria	Co-infection
Causative agent	Dengue virus (DEN-1,2,3,4)	Protozoa parasite (*Plasmodium* sp.)	Dengue virus and *Plasmodium* sp.
Mode of transmission	Vector (*Aedes* mosquito)	Vector (*Anopheles* mosquito)	Vectors (*Aedes* and *Anopheles*)
Symptoms and signs	Fever, headache, rash, vomiting, mucosal bleed, muscle pain	Fever, rigours, headache, vomiting, muscle pain	All are present
Thrombocytopaenia	Present	Absent	Present
Anaemia	Usually absent	Present	Present
Lymphocytosis	Present	Absent	Present
Parasitaemia	Absent	Present	Present
Clinical complications	Haemoconcentration, bleeding, shock	Cerebral malaria, haemolysis, hypoglycaemia, shock	All are present

Based on current knowledge, there is no specific treatment recommended for patients with concurrent infection. Hence, the combination of both dengue and malaria treatment protocols simultaneously will be sufficient, provided that the early diagnosis is being made (Wiwanitkit, 2011). However, the choice of antimalarial drugs differs according to the specific species of the parasite involved.

CONCLUSION

This case highlights the importance of history taking and a high index of suspicion among clinicians when dealing with patients who present with acute febrile illness. Missing the above condition will lead to treatment failure and potentially mortalities.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written consent was obtained from the patient to publish the case. A copy of the written consent is available for review by the Chief Editor.

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CASE REPORT

Late Asymptomatic Medial Patella Subluxation Post Total Knee Arthroplasty

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Keywords: *medial, patella, subluxation, post total knee arthroplasty (TKA)*

ABSTRACT

Post-operative complications are well known to impair the functional outcomes of total knee arthroplasty (TKA). Patella subluxations post-TKA is a grim complication rendering patients disable post-surgery. Howbeit, medial patella subluxation is a rarely recorded incident altogether. This case report describes a patient post successful TKA two years ago, who was incidentally diagnosed with a medial patellofemoral subluxation during a recent routine yearly follow up. This gentleman, however, had no complaints and the only evident clinical sign was anterior knee skin puckering. A radiograph of the knee confirmed our clinical suspicion of medial patella subluxation. The patient's symptoms, his expectations, radiological findings, what went wrong during surgery and management of this rare entity were analysed. This rarely reported entity requires a high degree of suspicion especially if the patient complains of instability and peculiar anterior knee pain. Diagnosis is customarily clinical and revision surgery is almost invariably necessary.

INTRODUCTION

Medial patella subluxation is a condition characterized by medial translation of the patella resulting in instability, anterior knee pain and/ or popping. Hughston and Deese (1988) first described this entity in patients with preceding arthroscopic lateral retinacular release and associated vastus lateralis release. The complication is almost always iatrogenic with the usual causes being discontinuity of

the vastus lateralis from the patella, previous lateral release, medial tibial tubercle transfer and a tight medial patellofemoral ligament (MPFL) graft. Patients with a history of vastus lateralis deficiency, hyperlaxity and trochlear dysplasia may also experience medial patella subluxation (Akşahin et al., 2010).

A typical complication causing postoperative pain and functional limitation is patella instability which most of the time may require revision surgery. This debilitating condition may occur with or without patella resurfacing. Patella subluxation is more common than dislocation (Assiotis et al., 2019). Main reasons for patellofemoral instability can be associated with surgical technique and component positioning, extensor mechanism imbalance and other causes.

Various approaches for the measurement of patellofemoral congruence have been described in the literature although there is no consensus with regards to an ideal method. In this report, we apply the patella shift index (PSI), a new reliable and valid measure for patellofemoral congruence for evaluation of patella alignment following TKA with an un-resurfaced patella. The PSI is calculated by dividing the patella shift with the trochlear width (PSI = patella shift/ trochlear width) (Metsna et al., 2013). PSI is rounded up to two decimal points. Patella shift can be medial or lateral with medial patella shift marked with a "–" sign.

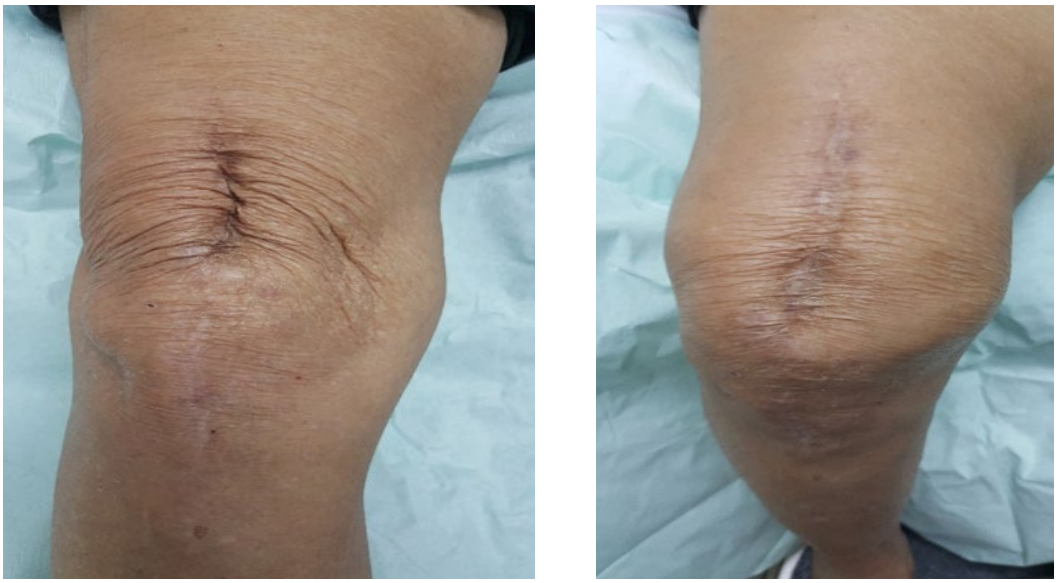
CASE PRESENTATION

An 84-year-old gentleman presented to our specialist clinic two years prior chief complains of pain over the knee exaggerated especially during start-up and ambulation. Clinically, he had a non-correctable varus knee and a range of movement (ROM) of 10 – 90 degrees. Pre-morbidly he had a history of ischaemic heart disease with coronary artery bypass grafting done.

