

Ocular Trauma in Children at Women and children Hospital (Hospital Wanita Dan Kanak-Kanak), Sabah, Malaysia

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ABSTRACT

Ocular trauma is a significant health problem in paediatric age group. This study is to evaluate the demographics, etiology, management and visual outcome of paediatric ocular trauma in Sabah. This is a retrospective review of all ocular trauma occurring in the paediatric age group from age 12 years old and below from January to December 2014 at Hospital Wanita Dan Kanak-Kanak, Sabah. Medical records were reviewed and the data was examined based on Birmingham Eye Trauma Terminology (BETT) system. Incomplete case notes were excluded from the study. A total of 37 cases were accumulated during the study period. All the paediatric ocular trauma cases were admitted and accounted for 13.4% of the total paediatric eye ward admission. However, 4 cases were excluded from the study as the medical records were incomplete. There were 26(78.8%) males while 7(21.2%) female children with a ratio male: female of 3.7: 1. There were 31(93.9%) unilateral ocular injury cases while only 2(6.1%) bilateral injury caused by chemical injury. The most common type of ocular trauma was closed globe injury totaling 24 (72.7%) cases. Trauma caused by blunt object contributed to the highest mode of injury 15 (45.5%) of cases. Open globe injuries which had poor visual outcome accounted for 9 (27.3%) cases. Most of patients required surgical treatment 21(63.6%) while 12(36.4%) cases treated non-surgically. In conclusion, ocular trauma was more common in male and pre-school age group. The main aetiology was blunt injury. Most of the cases treated surgically. Poorer visual outcome was observed in open globe injury.

Keywords: ocular trauma, paediatric, Sabah

INTRODUCTION

Ocular trauma is defined as any injury to the eye that may be due to mechanical, chemical, blast and radiation agents¹. Ocular trauma is a significant health problem in paediatric patients and is a leading cause of non-congenital unilateral blindness in this group². It accounts for approximately 8 to 14% of total injuries suffered by children^{3, 4}. Various studies have reported that 12.5 to 33.7% of eye injury and requiring admissions are children⁵. In the United States, a population-based study reported that the annual incidence of ocular trauma in children was 15.2/100000⁶. Worldwide, the incidence of severe visual impairment or blindness caused by ocular trauma in children varies from 2 to 14% in different studies^{5,7-10}.

Nearly 90% of ocular trauma can be prevented by relatively simple measures such as simple education, appropriate use of safety eye wear and removal of common and dangerous risk factors¹¹.

Children are at greater risk of ocular trauma because of immature motor skills, careless activities and inability to identify dangerous and harmful objects¹².

At present, there are not many published data regarding the incidence of paediatric ocular trauma in tertiary centre in Malaysia and none published in Sabah. There is a published report on paediatric ocular trauma at tertiary centre in Sarawak presenting the demography, aetiology, type and outcome of paediatric ocular trauma in tertiary centre in Malaysia¹³.

This descriptive study aims to evaluate the demographics, aetiology, management and visual outcome of paediatric ocular trauma at Hospital Wanita Dan Kanak-Kanak, Sabah.

MATERIALS AND METHODS

Paediatric patients aged 12 years old and below with ocular trauma at Hospital Wanita Dan Kanak-Kanak, Sabah that occurred from January to December 2014 were included in this study. The ethical permission was taken from Medical Research and Ethic committee (MREC) {NMRR-15-1619-27532(IIR)} The exclusion criteria are incomplete case notes, cases that were treated elsewhere before referred to Hospital Wanita Dan Kanak-Kanak, Sabah and cases with trauma more than three months. The cases were referred from health clinic, district hospital, tertiary centre accident and emergency (A&E) department and private practitioner surrounding Kota Kinabalu.

A review of patient's admission notes and medical records were done. Demographic data, date and time of injury and presentation, mode of injury, etiology, ocular structures involved, treatment done and visual acuity on presentation and at three months post-trauma were recorded.

The classifications of ocular trauma in this study were based on the Birmingham Eye Trauma Terminology (BETT) system¹⁴.

Visual acuity for patients less than 2 years were measured using fixation and follow test patterns, 2 to 5 years with Cardiff visual acuity charts or Kay pictures, more than 5 years with Snellen charts or illiterate E charts.

Statistical analysis was performed using SPSS version 21. Descriptive statistics were used to describe the patients' demographic, aetiology, management and visual outcome. Percentages and frequencies were used for the categorical variables, while means and standard deviations were calculated for the continuous variables.

