

An Epidemiological Study of Abdominal and Pelvic Injury Trauma in post-mortem Cases at Hospital Kuala Lumpur Between The Year of 2002-2003

(Kajian Epidemiologi Ke Atas Kecederaan Trauma Abdominal dan Pelvik di Kalangan Kes Bedah Siasat di Hospital Kuala Lumpur di antara Tahun 2002-2003)

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ABSTRACT

The abdominal pelvic cavity has always been regarded as one of the most vulnerable regions of the body. Injuries to this part have been known to be very serious. Based on this a retrospective study was performed on postmortem cases with abdominal and pelvic trauma from 1 October 2002 to 31 January 2003 at the Forensic Institute, Hospital Kuala Lumpur to determine the common pattern of abdomino-pelvic injuries, the injury's relationship to epidemiological and socio-economic factors, risk organ within the abdomino-pelvic region and relationship between injuries and survival period. A total of 122 cases abdomino-pelvic were obtained stemming from medico legal postmortems procedures. Results indicated that those aged between 21 to 30 years (38.5%) had the highest incidence of this type of injury. Categorization based on gender showed that males (90.2%) dominated most of the cases. Prevalence based on socio-economic status showed that lower socioeconomic class (52.5%) had the highest incident. This was followed by the middle income (39.3%) and finally the higher income group. The most numerous type of trauma was non-penetrating trauma (94.3%). It was also found that victims with low injury severity score (ISS) had a longer survival period as compared to those with high ISS. It was also noted that victims with two or more region injuries either were spot dead or brought dead. The most common combination of injuries was abdomen, pelvic, chest and limb. In most blunt trauma cases majority of victims had one or two organ involvement while penetrating injuries were difficult to assess. The most common organ involved in this type of trauma was liver (72.1%), pelvic bone (47.5%) and spleen (43.4%). In conclusion, abdomino-pelvic injury is a serious condition and should not be overlooked. Proper attention towards their diagnosis and

management is important and so any patient of head injury with coma must be considered as having intra-abdominal injury until proven otherwise.

Key words: Postmortem, Injury, Pelvic, Abdomen.

ABSTRAK

Ruang abdomen pelvis telah dikenal pasti sebagai salah satu kawasan yang mudah terdedah kepada bahaya. Kecederaan pada bahagian ini telahpun dikenal pasti sebagai sangat merbahaya. Berdasarkan ini sebuah kajian retrospektif telahpun dijalankan di Institut Forensik, Hospital Kuala Lumpur terhadap kes post-mortem trauma abdominal dan pelvis dari 1 Oktober 2002 hingga 31 Januari 2003 bagi menentukan corak sesama yang kerap dihasilkan oleh kecederaan abdomino-pelvik, hubung kait kecederaan tersebut dengan faktor epidemiologi dan sosioekonomi, menentukan organ yang berisiko dalam ruangan abdomino-pelvis dan hubung kait di antara kecederaan dan tempoh masa hidup. Sebanyak 122 data kes telah diperolehi daripada mangsa post-mortem mediko-legal. Keputusan menunjukkan bahawa mereka yang berumur di antara 21 hingga 30 tahun (38.5%) mempunyai insiden tertinggi untuk kecederaan jenis ini. Pengelasan berdasarkan jantina pula menunjukkan bahawa golongan lelaki (90.2%) mendominasi kes-kes yang dicatatkan. Prevalen berdasarkan status sosioekonomi pula menunjukkan bahawa golongan berpendapatan rendah (52.5%) merupakan penyumbang mangsa terbanyak. Ini diikuti dengan golongan berpendapatan sederhana (39.9%) dan akhir sekali golongan berpendapatan tinggi. Jenis trauma yang tertinggi adalah daripada jenis trauma tanpa menembus (94.3%). Didapati bahawa mangsa dengan nilai skor keterukan kecederaan (ISS) rendah mempunyai nilai jangka hayat yang tinggi berbanding dengan golongan yang mempunyai nilai ISS yang tinggi. Penelitian keputusan juga menunjukkan bahawa mangsa dengan lebih daripada dua lokasi kecederaan akan mati di tempat kejadian ataupun mati dalam perjalanan. Kombinasi kecederaan yang kerap dilihat adalah di abdomen, pelvis, dada, dan anggota atas dan bawah. Pada kebanyakan kes trauma tanpa tanda, mangsa didapati mengalami kecederaan pada lebih daripada dua organ manakala golongan yang mengalami kecederaan menembus pula sukar untuk ditentukan bilangan organ yang terlibat. Organ yang kerap terlibat untuk trauma jenis ini adalah hepar (72.1%) tulang pelvis (47.5%) dan limpa (43.4%). Kesimpulannya, kecederaan abdomino-pelvik merupakan kecederaan yang serius dan perlu diambil perhatian. Pemerhatian penuh terhadap diagnosis dan pengurusan pesakit adalah penting. Oleh itu sebarang kecederaan di bahagian kepala pada pesakit yang koma perlu dipertimbangkan sebagai mengalami kecederaan intra-abdomen sehinggalah dibuktikan sebaliknya.