After pre-operative counselling, he consented and successfully underwent TKA of the right knee for severe tri-compartmental osteoarthritis. He was operated on via a medial para-patellar arthrotomy approach with soft tissue release of the lateral patella retinaculum for better patella tracking. Surgery was routine with no intraoperative complications, and we decided against resurfacing his patella due to its small nature.

Postoperatively, the patient recovered well. No acute complications were reported. He achieved a good range of movement post-surgery from 0 to 120 degrees and did not complain about any post-operative pain. He received outpatient physiotherapy and rehabilitation at the hospital. The patient was put on a close chain physiotherapy regime comprising of static quadriceps exercise, straight leg raising, balancing, gait, and proprioceptive exercises. The gentleman was discharged well, and further clinic visits at 6 months and 1 year were unremarkable.

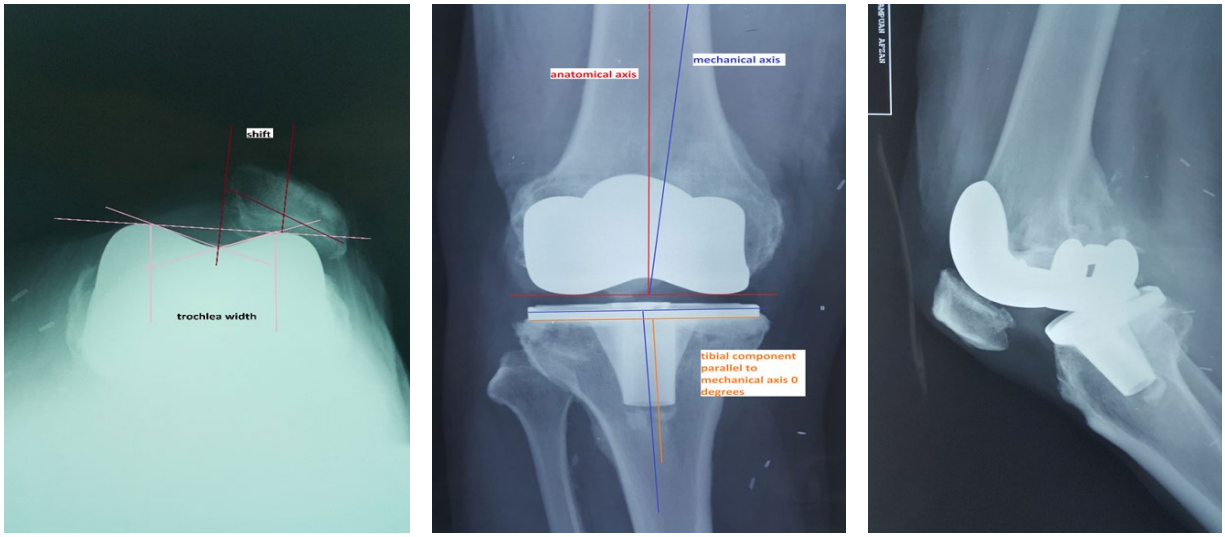
However, during his yearly routine follow up for the second post-operative year, we noticed that he had skin puckering/ dimpling over the anterior knee during extension [Figure 1 (a) and (b)]. The patient nonetheless did not seem bothered about this since he was not in any pain, nor did he complain of any instability. He was ambulating independently without aid.



(a) (b)

Figure 1 (a) Showing puckering of the skin on the knee joint during extension; (b) scarring over the knee joint on flexion

On assessment, he had a respectable knee ROM of 0 – 110 degrees, minimal varus laxity, medial patella tracking and tilt, a positive medial subluxation test, but no tenderness over the medial retinaculum. There was however evidence of muscle atrophy of the right thigh with a girth of 42 cm as compared to 45 cm on the left. His Q-angle measured 15 degrees. The X-ray of the right knee revealed a medial patella subluxation [Figure 2 (a) merchants, (b) anterior, (c) lateral]. Based on Figure 2 (a), the Patella Shift Index (PSI) was noted to be –0.48 and the Patella Tilt (PT) 41 degrees.



(a) (b) (c)

Figure 2 (a) Merchants view of the knee showing a medial patella subluxation, the Patellar shift index (PSI) [PSI = patellar shift/ trochlear width] can be calculated using this view; (b) the AP view the knee showing a restored mechanical axis; (c) Lateral view of the knee showing normal patella position

Further management of this patient involved obtaining a CT scan of the knee to look at the rotation of the femoral component and an MRI to assess the soft tissue balance, thence proceed with revision surgery or a realignment procedure with lateral plication and medial release plus possible patellar resurfacing.

The gentleman, however, is yet to decide on revision surgery as he was not suffering from any symptoms. He can carry out his activity of daily living with ease and has a good range of movement of the knee with no anterior knee pain. He has an occasional 'popping' of the knee, but this does not impair his function.

DISCUSSION

Cases of medial patella dislocation post-TKA are poorly recognized and rarely reported. In our patient, our early inference as to why the patella dislocated medially are abnormal femoral component rotation; excessive lateral patella retinaculum release with a tight medial para-patella repair; partial rupture to the quadriceps tendon which may also cause skin puckering. We fear that if left untreated, he may eventually develop debilitating loss of the knee extensor mechanism, anterior knee pain, aseptic loosening of the implants, severe quadriceps wasting, patella fracture and possible arthrofibrosis.

