Windscreen eye injuries in Singapore

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Introduction

WE noticed an increase in the number of patients with "windscreen eye injuries" over the past few years. In many of these patients, permanent severe visual and cosmetic sequelae occurred. We felt these injuries should not have occurred in the first place if patients were wearing safety belts. We feel it is timely to bring to the attention of all the results of our study and to stress the importance of a safety harness in the prevention of these injuries.

Materials and Methods

The data were obtained from an analysis of the case records, interviews and clinical examination of 23 patients seen in the Department of Ophthalmology, Singapore General Hospital between January 1975 and June 1977. The patients were personally interviewed and examined by the authors regarding the circumstances relating to the accident; seating arrangement, safety belts if any, and economic status. Clinical assessment include visual acuity by Snellen's test types, slit lamp microscopy, direct and/or indirect ophthalmoscopy to assess the extent of injury and visual as well as cosmetic sequelae.

Results

The actual ages of these 23 patients range from 15 years to 55 years. Twenty-one (91.2%) were young patients aged 15 years to 39 years. Of the 23 cases of windscreen eye injuries 5 (21.7%) took place in 1975, 10 (43.5%) in 1976 and 8 (34.8%) in the first 6 months of 1977. If this trend were to continue we would expect the total percentage for 1977 to be higher than that for 1976.

Table I

Patients with Windscreen Injuries involving the Eye by Age Group

Age Group (Years)	No	%
15 – 19	3	13.0
20 – 29	13	56.5
30 – 39	5	21.7
40 – 49	1	4.4
50 – 59	1	4.4
Total	23	100.0

There was a male preponderance of 15 (65.2%) as against 8 (34.8%) females (Table II). The racial composition of the patients reflected more or less the population structure of Singapore – with 78.3% Chinese, 8.7% Malays and 13% Indians.

Table II

Patients with Windscreen Injuries involving the Eye by Sex and Ethnic Group

Ethnic Group	Male		Female		Both Sexes	
	No	%	No	%	No	%
Chinese	12	52.2	6	26.1	18	78.3
Malay	1	4.3	1	4.3	2	8.7
Indian	2	8.7	1	4.3	3	13.0
Total	15	65.2	8	34.8	23	100.0

Seventeen (73.9%) were front seat passengers as against 6 (26.1%) drivers at the time of accident (Table III). Of the 17 (73.9%) front seat passengers, 9 (39.1%) were males and 8 (34.8%) females. This contrasts with 6 (26.1%) drivers all of whom were males (Table III).

Table III

Patients with Windscreen Injuries involving the Eye by Sex and Car-Seating

Car-Seating (In Front)	Male		Female		Both Sexes	
	No	%	No	%	No	%
Driver Seat	6	26.1	0	0	6	26.1
Passenger Seat	9	39.1	8	34.8	17	73.9
Total	15	65.2	8	34.8	23	100.0

A total of 24 eyes were injured in 23 cases (one patient had bilateral injury). The extent of eye injury was considerable: 16 (66.7%) eyes suffered fairly severe injury with corneal lacerations, iris prolapse and/or cataract formation. 8 (33.3%) eyes suffered very severe injury with ruptured globes and vitreous loss.

The final visual outcome of the eyes was poor. 13 (54.2%) eyes had very severe visual impairment with visual acuities ranging from 6/60 to NPL (two eyes were blind). Five (20.8%) eyes had moderately severe visual impairment with visual acuities ranging between 6/18 and 6/36. Only 6 (25%) eyes retain good vision of 6/12 or better. Cosmetic considerations show that 12 (52.2%) patients had severe facial scarring. In the two patients who lost an eye, they had to wear a prosthesis which is far from ideal. Analysis of the vehicular speed at impact showed that in 9 (39.1%) patients accidents occurred at speeds of below 50 KmH, 10 (43.5%) at 50 KmH or more and 4 (17.4%) could not estimate their speed at impact.