Kata kunci: Post-mortem, Pelvis, Abdomen

INTRODUCTION

The abdomino-pelvic region has been considered as one of the most vulnerable regions of the body and injuries involving this area of the body has been considered very serious. Even Hippocrates as early as 460 B.C. was aware of the danger to life caused by injury to the liver and spleen (Adams et al. 1996).

For the past five decades incidence of trauma injury had increased dramatically due to the increased density of motorized transportation, fast moving vehicular traffic, vast urbanization, rapid industrialization, changing social pattern and increased crime rate. In general abdomen and pelvic trauma cases are composed of either penetrating or non-penetrating injuries. Recent study in India had indicated that vehicular accidents usually involved the age group of 20 to 40 years. In 1978 alone, 27.4% of cases that had involved vehicular accident were due to abdominal injury (Chandra & Dogra 1978). Organs that are involved are usually the head, pericardial or the abdominal regions. Since abdomino-pelvic cavity contains vital organ like liver, spleen, kidney, stomach and intestine, trauma to this part of the body is life threatening (Bishop et al. 1991).

Injuries to the abdomen and pelvis are often associated with injuries to other parts e.g. head, chest, spine and extremities. Hence intra-abdominal or intra-pelvic involvement may be overlooked. Early recognition of the injuries and immediate treatment will in general improve the overall survival rate of the patient. If overlooked and neglected, this situation would eventually have medico-legal implications. Due to the significant social impact of trauma, a study was undertaken to study the pattern of abdomino-pelvic injuries in trauma cases occurring in Hospital Kuala Lumpur, Malaysia.

MATERIALS AND METHOD

SUBJECTS

This is a retrospective in examining medical records of postmortem cases with abdominal and pelvic trauma from 1st October 2002 to 31st January 2003 conducted at the Forensic Institute, Hospital Kuala Lumpur. Inclusive criteria were (1) Presence of abdominal and pelvic trauma, (2) Victim was hospitalized following accident and had died to injuries and (3) Autopsy was conducted and a comprehensive report was available.

DATA ANALYSIS

Data that was collected included history, casual factors, external and internal examination, associated injuries, cause of death and injury severity score (ISS). Socio-economic status for every case was also determined using three socio-

economic classes i.e. lower income (<RM696), (2) middle income (RM696-8625) and (3) upper income (>RM 8625).

ISS were based on a simplified trauma chart suggested by Acosta et al (1998). This involved the grading of all injuries of given case using the trauma chart. the AIS code of the most severe injury in each of the six body regions was recorded under AIS score in the scoring table. The injury severity score was then obtained by summing the squares of the highest AIS code in each of the three most severely injured regions. For example, injuries scored as ais-6 were assigned an ISS of 75.