The presenting complain of patellar instability is consistently anterior knee pain during activities such as climbing up stairs or standing from a sitting position. Pain is commonly at the patellofemoral joint and differs from that prior to TKA. Another common complains include painful patella 'popping' sensation with certain knee movements. Patients generally claim the patella pops laterally and this is commonly mistaken as lateral patellofemoral instability. Customarily, however, the patella is subluxed medially in full extension. It pops laterally into the trochlear groove as the knee flexes. Hughston and Deese (1988) reported that 85% of patients were not able to perform light recreational activities, 69% had disabling knee pain, and 5 of 65 patients managed to go back to competitive sports (Feller, 2015).

Surgical complications are the most frequent cause of patellar maltracking. Patella alta, residual valgus limb malalignment, excessive internal rotation of the femoral and/or tibial component, medial placement of the femoral component, valgus alignment of the femoral component, asymmetrical patellar resection, lateral positioning or excessive thickness of the patellar button, incorrect soft-tissue balancing and missing or insufficient lateral release, have all been shown to have a negative effect on patellar tracking (McCarthy & Bollier, 2015; Motsis et al., 2009).

Premature movement of the knee joint post lateral collateral ligament, lateral retinacular and/or vastus lateralis release could provoke atrophy and retraction of the vastus lateralis tendon and muscle as described by Hughston and Deese (1988). With the absence of the extensor mechanism contributed by the vastus lateralis, this thereupon leads to unbalanced muscle forces on the patella ensuing medial subluxation. Additional contributing factors are patella alta and a shallow trochlear groove of the distal femur.

Spontaneous medial patella subluxations/dislocations are unheard of and are almost always related to previous patella-femoral surgery. This condition was first reported by Hughston and Deese (1988) in 54 patients (60 knees) who had worsening symptoms or failure to improve after a lateral retinacular release. These 54 patients suffered deteriorating symptoms. Of the 60 knees, 30 developed medial subluxation postoperatively (Hughston & Deese, 1988). A total of 94% reported cases of medial patella subluxation occurred in patients with a history of previous lateral retinacular release, albeit with or without a tibial tubercle transfer.

Treatment options can be divided into surgical and non-surgical management. Physiotherapy, specifically quadriceps (vastus lateralis) strengthening and the adoption of a patellofemoral brace during activities can be recommended (Saper & Shneider, 2015). Regrettably, non-operative management is usually futile.

Surgical techniques as the incomplete release of the vastus lateralis muscle and suturing of the vastus lateralis to the quadriceps tendon more proximally may diminish the occurrence of medial patella dislocation and subluxation (Hughston & Deese, 1988). These techniques may prevent loss of lateral stabilization and maintain the biomechanical and soft-tissue balance of muscular forces acting on the patella. Most modalities involve repairing or reconstructing the lateral patellar stabilizers.

CONCLUSION

Patients (post-TKA surgery) who complain of instability, popping or anterior knee pain should raise a strong suspicion of medial patella subluxation. Diagnosis is clinical and, while a constellation of signs and symptoms are typical, the medial patella subluxation test is diagnostic. Unfortunately, conservative management is almost always futile. Surgical intervention has been proven to demonstrate favourable results in most patients. The vigilance of this rare subtle condition will lead to earlier intervention and most definitely decrease its incidence through meticulous surgical indications, procedures, and techniques. In TKA patients with chronic instability or frank dislocation, surgical intervention is paramount. Possible prosthetic causes (limb malalignment, component malposition and soft-tissue issues around the patella) should be attentively assessed to avert revision.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this article.

CONSENTS

Written consent was obtained from the patient to publish the case with some related pictures. A copy of the written consent is available for review by the Chief Editor.

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SHORT COMMUNICATION

Recommendations on Otorhinolaryngology Procedural-Based Services During COVID-19 Pandemic

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ABSTRACT

The current COVID-19 pandemic has forced many clinical disciplines to evolve to function safely and still provide the necessary care. Otorhinolaryngology (ORL) is a field that has been greatly affected by this highly transmissible viral pathogen. Aerosolizing procedures, proximity examination and other common procedures must be revamped to suit current time. The usual norm ORL procedures need also be altered to incorporate safeguards to protect both patient and healthcare workers. This recommendation for current practices aims to give a practical approach to modify current practices to maintain safety during the pandemic. These recommendations are the consensus amongst ORL practitioners in Hospital Sungai Buloh which is the designated COVID-19 centre for Malaysia's central region and is currently being practised.

INTRODUCTION

Otorhinolaryngology (ORL) is a very heavy surgical-based subspecialty procedure (American Academy of Otolaryngology-Head and Neck Surgery, 2020). The procedures are also at high risk to disseminate COVID-19 due to factors like proximity to the patient and aerosol-generating procedures. In the initial emergence of disease, it has been reported that ophthalmology, ORL and dental specialities are the most affected due to the nature of their procedures. Practitioners were reported to contract COVID-19 during daily practice. Thus, certain principles and

precautions must be applied to reduce the risk of COVID-19 during practice.

Some principles are worth to be practised to ensure safety. Avoidance of propagation and dissemination of disease through proper personal protective equipment (PPE) (O'Neill, 2020; The Canadian Society of Otolaryngology - Head & Neck Surgery [CSO-HNS], 2020), a judicious indication of procedures and limiting non-essential/ elective clinical activities to avoid contact should be practised. These must take place while ensuring adequate care is given to patients in minimalizing the risk of disease propagation. Adherence to the latest evidence-based practice in the evolving management of COVID-19 should also be emphasized to maximize efficiency while not compromising on safety.

The amount of PPE that need to be donned will, of course, reflect the amount of exposure that the practitioner will be subjected. It is easily gauged when the patient is known to be COVID-19. This applies to suspected patients with symptoms of COVID-19, where the maximum amount of PPE should be donned prior to any interaction or procedure. This is not the case for asymptomatic patients that health care workers may encounter during consultation or procedures. ORL examinations and procedures are mainly high risk to health care workers due to proximity and high potential to cause aerosolization of viral particles.

