

Medicolegal Aspect of Abdominal Injuries in Egypt

***A Retrospective study in Cairo and Giza
governorates throughout the years 2009, 2010***

Thesis submitted in the partial fulfillment
of The Masters Degree in Forensic Medicine and toxicology

BY

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بسم الله الرحمن الرحيم

(وَأَنْ لَّنِيسَ لِلْإِنْسَانِ إِلَّا مَا سَعَى
وَأَنْ سَعْيُهُ سَفْوَةٌ بُرَى)

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List of Abbreviations

<i>AAT</i>	Abusive abdominal trauma
<i>AIDS</i>	Acquired immune deficiency syndrome
<i>BDR</i>	Blunt diaphragmatic rupture
<i>BMI</i>	Bowel and/or mesenteric injuries
<i>CDC</i>	Center for disease control
<i>CHDIR</i>	CDC Health Disparities and Inequalities Report
<i>cm</i>	Centimeter
<i>CO</i>	Carbon monoxide
<i>CT</i>	Computed tomography
<i>CT</i>	Computed tomography
<i>DALYs</i>	Disability-adjusted life-years
<i>DALYs</i>	Disability-adjusted life-years
<i>DPL</i>	Diagnostic peritoneal lavage
<i>ED</i>	Emergency department
<i>GIT</i>	Gastro-intestinal tract
<i>HIV</i>	Human immunodeficiency virus
<i>HVA,</i>	High-velocity accidents
<i>IDH</i>	Intra duodenal hematoma
<i>IVC</i>	Inferior vena cava
<i>LVA</i>	Low-velocity accidents
<i>MVA</i>	Motor vehicle accidents
<i>PM</i>	Postmortem
<i>SMA</i>	Superior mesenteric arteries
<i>US</i>	United States
<i>USA</i>	United States of America

- **Introduction:**

The damage caused by blunt and penetrating trauma (stab, bullet) of the abdomen depends upon the location of the injury. In addition, the large area of the anterior abdomen occupied by the intestine provides a target for perforation with consequent chemical or infective peritonitis (*Saukko and Knight, 2004*).

The abdominal organs are vulnerable to a variety of injuries from blunt trauma because the lax and compressible abdominal walls, composed of skin, fascia, and muscle, readily transmit the force applied to the abdominal viscera. However, absence of external injury (contusions or abrasions) to the abdominal walls does not exclude injury. The lack of external injuries is attributable to the lax and compressible abdominal walls and protection afforded by clothing (*DiMaio and DiMaio, 2001*).

The liver, intestine, spleen and mesentery are most vulnerable (*Saukko and Knight, 2004*). Urinary tract injuries occur in 3%–10% of all abdominal trauma patients, the kidney being the most commonly injured organ. The vast majority (80%–90%) of cases is secondary to blunt abdominal trauma and most significant renal trauma is associated with injury to other major organs (*Alonso et al., 2009*).

Massive trauma and abdominal catastrophes carry high morbidity and mortality. In addition to the primary pathologic process, a secondary systemic injury, characterized by

inflammatory mediator release, contributes to subsequent cellular, end-organ, and systemic dysfunction (*Smith et al., 2010*).

Penetrating injuries to the abdominal viscera from projectiles can cause immediate or delayed disability or death. The abdominal viscera, particularly the intestines, are vulnerable to penetrating injuries making management of penetrating colorectal injuries among the most important issues in traumatology (*Saghafinia et al., 2010*). Penetrating trauma of the abdomen continues to be a major cause of trauma, with the stab wounds encountered three times more often than gunshot wounds, but have a lower mortality because of the lower energy transmitted (*Butt et al., 2009*).

- **Aim of the work:**

The aim of the present study is to evaluate abdominal injuries in Cairo and Giza, and their relations to factors such as age and gender of victims, motive of assault, outcome of the injury and other factors.

- **Methodology:**

Data of cases with abdominal injuries, presented to departments and morgue of Cairo and Giza in Medicolegal Administration in 2-years period from January 1st 2009 to

December 31st 2010, will be collected from files and analyzed.

Data collected will include the following:

1. Age of victims.
2. Gender of victims.
3. Circumstances of the injury.
4. Motive of the injury, if any.
5. Type of trauma.
6. Site of trauma.
7. Weapon used.
8. Prognosis.
9. Manner of trauma and death.
10. Cause of death.
11. Positive findings in postmortem cases (e.g. peritonitis....etc).

- **Results and Discussion:**

The results collected will be analyzed and discussed accordingly.

- **Conclusion and Recommendations:**

Based on the results and discussion.

• **References:**

1. ***Alonso, R.C.; Nacenta, S.B.; Martinez, P.D.; Guerrero, A.S. and Fuentes, C.G. (2009):***

Kidney in Danger: CT Findings of Blunt and Penetrating Renal Trauma. *RadioGraphics*. 29: 2033-2053.

2. ***Butt, M.U.; Zacharias, N. and Velmahos G.C.(2009):***

Penetrating Abdominal Injuries: Management Controversies. *Scand J Trauma Resusc Emerg Med*. 17-19.

3. ***DiMaio, V. J. and DiMaio, D.(2001):***

Blunt Trauma Injuries of the Trunk and Extremities. In: *Forensic Pathology 2nd ed.* Edited by CRC Press Library of Congress. pp: 114-40.

4. ***Saghafinia, M.; Nafissi, N. Motamedi, M.R.K.; Motamedi, M.H.K.; Hashemzade, M.; Hayati, Z. and Panahi, F. (2010):***

Assessment and Outcome of 496 Penetrating Gastrointestinal Warfare Injuries. *JR Army Med Corps* 156(1): 25-27.

5. ***Saukko P and Knight B. (2004):***

Chest and Abdominal Injuries. In: *Knight's Forensic pathology*. 3rd ed. Edited by Saukko, P. and Knight, B. Edward Arnold publishers. pp: 222-34.