RESULTS

Results indicated that abdominal and pelvic trauma is highest among the 21 to 30 years age group (Table 1). Children below 10 years constituted only 2.5% while those above 70 years constituted only 1.0%. Male were found to have a 10 : 1 ratio for this type of injury compared to female (Table 2). Among the 122 cases examined, those classified as lower socio-economic were found to have the highest prevalence of this type of injury. This is followed up closely by middle class (39.3%) and upper class (8.2%) (Table 3).

TABLE 1. Distribution of reported cases based on age and survival period

Age group	Dead on arrival	Survival period								
		< 2 hours	2 – 6 hours	6 – 12 hours	12 – 24 hours	24 hours – 3 days	3 days – 1 week	1 week – 2 weeks	2 weeks – 4 weeks	> 4 weeks
0 - 10	2	1	-	-	-	-	-	-	-	-
11 - 20	5	1	6	4	-	-	-	-	-	-
21 - 30	8	6	8	4	2	3	3	2	-	2
31 - 40	5	3	6	2	-	2	-	-	1	-
41 - 50	2	3	1	-	-	2	3	-	-	-
51 - 60	1	1	1	-	-	-	1	-	-	-
61 - 70	1	2	-	-	-	1	1	-	-	-
71 – 80	-	-	1	-	-	-	-	-	-	-

TABLE 2. Distribution of reported abdomen-pelvic injury cases based on sex

Sex	Cases	Percentage
Male	110	90.2%
Female	12	9.8%

TABLE 3. Distribution of reported cases based on socio-economic status

Socio-economic class	Cases	Percentage
Upper income	10	8.2%
Middle income	48	39.3%
Lower income	64	52.4%

It was observed that the persons in the age group of 21 to 30 years and 31 to 40 years had a longer survival period compared to children below 10 years and elderly above 70 years (Table 1). When the data was normalized based on ISS it was found that victims with low ISS (21 to 40 ISS) had better survival rate compared to victims with high ISS (>51 ISS) (Table 4) .

TABLE 4. Distribution of reported cases based on age and ISS

ISS score	Dead on arrival	Survival period								
		< 2 hours	2 – 6 hours	6 – 12 hours	12 – 24 hours	24 hours	3 days – 1 week	1 week – 2 weeks	2 weeks – 4 weeks	> 4 weeks
0-10	-	-	-	-	-	-	-	-	-	-
11-20	-	-	-	-	-	-	-	-	-	1
21-30	-	-	-	1	1	5	4	2	-	1
31-40	1	-	9	6	-	1	3	-	-	-
41-50	13	9	11	1	-	-	-	-	-	-
51-60	10	1	-	-	-	-	-	-	-	-
61-70	-	-	-	-	-	-	-	-	-	-

We also found that majority of the victims with associated body injuries to two or more body regions were usually spot dead (18 cases), brought dead (17 cases) or had very short survival period. Victims with associated injuries of the chest had remarkably long survival period compared to victims associated with head injuries. In general, the most common combination of associated injuries observed was abdominal, pelvic, chest and limb injuries and non-penetrating trauma dominated the type of injury by as high as 94.3% (Table 5). A further analysis of the result indicated that peritoneal hemorrhage (80.3%), liver (68.0%) and pelvic bone (23.0%) dominated organ involved in non-penetrating trauma. On the other hand, peritoneal hemorrhage is highest in penetrating trauma (Table 6).