Recommendations for Personal Protective Equipment in ORL Practice

The Canadian Society of head and neck surgery has proposed a practical outline of PPE usage which has been adapted to the Malaysian Ministry of health recommendations (Ahmed et al., 2005; CSO-HNS, 2020). This is further refined in this recommendation to suit our local scenario while not compromising the efficacy.

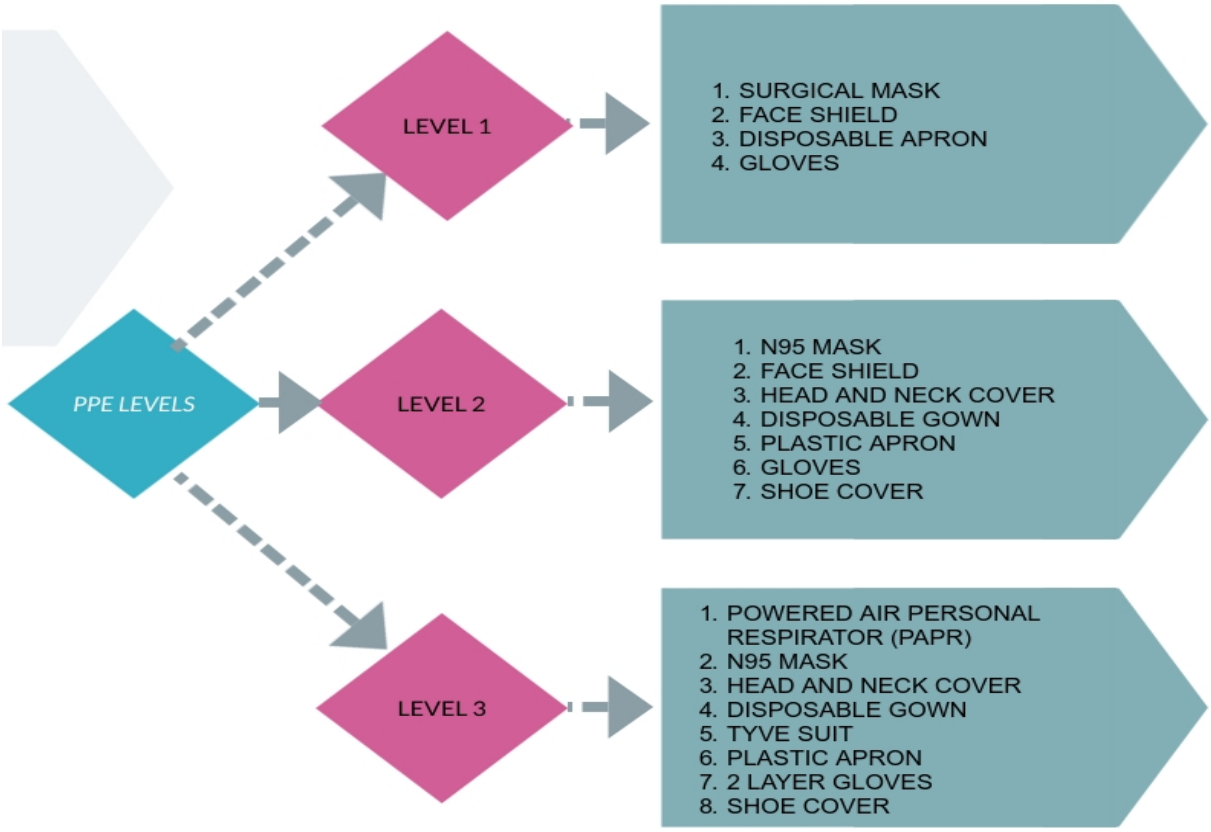

Figure 1 Levels of personal protective equipment

It is recommended that level 2 PPE be used in the clinic procedure room for all procedures such as rigid nasoendoscopy, flexible nasopharyngolaryngoscopy and tracheostomy tube changes. Level 3 PPE's should be donned when dealing with any patients suspected or confirmed COVID-19 regardless of the procedure (Figure 1).

The availability of PAPR remains an issue in some centres, thus raising the issue of alternative PPE in the event of PAPR being unavailable. There is no evidence to suggest that there is a replacement for PAPR in a confirmed positive COVID-19 case. Using an N-95 mask with a PAPR also shows benefit (Roberge et al., 2008). This is especially useful while performing a highly aerosolized procedure such as tracheostomy and endoscopic nasal surgery. Thus, PAPR is still the standard of practice for all COVID-19 or COVID-19 suspected patients, and it is recommended that administrators allocate these devices for ORL use.

The use of N-95 mask with PAPR is also recommended since there is evidence that shows benefit in using both devices simultaneously (Crisis Preparedness and Response Centre [CPRC], 2020). There have also been incidents of PAPR failing during procedures. N-95 mask would serve as a temporary back up to limit the risk of infection to health care worker.

Most of ORL procedures are considered high-risk procedures due to the aerosolization effect (CSO-HNS, 2020). Multiple documentation of ORL staff developing severe manifestation of COVID-19 has surfaced worldwide, and it is suggested that it happened due to spread from patients (Chan et al., 2020; Ellison, 2020; Fusco et al., 2020). Due to the nature and current spread patters of COVID-19, it is recommended to assume that all patients are potential asymptomatic COVID-19 patient until proven otherwise in respect to an ORL Procedure (American Academy of Otolaryngology-Head and Neck Surgery, 2020; Chan et al., 2020; CSO-HNS, 2020; Lu et al., 2020). It is recommended to test for COVID-19 for all surgical procedures before operation if possible (American Academy of Otolaryngology-Head and Neck Surgery, 2020; Chan et al., 2020; Gilat et al., 2020; CSO-HNS, 2020; Kuhar et al., 2020; Silva et al., 2020). PPE should be worn for all staff present during the procedure, as mentioned earlier. Level 2 PPE should be worn despite the patient having a COVID-19 negative test. It is recommended that this minimum PPE requirement become the new normal for the time being until the disease incidence rates drop significantly (CSO-HNS, 2020).