All patients were hospitalised with 13 (56.5%) staying more than three weeks, 4 (17.4%) over a fortnight and 6 (26.1%) a fortnight or less. Twenty-one (91.3%) were economically active with 12 (52.2%) who were "sole breadwinners" and 9 (39.1%) who helped in the family finances although they were not the main supporter of the family. Only 2 (8.7%) were economically inactive. As far as safety belts are concerned, none of the patients wore a safety belt; and in fact none of the cars had a safety belt installed. Most were not wearing spectacles except two patients whose spectacles lenses were of glass and not safety or plastic lenses.

Discussion

To date no survey of this nature had been undertaken in this part of the world. But with rising affluence and the availability of motor vehicles, unless safety precautions are adhered to, ophthalmologists especially in institutional practices will expect to see more windscreen eye injuries. Although this is a limited study, comparing the figures for 1975, 1976 and the first 6 months of 1977 we see a definite rising trend. Perhaps an extensive study say over a 10 year period might reveal more striking statistics.

One of our significant findings is the high incidence of such injuries among the front seat passengers. This finding is not without expectation – for obvious reasons the front seat passenger is not fully aware of traffic conditions as compared to the driver and therefore cannot react fast enough to take any effective evasive action. He is therefore exposed to far greater risks than any other occupant in the motor vehicle.

For this reason it is even more important for the front seat passenger to wear a safety belt than the driver. It is hoped that when seat belts do become compulsory in 1983, equal emphasis should be placed on both the front seat passenger as well as the driver in complying by wearing the safety belt.

As we have seen the extent of eye injury was severe in nearly every patient in this study. Two patients had their injured eye removed. Two other patients had phthisical eyes. In three patients the fellow eye showed cellular activity in the anterior chamber and the possibility of sympathetic ophthalmitis was entertained. However with topical and systemic steroids, these eyes improved and hence histological confirmation of our clinical diagnosis was impossible. The rarity of sympathetic ophthalmitis in Singapore remains true in our study as in a previous study (Loh, 1968) in Singapore.

It follows, from the severity of these injuries, that the final visual outcome is poor in most of these patients. The visual loss either partial or complete is frequently irreversible due to corneal scarring, structural distortion of the anterior segment, cataract formation, vitreous haemorrhage and opacities, phthisis or removal of the eye.

Analysis of the vehicular speed at impact showed that even at slow speeds of below 50 KmH, severe windscreen injuries do occur. As you would realise, estimating the speed is difficult and we would not want to emphasize too much on this; suffice to mention that most patients felt that their cars were not travelling at high speeds at impact. Only one

patient admitted that the car was "speeding" when the accident occurred but was unable to estimate the speed.

These injuries are expensive both to the patient as well as hard on the health services. Patients stayed from 10 days to two months in hospital, taking up bed space and reducing the turnover of patients who would otherwise have occupied the available bed space. Besides having to bear the cost of their stay in hospital, most of these patients are economically active and being away from their jobs represent an economic loss not only to themselves but to their employers and the nation as a whole. If the economic loss is measured in terms of dollars and cents, it should be substantial.

Perhaps the most striking finding in this survey is that none of these patients had seat belts on. This is a widespread practice in Singapore. It is our belief and contention that if these patients had a safety harness on at impact, the severity and extent of injury would have been minimised if not prevented. A properly fastened safety harness would certainly prevent the patient's body from lurching forward and the head crashing through the windscreen.

Finally as an added precaution for those who normally wear glasses (and this is common in Singapore) we would strongly recommend that they have their spectacles made with safety plastic lenses which could act as eye shields in the event of accidents not only on the road but also in industry, sports and in the home.

Summary

Twenty-three patients seen over a $2\frac{1}{2}$ year period (1975–1977) had severe eye involvement following windscreen injuries. 17 (73.9%) were front seat passengers and 6 (26.1%) were drivers. The significant finding was that none wore seat belts. Twenty-four eyes were injured in 23 patients (one patient had both eyes injured). The extent of eye injury was severe; 16 (66.7%) eyes had moderately severe injury and 8 (33.3%) eyes had very severe injury including two blind eyes. The final visual outcome was poor in spite of surgery: over 2/3 had significant visual deficit. Twenty-one (91.2%) cases were economically active and were young patients whose ages range from 15 to 39 years. If seat belts and possibly safety plastic lenses (for those who need spectacles) were used, we believe these injuries could be minimised if not prevented.

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Reference

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