TABLE 5. Frequency of multiple intra-abdominal organ injuries

Number of intra-abdominal organs injury	Non-penetrating cases	Penetrating cases	Total
1	43	2	45
2	37	1	38
3	19	2	21
4	8	1	9
5	8	1	9

TABLE 6. Distribution of reported cases based on age and ISS

Organ	Non-penetrating trauma	Penetrating trauma
Diaphragm	12	4
Peritoneal hemorrhage	98	7
Retroperitoneal hemorrhage	5	1
Stomach	5	3
Omentum	21	-
Small intestine	13	1
Large intestine	9	2
Mesentery	36	3
Liver	83	5
Spleen	53	-
Gall bladder	2	-
Pancreas	10	2
Adrenals	5	-
Vascular injuries	5	1
Kidney	33	3
Urinary bladder	15	-
Urethral injuries	5	-
Uterus	1	-
Ovaries	1	-
Lumbar spine column	5	2
Sacrum	2	-
Pelvic bone	28	-

DISCUSSION

In this study it was observed that majority of cases were males and within the age group of 21-30 years old. This characteristic was also seen by other researchers that had found highest incident in male at the mean age of 29.8 and 30 years (Degiannis et al. 1996, Regel et al. 1995). A large number of cases in this

age range can be attributed to the fact that young persons are at the peak of their health and sufficient income. These two factors will usually induce most young individuals to take undue risk, thereby subjecting themselves to the hazards of accident and injuries. Male dominance in this type of injury could likely be due to the fact the males are more exposed to hazards of roads, industry, violence and sports, as they constitute working and earning member in majority of families.

In the above report, it was quite clear that the maximum number of victims of abdominal and pelvic trauma were from lower economic class while upper class constitutes the lowest amount. This finding tallies with other research that had found similar characteristics (Chibnall et al. 2005). It is very likely that this is due to the type of transportation that these group usually took i.e. motorcycle..

In the present study, spot dead and brought dead cases accounted for 19.7% cases each. This emphasizes the fact that these victims need on-spot emergency, medical care and rapid transportation from the incident site to the hospital. Dally and Thomas (1992) reported that majority of the death are due to multiple injuries occurred before arrival at the hospital. We also noticed that youngsters of second and third decades, victims with low ISS score and victims with associated injuries of chest had long survival period as compared to young children and elderly. Victims of high ISS and victims with associated injuries must be taken into consideration.

In the present study, majority of the victims had multiple intra-abdominal injuries. Similar findings have also been reported by Talton et al. (1995). This high prevalence can be explained by the fact that penetrating wounds of lower chest often extend through the diaphragm and injury the liver, spleen, stomach or intestine. Penetrating wounds of the abdomen mainly from forearms often cause widespread visceral damage because of missiles capricious course, ricocheting and burning. Blunt injuries of the abdomen is commonly due to compression, traction or bursting forces that would eventually cause widespread involvement of internal abdominal viscera.

Majority of peritoneal hemorrhage cases in the present study were due to combined liver and spleen injuries followed by liver injuries alone. This characteristic tallied well with the finding of Ndiaya (1995). Retroperitoneal hemorrhage caused by blunt trauma is usually attributed to vehicular accident and was commonly found associated with pelvic fractures (50%) (Table 6). This characteristic was incidentally similar to what was reported by Albektsen & Thomsen (1989) and Lucas & Ledgerwood (1975).

In this report, liver injuries due to blunt trauma were observed in 68.0% of cases, of which majority of cases were due to vehicular accidents. Similar findings have also been reported by Davis et al. (1996) in which majority of cases showed laceration injury including superficial and deep lacerations. Piecemeal liver was also noted in 11.4% of the cases. Penetrating trauma directed towards right, left costal, and sub costal regions by firearms or knife was found to cause injury to

the liver. A total of 40.0% of liver injuries were noticed following penetrating wounds of the abdomen. This tallied well with previous report by Sharma (1989) which had reported this type of incident to be at 44.4%. Liver was also found to be the most commonly injured organ following penetrating abdominal trauma.

CONCLUSION

In conclusion abdomino-pelvic injury is serious and should not be overlooked especially those that are males, aged between 21-30 and having lower social-economic background. Proper assessment of survival time is important, and factors such as age, ISS and associated injuries must be taken into consideration.

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