Emergency Procedure

Emergency Procedures must have a multi-disciplinary approach. Communication between ORL team, anesthesiology and infectious disease team must be clear and transparent. The indication of the procedure must be agreed by all teams. It is recommended to treat any patients with suspicious or unknown history as a suspected COVID-19 patient until proven otherwise. If the patient is COVID-19 positive or unknown status, the procedure must be done in accordance with current hospital operating protocol for transfer of patient, specialized operating theatre (OT). Full personal protective equipment for all OT staff as per hospital protocol (PAPR is mandatory). OT instruments are specialized for COVID-19 patients. Use disposable equipment when able. Cleaning and disinfecting of instruments should be done according to hospital Infection control protocol (Chee et al., 2004).

Experienced ORL team personnel should be present for a procedure to reduce operating time. Ideally, one surgeon, one medical officer, one scrub nurse and one circulating nurse only in the operating theatre. The total number of personnel in OT should be limited. Post-operative precautions during transfer and post-op care to ensure continuity of risk reduction to disseminate disease (Chee et al., 2004).

Elective Procedures

In the current stage of the pandemic, it is advised that all elective surgeries be postponed until the number of infection cases is acceptable in the population (Gilat et al., 2020; Silva et al., 2020). This is to allow resources and human resources to be diverted to containing COVID-19. Consideration of timing to resume elective services should be made if any the following conditions have been met:

a. Testing for COVID-19 can be done for elective cases
b. A viable treatment has been implemented
c. Development of vaccine
d. Herd immunity has been achieved

Testing for COVID-19 is imperative for the safety of the patient as well as the health care worker. It is a form of vigilance to prevent further spread of the disease, and it benefits all. Thus it should be done liberally once the pandemic has reached a declining or stable stage. It is observed from other countries that a second or even third wave of the disease might re-emerge. The resumption of elective services should be started once numbers are controlled, but it should be ceased again if the need arises.

CONCLUSION

Modifications in current ORL procedural based practices is imperative to ensure safety for patients as well as staff. These modifications should also occur in tandem with other related specialities such as anaesthesia to ensure overall risk reduction.

DISCLAIMER

COVID-19 is a newly emergent disease; thus, management protocols are still evolving. Recommendations are made using available publications and the consensus amongst authors who are practising in Hospital Sungai Buloh which is the central region COVID-19 centre. Where there is a lack of data, best standard management practice is discussed within the fraternity of ORL surgeons. A detailed version of this recommendation document is available upon request to the authors.

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SHORT COMMUNICATION

Detection of Mumps Virus of Genotype G in Bangladeshi Children Suffering from Encephalitis

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ABSTRACT

Although mumps virus (MuVi) is an important agent of encephalitis, however, mumps vaccine has not yet been included in the national immunization programme of Bangladesh. Furthermore, the genotype distribution of this virus in Bangladesh is unknown. Cerebrospinal fluid samples collected from 97 children with encephalitis from April 2009 to March 2010 were subjected to polymerase chain reaction (PCR) test to determine the causative agents. MuVi was detected in two samples, these samples were further subjected to conventional PCR using specific primers, then amplicons were sequenced, and genotype was determined as genotype G. Phylogenetic analysis showed that these strains were clustered with strains from Nepal, India, the UK, Thailand, and the USA. By Bayesian inference, we also determined that the ancestor of Bangladeshi and Indian MuVi were same and segregated only about two decades back. These results will help future surveillance and the detection of invading MuVi strains from other countries.

INTRODUCTION

Mumps is a viral infection which affects normally young children. The main clinical features are fever and swelling of the parotid glands. Orchitis, oophoritis, transient deafness, meningitis, and encephalitis are serious complications associated with mumps. Encephalitis occurs in up to 0.1% of mumps cases (World Health Organization, 2012). MuVi only infects humans and

belongs to *Paramyxoviridae* family, subfamily *Paramyxovirinae* and genus *Rubulavirus*. The genome size of MuVi is 5,384 nucleotides, composed of single-stranded, negative-sense RNA (Jin et al., 2005). These encoding two surface glycoproteins; fusion (F) and haemagglutinin-neuraminidase (NH) and, four core proteins; nucleoprotein (NP), phospho-protein (P), matrix (M), large protein (L), and the membrane-associated small hydrophobic (SH) protein (Jin et al., 2005). Among these protein-encoding genes, the most variable segment of the MuVi genome is the SH gene (Jin et al., 2005). Among the twelve genotypes of MuVi, wildtype of genotype A is no longer seen worldwide from 1990 (Jin et al., 2015). Strains of genotype G of MuVi are identified in the countries of Europe and the Americas. Whereas genotypes J and F are detected in the countries of Asia and the Pacific region. Genotype H is found in the Middle East where mumps vaccine containing Jeryl Lynn strain (genotype A) is mainly used and vaccines containing Urabe-AM9 and the Leningrad-Zagreb strains (genotype B) are used in some extent (Rubin et al., 2012). Therefore, molecular characterization of MuVi is an essential part of mumps surveillance strategy because it can lead to the identification of the spread routes of the MuVi, besides it will discriminate between natural and vaccine strains (Jin et al., 2005). However, limited data are available on the global distribution of MuVi genotypes; of 194 countries only 38 have reported the MuVi genotypes distribution in their territories (World Health Organization, 2012). Bangladesh is among countries where MuVi genotype distribution is unknown. We are afraid that the influx of Rohingya refugees from Myanmar with mumps (Mair et al., 2020) into Bangladesh may risk Bangladeshi children into unknown genotypes. Therefore, it becomes essential to identify the genotype of the prevailing Bangladeshi MuVi, their relatedness with similar strains circulating in other areas of the world as well as the timeline of evolution. Overall, understanding genetic diversity might help in selecting vaccine strains.