RESULTS

A total number of 37 cases of ocular trauma were accumulated during the study period. All the paediatric ocular trauma cases were admitted and accounted for 13.4% of the total paediatric eye ward admission. However only 33 patients were included in this study as 4 cases had incomplete case notes. Mean age is 6 ± 3 years (range, 1-12 years). The age group was divided into pre-school (0-6 years) and school (7-12 years). The majority of cases 18 (54.5%) occurred in pre-school and 15 (45.5%) in school age group. Most of the cases were male 26 (78.8%).

Kadazan/Dusun race accounted for the majority of cases 16(48.5%) followed by Bajau 4 (12.1%), Filipino 3 (9.1%), Sungai 2 (6.1%) and others 8 (24.2%). Table 1 presents the socio-demographic characteristics of paediatric ocular trauma patients at Hospital Wanita Dan Kanak-Kanak, Sabah.

Table 1: Socio-demographic characteristics of paediatric ocular trauma patients at Hospital Wanita Dan Kanak-Kanak, Sabah

Variables	Frequency	Percentage	Mean (SD)
n=33 patients	n	%	
Age (years)			6.0 (3.0)
Pre-school (1-6)	18	54.5	

School (7-12)	15	45.5	
Gender			
Male	26	78.8	
Female	7	21.2	
Race			
Kadazan/Dusun	16	48.5	
Bajau	4	12.1	
Filipino	3	9.1	
Sungai	2	6.1	
Others	8	24.2	

Unilateral ocular trauma was seen in 31 (93.9%) cases while the remaining 2 (6.1%) cases were bilateral trauma caused by chemical injuries.

Closed globe injuries were the commonest and accounted for 24 (72.7%) cases. In closed globe injury group, 13 (54.2%) had lamellar laceration and 11 (45.8%) had contusive injury. Of 9 (27.3%) cases open globe injury, 7 (77.8%) had penetrating injury and 2 (22.2%) had ruptured eye (Figure 1).

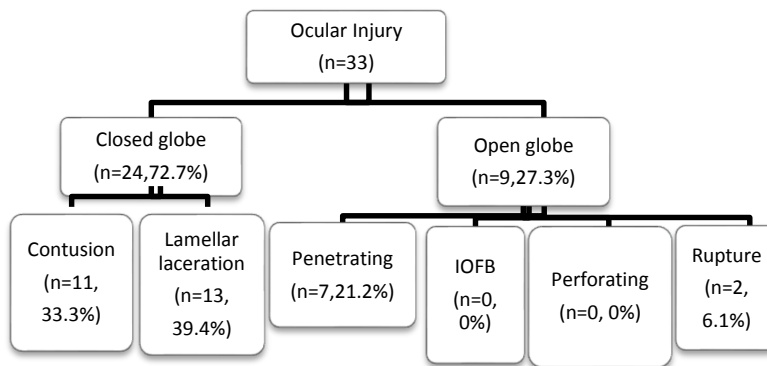


Figure 1: Distribution of type of ocular injury.

Trauma caused by blunt objects were responsible for 15 (45.5%) cases, sharp objects 14 (42.4%), blast injury 2 (6.1%) and chemical injury 2 (6.1%). In sharp object group, domestic animal (cat and dog) responsible for 6(42.9%) followed by metal 4 (28.6%), wood and household items each responsible for 2 (14.3%).

Overall, 6 cases (18.2%) were caused by domestic animals and household items, metal 5 (15.2%), wood 4 (12.1%) and 2 (6.1%) cases each contributed by sports, stone, chemical, firecrackers and miscellaneous. Cause of trauma in 2 (6.1%) cases could not be determined as it could not to be elicited from history.

Many of the cases had more than 1 tissue involvement. In lid injury cases, canaliculus was involved in 8 (61.5%) cases and was not involved in 5 (38.5%) cases. Hyphema occurred in 5 (15.2%) cases and all were closed globe injury. Table 2 presents the characteristics of ocular injuries in paediatric patients at Hospital Wanita Dan Kanak-Kanak, Sabah.

Table 2: Characteristics of ocular injuries in paediatric patients at Hospital Wanita Dan Kanak-Kanak, Sabah

Variables	Frequency	Percentage
n=33 patients	n	%
Involvement		
Unilateral	31	93.9
Bilateral	2	6.1
Time interval from trauma to presentation at HWKKS (hours)		
≤ 1	29	87.9
1-2	1	3.0
> 2	3	9.1
Types of injury		
Open globe injury	9	27.3
Close globe injury	24	72.7
Mechanism of injury		
Blunt trauma	15	45.5
Sharp objects	14	42.4
Blast injury	2	6.1
Chemical injury	2	6.1
Aetiology		
Domestic animals	6	18.2
Household items	6	18.2
Metal	5	15.2

Wood	4	12.1
Stone	2	6.1
Sports	2	6.1
Chemical	2	6.1
Firecracker	2	6.1
Miscellaneous	2	6.1
Unknown	2	6.1
Tissue Involvement		
Cornea	16	28.6
Eyelid	13	23.2
Iris	7	12.5
Canaliculus	5	8.9
Conjunctiva	5	8.9
Sclera	4	7.1
Retina	3	5.4
Others	3	5.4

The distribution of cases from interior district level of Sabah and area around Hospital Wanita Dan Kanak-Kanak, Sabah according to time taken by car to the said hospital, time presented more than 24 hours after trauma and lost to follow-up after primary treatment as in table 3.

