FATAL TRAFFIC ACCIDENTS IN MEDELLIN, COLOMBIA,
SOUTH AMERICA

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Colombia, as other developing countries, has a serious problem with fatal traffic accidents. The last countrywide data, for 1967, indicate that 2,026 persons died of this cause during that year, with a mortality rate of 10.5 per 100,000 inhabitants (1). A more meaningful figure is provided by the comparison of the above with the number of existing vehicles, and the number of people who were killed or injured. There were 264,300 motor vehicles, and the number of traffic accident deaths per 1,000 vehicles was 7.7. This figure is surpassed in America only by Ecuador with 14.9. Compare this with the figures for the United States and Canada, which are respectively 0.6 and 0.7 dead per 1,000 vehicles (2).

Two Colombian cities, Bogotá and Cali, participated in a study of traffic accidents and mortality done by the Oficina Sanitaria Panamericana (OPS) (3), but in general, the literature on this subject is very scarce for our country (4). This was one of the reasons for carrying on this research in Medellin. For this purpose we have examined the autopsies practiced in the City Morgue during a period of fifteen months, extending from

September 28, 1970 to December 31, 1971.

Medellin is the second largest city in Colombia with an estimated present population of 1,000,000, and an urban area of 358 Km^2. It has 1,200 Km of roads, and the number of registered vehicles in 1971 was 60,000

RESULTS OF THE STUDY

20% of all autopsies done at the City Morgue during this period were on persons who were killed in traffic accidents. This represents 156 victims. Of these, 135 were pedestrians (86.6%) 16 were passengers (10.2%) and 5 were drivers (3.2%). These figures are similar to these compiled for Bo-gotá and Cali (3), and they tend to confirm that the pedestrian of our cities runs the greatest risk of harm in traffic accidents.

The Pedestrian. Table 1 illustrates the distribution by age and sex of pedestrian victims. It can be clearly seen that males predominate. There were victims of all ages, with the greater number between the ages of 20-30 economically considered the most productive group. Table 2 shows the place of death. It can be seen that 83% of pedestrian victims died during the first 24 hours after the accident. This is a reflection of the seriousness of the traumas.

No deaths occurred during transport to the hospitals. Table 3 shows the time of occurrence of the fatal accidents. 31.6% of these happened during the night hours (from 9 p.m. to 6 p.m.), even though the traffic of pedestrian and motor vehicles is considerably reduced during those hours. Perhaps the consumption of alcoholic beverages by drivers and pedestrians

played an important role. However, this could not be established in all cas⁻es. Most fatal accidents involving pedestrians occurred around 3 p.m, which is to be expected due to the increased vehicular and pedestrian traffic at that time.

Table 4 lists the most serious injuries (those which presumably caused death) suffered by the pedestrian victims, grouped into five different types. However, in most cases these death-causing lesions occurred in association with traumatisms of the bones and soft tissues. We observed especially some of the injuries of great interest for legal medicine such as those produced by impact with the vehicle's bumper (PL. 1), impressions of tires on the skin (PL. 2), and injuries caused by dragging with associated show of viscera (PL. 3).

Cranioencephalic traumas caused death in almost half of these pedestrian victims. The lesions varied widely, but subdural hemorrhaging in more than one of the cranial fosa showed up with more frequency, being present in one-third of the cases. In eleven cases there were encephalic lacerations with intracerebral hematomas present. In ten cases the encephalic mass was totally mashed. Extradural and subdural hemorrhaging occurred simultaneously in nine cases. Extradural hemorrhaging alone was found in only two cases. In seven cases there was subaracnoid hemorrhaging with severe edema associated with hernias, located mainly in the cerebellous amygdals and sometimes in the uncus. There were fractures of one or more bones in 36 cases, which is equivalent to 60% of all cranioencephalic traumas. In two opportunities the main finding was the presence of subara⁻cnoid hemorrhagingwithout any apparent edema or hernias. In both cases

however there was fracture of the clinoid apophysis, and the hypophysis appeared completely mashed. Of these two patients one survived eight hours and the other one eleven hours, both comatous,but without any signs for location of a neurologic injury. We did not find any injury which could explain death. Fat embolism could not be determined either. At this time we do not have an adequate explanation for these occurrences, and we ignore the role that could have been played by hypophisial trauma.