MATERIALS AND METHODS

During a study to determine the causative agents, cerebrospinal fluid (CSF) was collected from 97 Bangladeshi children with encephalitis (Mori et al., 2017). The study was done in the hospital of the Institute of Child and Mother Health, Matuail, Dhaka, Bangladesh from April 2009 through March 2010. Genomic RNA was extracted from CSF using a commercial kit (Mori et al., 2017). A battery of viral family-specific conventional PCR tests was done, among these samples, only two were positive for *Paramyxovirinae* (Mori et al., 2017). The nucleotide sequencing of these amplicons confirmed the presence of MuVi. These samples were used in the present study to perform conventional PCR using the MuVi gene-specific primers as written below. Detailed patient information is shown in Table 1.

Table 1 Clinical features, data on laboratory investigations and demographic information of patients with mumps virus-associated encephalitis

Variables	Patient ID No. 34	Patient ID No. 43
Sample collection date	May 30, 2012	July 22, 2012
Gender	Female	Male
Weight (nutritional status)	8.8 kg (low body weight)	11 kg (low body weight)
Fever	Yes	No
Parotid gland enlargement	Absent	Absent
Runny nose	Yes	Yes
Body rash	No	No
Glasgow coma scale	Normal	Normal
Residence	Village	Urban slum
Vaccination covered by EPI	None	None
Similar illness in the neighbourhood	No	No
First medical consultation	Direct to hospital	Direct to hospital
Time interval between the onset of infections and hospitalization	<24 h	<24 h
Duration of hospitalization	10 days	2 days

CSF tests		
Colour	Clear	Clear
WBC (µl)	2	280
PMN (%)	0	30
Lymphocytes (%)	100	70
Protein (mg/dl)	60	160
Glucose (mg/dl)	50	40
Blood tests		
WBC (mm^3)	11,720	10,500
PMN (%)	85.4	51.0
Lymphocytes (%)	14.2	44.0
Eosinophils (%)	0.0	2.0
Monocytes (%)	1.2	1.3
Basophils (%)	0.1	0.5
Haemoglobin (mg/dl)	10.4	12.0
ESR (mm)	40	25
CRP (mg/dl)	4.8	12.0
Treatment given	Ceftriaxone, Acyclovir, Quinine	Ceftriaxone, Acyclovir
Outcome	Discharged	Discharged on request

Notes:
EPI: Expanded Programme of Immunization
Haemoglobin: considered anaemic when the level is less than 11 g/dl in children (6 months to 6 years old)
ESR: Erythrocyte Sedimentation Rate normal up to 20 mm
CRP: C-reactive protein
Reference value: Less than 0.2 mg/dl
WBC: White Blood Cell
PMN: Polymorphonuclear leukocytes
Mumps IgM or IgG antibody: Not determined

Using these samples, we performed reverse transcription-PCR to determine the genotype of MuVi (Jin et al., 1999). Briefly, for the first round of nested PCR, primers SH1 (5'AGTAGTGTCGATGATCTCAT-3') and SH2R (5'GCTCAAGCCTTGATCATTGA-3') were used to amplify a 639-bp fragment covering the entire SH gene, then primers SH3 (5'-GTCGATGATCTCATCAGGTAC-3') and SH4R (5'-AGCTCACCTAAAGTGACAAT-3') were used for the second round of PCR.

The amplicons were sequenced and the nucleotide sequences were analyzed by BLAST (Altschul et al., 1990) to identify the viruses and genotypes (Mori et al., 2017). For phylogenetic analysis, nucleotide sequences of at least two SH gene of standard MuVi strains representing each genotype and subtype were extracted from GenBank. Multiple sequence alignment was conducted using ClustalW. The phylogenetic analysis was performed by the neighbour-joining method using MEGA7.0 software (Kumar et al., 2016). To test the reliability of the branching pattern of the phylogenetic tree a bootstrap analysis of 1,000 replicates was performed.

Evolutionary analysis was performed using the SH gene sequences. By using the Bayesian Markov chain Monte Carlo method accessible in BEAST (Drummond & Rambaut, 2007) version 1.6.1, we inferred maximum clade credibility phylogenetic tree. A relaxed (uncorrelated lognormal) molecular clock and HKY+Γ model of nucleotide substitution were used for analysis. All chains were run for 9×10^7 generations and sampled every 3,000 steps. The posterior densities were calculated with 10% burn-in and checked for convergence by using Tracer version 1.5 available in BEAST.

The study was approved by the ethics committee of the Institute of Child and Mother Health, Matuail, Dhaka, Bangladesh.

RESULTS

Of 97 patients, two were positive for MuVi making the proportion as 2.1%. In this study, our phylogenetic analysis revealed that MuVi strains from Bangladesh belonged to genotype G (Figure 1). Nucleotide sequences of Bangladeshi MuVi showed 100% homology among them and 94 – 98% to the prototype strain of genotype G. Phylogenetically Bangladeshi strains together with strains from Nepal, India, the UK, Thailand, and the USA belonged to G2 cluster. With these MuVi strains from different countries, Bangladeshi MuVi strains have 96 – 98% nucleotide identities.