Table 3: The distribution of cases from interior district level of Sabah and area around Hospital Wanita Dan Kanak-Kanak, Sabah

Parameters	Interior district level of Sabah	Area around HWKKS
Time taken to HWKKS by car	1-4 hours	< 1 hour
Number of cases	16(48.5%)	17(51.5%)
Number of cases presented > 24 hours to hospital from time of trauma	2(6.1%)	2(6.1%)
Number of cases lost to follow-up after primary treatment	6 (18.2%)	8(24.2%)

The visual acuity was grouped as normal vision ($\geq 6/12$), early visual impairment (less than 6/12 but at least 6/18), moderate visual impairment (less than 6/18 but at least 6/60), severe visual impairment (less than

6/60 but at least 3/60) and blind (< 3/60). The classification of visual impairment used is in accordance with the International Classification of Disease (ICD-10), 1992 and the revision proposed by WHO. Table 4 shows the visual acuity at presentation and at three months post trauma.

Table 4: Visual acuity at presentation and final visual acuity at three months post trauma.

Visual acuity	At presentation, n (%)	Final visual acuity, n(%)
Normal	8 (24.2)	7(21.2)
Early impairment	0 (0.0)	1(3.0)
Moderate impairment	3(9.1)	0(0.0)
Severe impairment	0(0.0)	0(0.0)
Blind	8 (24.2)	7(21.2)
Others*	14(42.4)	18(54.5)
Total	33(100.0)	33(100.0)

* Includes cases too young to receive visual acuity assessment or presenting symptoms too severe to check visual acuity and lost to follow-up after primary treatment.

At presentation, cases with visual acuity less than 3/60 (blind category) were 6 (18.2%) in open globe injury and 2 (6.1%) in closed globe injury. At three months post trauma, cases with visual acuity less than 3/60 (blind category) were 6 (18.2%) in open globe injury and 1 (3.0%) in closed globe injury.

Most of cases required surgical treatment 21(63.6%) while 12(36.4%) cases treated non-surgically.

DISCUSSION

Our data showed more boys than girls with the ratio of 3.7:1 in keeping with other studies^{7, 10, 15-17}. This maybe contributed by their adventurous and aggressive nature¹⁸. Ocular injuries in pre-school children (0-6) were more than school children in our study as supported by others studies^{7, 19}. This maybe contributed by their in common physical vulnerability, lack of coordination and limited ability to avoid or escape danger. Young children also show curiosity and a desire to explore, which may expose them to serious hazards¹⁹.

Closed globe injury had the highest occurrence in ocular injuries^{5, 7, 10}. In this study majority of cases were caused by blunt object that is consistent with other studies^{10, 15, 20}.

Adverse visual outcomes were noted more in open globe injury which was 7(21.2%) cases. Main causes of ocular trauma were domestic animals and household items. These are preventable by close supervision of children by parents at home.

In 2014, referral system between primary healthcare centre and tertiary centre in Sabah is already well established to optimize the continuity of patients' care²¹. However, 4 (12.12%) cases presented more than 24 hours to Hospital Wanita Dan Kanak-Kanak, Sabah may be due to delayed referral from primary healthcare settings or late presentation of patients to primary healthcare centre.

Considerable number of cases lost to follow-up after primary treatment may be due to poor road accessibility for those living at the interior part of Sabah and low socioeconomic status which hinders them from affording transportation to hospital. In 2014, Sabah had the highest poverty in Malaysia and poverty is more in rural than urban area of Malaysia²². Other possible contributing factor could be parents' ignorance of the importance of follow-up and seeking early treatment.

Limitations in this study were small sample size with short duration, incomplete case notes, cases lost to follow-up after primary treatment and underreporting especially the cases that refused further treatment to tertiary centre from primary health care centres located in the remote area of Sabah.

CONCLUSION

Our study, although with its limitation, shows ocular trauma among paediatric population is still a major concern with debilitating outcomes. Major cause can be avoided with public education, parents' awareness, closer supervision and improvement in safety measures. Timely referral and optimal follow-up should be promoted and stressed.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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