Thoracic injuries were different for children and youths, as compared with adults: the former showed pulmonar bursting with extense hemorrhaging, but without any evidence of fractures, due probably to the elasticity of the thoracic cage. However, the main finding for adults was the presence of costal fractures which lacerated the pulmonar parenchyma and caused massive hemothorax.

Abdominal traumas varied from those involving avulsion with show of viscera and closed traumas with rupture of massive and hollow viscera. The liver was affected most frequently. It often showed multiple tears which in many cases caused fatal hemoperitoneum before any treatment could be established. Another important finding was pelvic fracture which produced retroperitoneal hematomas. In these cases we could not deter - mine one specific vessel as the source of the hemorrhaging. We could only determine that several vessels in the abdominal wall were the possible source.

We classify as polytraumatisms those which showed more than one injury capable by itself of producing death. In this group we include a young female victim who died of systemic fat embolism two days after suffering fractures

in the lower extremities.

Late deaths are explained in Table 4. The two patients with meningitis showed linear skull fractures which were not suspected before autopsy. Both fractures ocurred in the anterior fosa with possible fistulae of cerebrospinal fluid.

Other incidental findings of autopsies practiced on pedestrian victims were as folows: two patients showed cerebromeningeal scars of the central nervous system, and both suffered convulsive crises. Another one was an oligophrenic who placed himself under the wheels of a vehicle, without being noticed by the driver.

The Passenger. There were 16 passenger deaths, or 10.2% of the total. Table 5 shows their distribution by age and sex. Males from the 20-30 years age- group predominate.

Table 6 shows the place of death. Most deaths occurred at the scene of the accident, and all victims in this category were dead by the end of the first day. One patient died during transportation to the hospital due to acute anemia caused by the amputation of an upper extremity.

Multiple traumas were responsible for death in eight cases, in half of which these were injuries of the thorax and abdomen. Other cases showed associated cranioencephalic trauma. In this latter group we included a young woman with fracture of the pelvis and tibia who also developed systemic fat embolism. Cranioencephalic trauma alone (without other serious lesions involved) was responsible for death in five cases: In all of these the victims showed extensive fractures with severe lacerations of the

encephalic mass. Acute anemia caused death in two cases: one as a consequence of pelvic fracture and hemoperitoneum, the other was already commented upon when we referred to deaths occurring during transportation. One child suffered pulmonar bursting when he was trapped by a pneumatic door in a bus. In two polytraumatized patients there were associated second -degree burns, of little extension.

It is interesting to comment upon the type of vehicle in which death occurred. Bear in mind that safety belts are not used in Colombia. In seven cases death occurred in open-platform trucks in three different accidents: two of these accidents involved military troop transports. In all these cases involving open-platform trucks the vehicle overturned and caused the death of some occupants of the tarp-covered platform.

Four deaths occurred in bus-type vehicles, in two different accidents: both accidents involved collision with moving vehicles. Two automobile passengers died due to collisions: one in a taxi and the other in a private vehicle. Another passenger died when the jeep in which he was traveling overturned.

Excessive vehicular speed could not be determined for any of the cases mentioned above. Most deaths could be attributed to direct traumas not involving injuries caused by deceleration. We must note that our motor vehicles are to a large extent old or antiquated, and the import duties on newer vehicles are high. Also our roads are not adequate for high-speed driving. This is in contrast with developed countries, where modern vehicles can reach high velocities in adequate highways.

The Driver. In Colombia drivers are the population with lowest risk in traffic accidents. There were only five traffic accident fatalities belonging

to this category, or 3.2% of the total. All victims were males, and it was ascertained that three of them had ingested liquor moments before the accident occurred. In three cases death was due to cranioencephalic trauma. In one case there were multiple rib fractures with lung tears, and hemothorax present. In another case, there was sternum fracture with cardiac trauma. Autopsy didn't reveal any associated injury of cardiac, pulmonar or central nervous system type, in any of these victims.

Location of fatal traffic accidents in the city:

We drew a map of Medellin for our own use and observed that most accidents occur in higher-speed roads and streets, for example the Autopista Norte. These roads have also a large flow of pedestrians, who cross the roads carelessly. These roads give access to the city from neighboring towns. There are not as many traffic accidents in downtown Medellin due to the slower pace of traffic there.

SUMMARY

A study of fatal traffic accidents in Medellin, Colombia shows us that the highest risk population is composed of pedestrians, while passengers and drivers are relatively lower-risk categories.