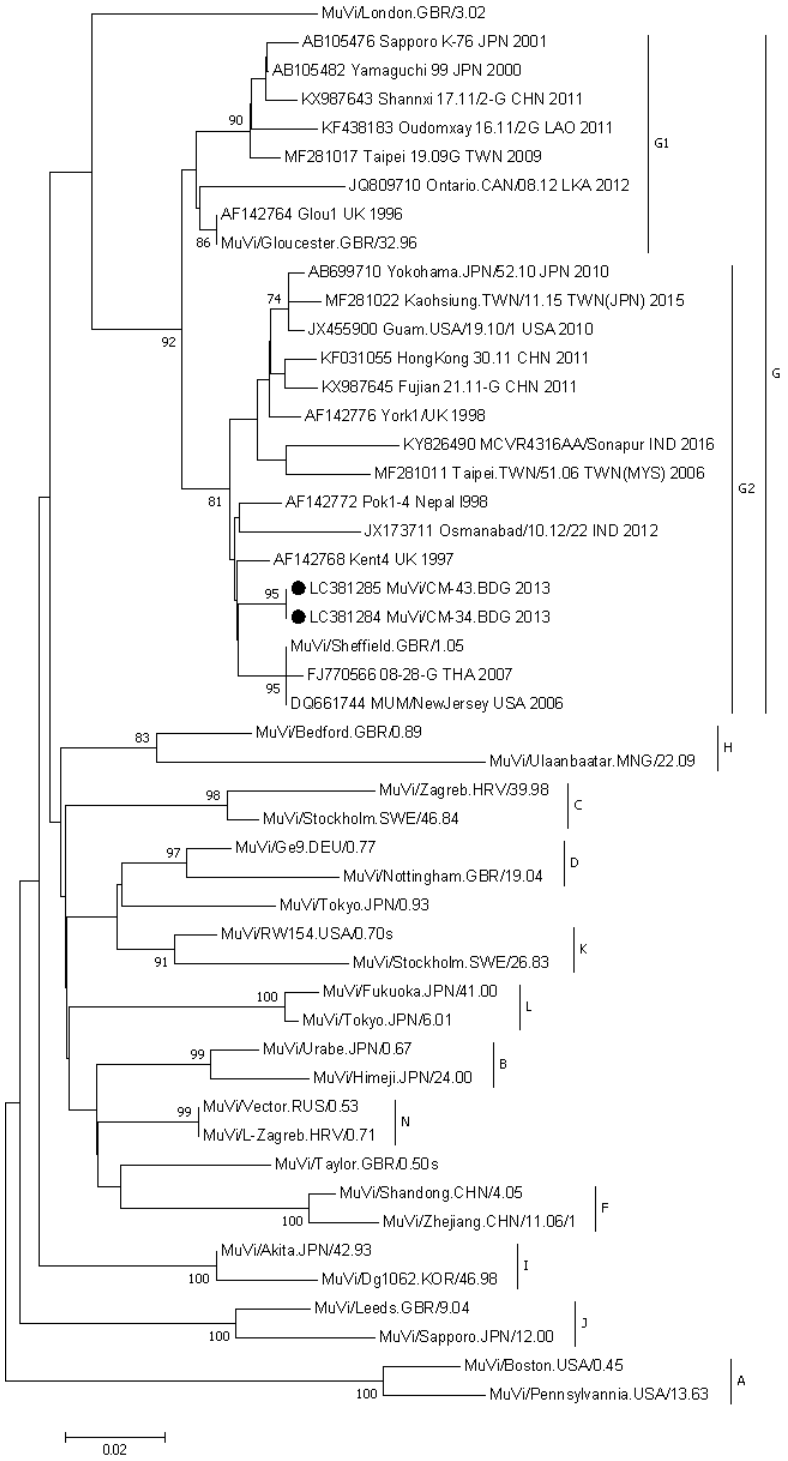

Figure 1 Using the nucleotide sequences of the small hydrophobic protein genes the phylogenetic tree was constructed. The strains from the present study are designated by filled circles. The bootstrap value is represented by the number adjacent to the node, values higher than 70% are shown. The scale bar at the bottom of the tree representing genetic distance expressed as nucleotide substitutions per site. Nucleotide sequences for Bangladeshi strains MuVi/CM-34.BDG/2013-G and MuVi/CM-43.BDG/2013-G appear in the nucleotide sequence databases of DNA DataBank of Japan, European Molecular Biology Laboratory, and GenBank with accession numbers LC381284 and LC381285, respectively.

The estimated mean rate of nucleotide substitution for the SH gene was 8.1×10^{4} substitutions/site/year (95% highest posterior density [HPD] values 1.1×10^{3} – 5.2×10^{4} substitutions/site/year). This rate of nucleotide substitution is comparable with previous findings (Cui et al., 2017). Approximately 164.3 years ago (95% HPD 118.0 – 220.9), circa 1848 (95% HPD range 1792 – 1894), the currently circulating MuVi strains diverged into different genotypes from the most recent common ancestor (MRCA). Only 43.5 years ago (95% HPD 31.1 – 57.7 years) MuVi divided into G1 and G2 genotypes from the MRCA. Bangladeshi and Indian MuVi diverged from their MRCA, approximately 23.3 years ago (95% HPD 14.4 – 33.0 years), that is, in ≈1989 (95% HPD range 1979 – 1998). Approximately 5.2 years ago (95% HPD 3.0 – 9.5 years), that is, in ≈2007 (95% HPD range 2003 – 2009), strain CM-34 and CM-43diverged from their MRCA in Bangladesh (Figure 2).