One-half of the victims die of cranioencephalic traumas.

We analyzed some peculiarities of traffic accidents in our city, which in this respect is probably similar to other cities in developing countries.

TABLE 1

DISTRIBUTION BY AGE AND SEX OF 135 PEDESTRIANS WHO DIED IN TRAFFIC ACCIDENTS

AGE IN YEARS	MALES	FEMALES	TOTAL
0-5	11	4	15
6-10	10	7	17
11-20	11	4	15
21-30	29	2	31
31-40	18	3	21
51-60	15	7	22
61-70	6	1	7
71 and more	3	3	6
	104	31	135
	67%	23%	100%

TABLE 2

PLACE OF DEATH FOR 135 PEDESTRIANS KILLED IN

TRAFFIC ACCIDENTS

PLACE OF DEATH:	TOTAL	PERCENT
Scene of the accident	53	39%
During transport to the hospital	0	0
During hospitalization:		
a) during the first hour	26	19%
b) between 1 and 24 hours	34	25%
c) more than 24 hours	22	17%
Total	135	100%

TABLE 3

TIME OF FATAL TRAFFIC ACCIDENT FOR PEDESTRIAN

TIME	TOTAL	PERCENT
0-3 a.m.	14	10,3 %
3-6 a.m.	14	10,3 %
6-9 a.m.	7	5,5 %
9-12 m.	12	8,8 %
12-3 p.m.	14	10,3 %
3-6 p.m.	20	14,8 %
6-9 p.m.	10	7,4 %
9-12 p.m.	16	11 %
Unknown	6	4,4 %
Total	135	100 %

TABLE 4

INJURIES WHICH CAUSED DEATH IN 135 PERSONS

		Total	Percent
1)	Cranioencephalic traumas	60	44%
	Trauma of the hypophysis	2	1,5%
2)	Abdominal trauma	27	20%
	Bursting of the liver	10	
	Retroperitoneal hematoma due to pelvic fracture: associated ⎰bladder 3 / rupture ⎱urethra 1	7	
	Bursting of liver and spleen	2	
	Bursting of liver and kidney	2	
	Bursting of spleen and kidney	1	
	Bursting of hollow viscera	5	
	(Small intestine 2, duodenum 1, multiple 2)		
3)	Thoracic trauma	19	14%
	Bursting of lungs	10	
	Rib fractures with hemothorax	9	
4)	Polytraumatisms	21	
5)	Late deaths (more than one week)	6	
	Broncopneumonia	2	
	Sepsis, after C5 fracture	1	
	Meningitis, after skull fracture	2	
	Colangitis and duodenal fistula	1	
	Total	135	100%

TABLE 5

DISTRIBUTION BY AGE AND SEX OF 16 PASSENGERS KILLED

IN TRAFFIC ACCIDENTS

Age in years	Males	Females	Total
0-10	-	3	3
11-20	1	-	1
21-30	7	2	9
31-40	-	1	1
41-50	1	-	1
51-60	1	-	1
Total	10	6	16

TABLE 6

PLACE WHERE DEATH OCCURRED FOR 16 PASSENGERS

Place of death	Total
Scene of the accident	10
During transport to the hospital	1
During hospitalization:	
a- during the first hour	2
b- between 1 and 24 hours	2
c- more than 24 hours	1
Total	16

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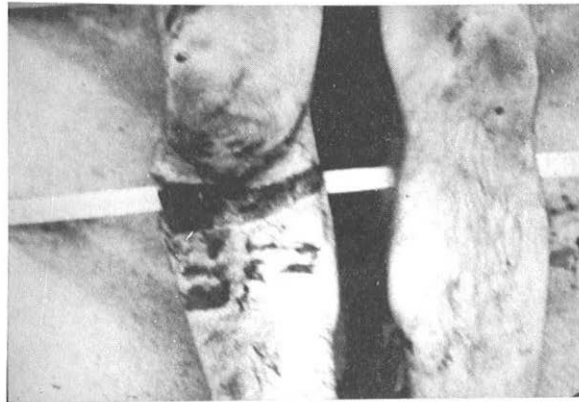
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Plate 1 :

Bumper impact injury

Plate 2 :

Tire impressions on the skin
of a pedestrian

Plate 3 :

Dragging injury with show
of abdominal viscera