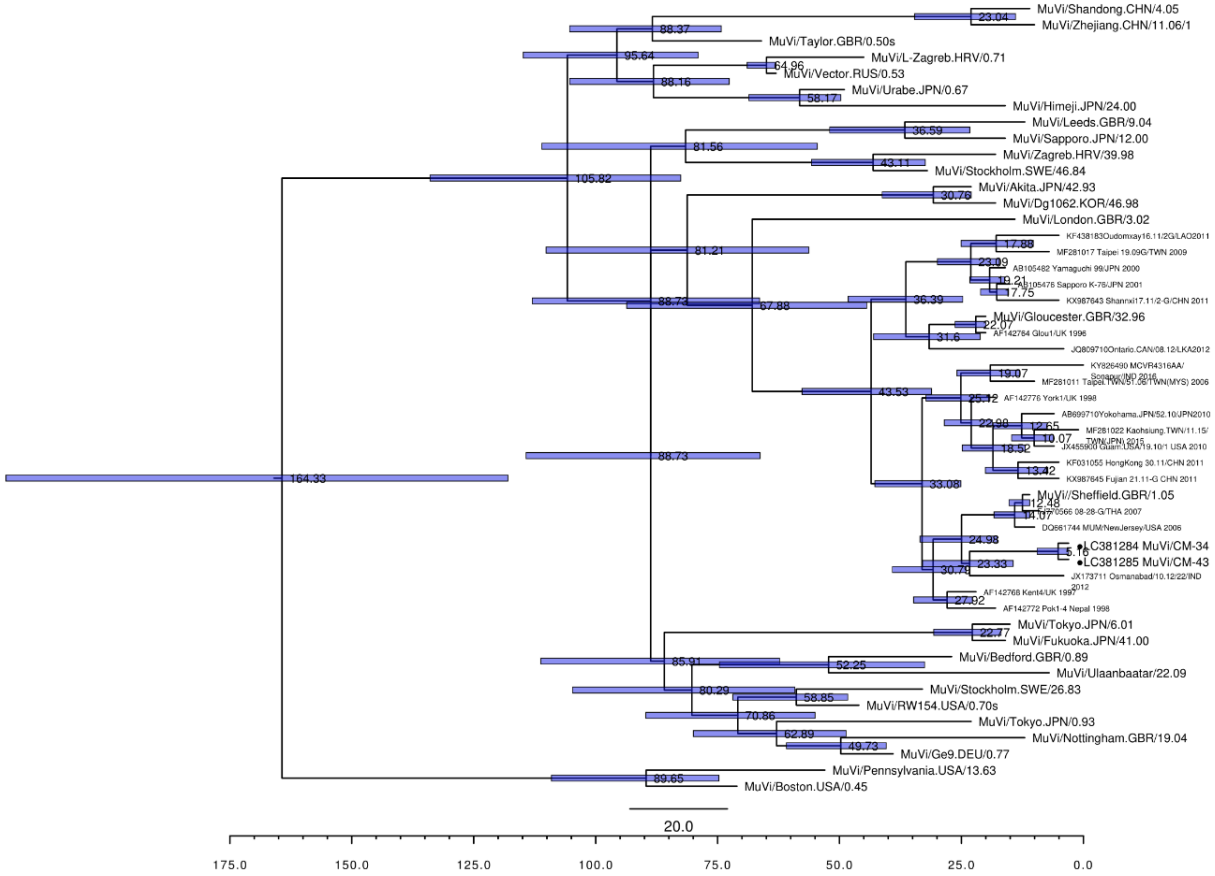

Figure 2 The genealogy of mumps virus is represented by Bayesian maximum-credibility tree which was obtained by analyzing nucleotide sequences of the small hydrophobic protein gene. Nodes correspond to mean age at which lineages diverge from the most recent common ancestor (MRCA); 95% highest posterior density of the MRCA is represented by horizontal bars at nodes. Posterior values are represented by numbers at the main nodes. Time scales in years are represented by horizontal axis at bottom.

DISCUSSION

The incidences and complications of mumps in Bangladeshi children are no less than those in other developing countries (Sultana et al., 2006). However, data are scarce on the prevalence of mumps, MuVi genotype distribution and immune status in Bangladeshi children against MuVi. Although mumps vaccine has been introduced in 122 member countries by the end of 2019 (World Health Organization, 2020), it is not yet included in the national immunization programme in Bangladesh.

The prevalence of mumps encephalitis in the present study was 2.6%. Although only two samples were tested, however, this is the first study to our knowledge reporting MuVi genotypes circulating among the children in Bangladesh and therefore, deserves importance. Although we found only G genotype in the present study, however, the redistribution of the genotypes of MuVi may occur over time with invasion of the virus from a foreign country (Hviid et al., 2008; Jin et al., 2015). Genotype C and G have been reported from neighbouring India (Mishra et al., 2013; Vaidya et al., 2016). There is a possibility of the existence of other genotypes in Bangladesh. By Bayesian inference, we also determined that the ancestor of Bangladeshi and Indian MuVi were same and segregated only about two decades back. The two Bangladeshi strains were from two different regions and they segregated from their common ancestor only about five years ago indicating that evolution is ongoing and spreading in different regions of Bangladesh. One of the limitations of this study is that it was performed on samples from one hospital only, therefore further study is needed to explore the full picture of MuVi genotype distribution in Bangladesh. The other limitation is that in the present study we used a partial length SH gene for determining the timeline of evolution, in future, a full-length SH gene should be used to verify the results.

CONCLUSION

We have determined that genotype G is circulating MuVi genotype in Bangladesh children with encephalitis. The strain was phylogenetically related with MuVi genotype G from India. Monitoring the MuVi genotype in Bangladesh might be beneficial for the surveillance of mumps infection in the country.

CONFLICTS OF INTEREST

The authors declare that they have no conflicting interests in publishing this article.

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CLINICAL QUIZ

Eyelid Abscess with Dacryocystitis due to *Burkholderia pseudomallei*

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ANSWER

Melioidosis is an infection caused by *Burkholderia pseudomallei*, which is a Gram-negative, saprophytic bacterium. Melioidosis can present with a broad spectrum of clinical manifestations including pneumonia, skin and soft tissue infection, visceral organ abscesses, neurological disease, bone/ joint infection, and bacteraemia (Cheng & Currrie, 2005). Ocular disease is a rare presentation of melioidosis; periorbital or orbital cellulitis, eyelid abscess, endophthalmitis, and panuveitis were among the reported cases (Yaisawang et al., 2018; Chang, 2020). Eyelid abscess due to melioidosis is treated with surgical drainage and antimicrobial therapy, which consists of intensive phase (ceftazidime or meropenem) and eradication phase (trimethoprim-sulfamethoxazole or amoxicillin-clavulanic acid) (Dance, 2014).

Clinicians should maintain a high index of clinical suspicion of melioidosis in patients presenting with eyelid abscess in areas where melioidosis is endemic. Hence, antibiotic therapy should be initiated promptly in suspicious cases, and surgical drainage of the abscess is a crucial aspect of management besides standard antibiotic therapy.

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