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Research Paper

Selective Non Operative Management of Penetrating Abdominal Injuries

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ABSTRACT:

BACKGROUND:

At early 1960s, (Gerald W. Shaftan, M.D.) support "observant and expectant management" rather than operative management in the management of penetrating abdominal injury.

OBJECTIVE:

To assess the expediency and safety of selective nonoperative management in penetrating abdominal injuries.

PATIENTS AND METHOD:

Prospective study was performed at Al-Imamain Al-Kadhimain Medical City over a two years from (October 2018 to October 2020) the study included patients with penetrating abdominal injuries from level of fifth intercostal space to the level of pubic symphasis. Patients with peritonitis or hemodynamic instability were selected for emergent laparotomy. Clinically conscious patients who were haemodynamically stable and had no signs of peritonitis were evaluated by CT scan with intravenous contrast.

RESULTS:

During the study, there were 143 patients with penetrating abdominal injuries , (62.22%) underwent an emergency laparotomy. (37.76%) were selected for CT scan evaluation and clinical observation. (7.69%) of them have CT-scan findings of hallow viscous injury and explored. (1.39%) failed for nonoperative management. (28.67%) had been managed nonoperatively successfully.

CONCLUSION:

Selective nonoperative management of penetrating abdominal injuries can be practiced safely with use of CT scanning.

KEY WARDS: selective nonoperative, penetrating abdominal injury, bullet injury, stab wound, shell injury.

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Iraqi Postgraduate Medical Journal, 2024; Vol. 23(3): 303-307
DOI: 10.52573/ipmj.2024.137400 Received: January 19, 2023, Accepted: April 30, 2023

INTRODUCTION:

Before 20th century, abdominal injuries were treated expectantly, with immobilization, dressings, blood-letting, and pain killers, with high death rates.[1] At the turn of 20th century during the first World War, operative management became the accepted standard for penetrating abdominal injuries.[1,2] At early 1960s, (Gerald W. Shaftan, M.D.) support "observant and expectant management" rather than operative management in the management of penetrating abdominal injury.[2] This was boosted in 1969 by Nance and Cohn for the treatment of abdominal stab wounds (SWs).[3,5] Since that time, selective non operative management (NOM) of SWs to the anterior abdomen has become more readily accepted.[6] The interest for non operative management is founded on a high incidence of non therapeutic from low-velocity injuries.[8,9]

Reports on the incidence of unnecessary laparotomy range from 23% to 53% for patients with SWs and 5.3% to 27% for patients with GSWs.[10] Complications develop in 2.5% to 41% of all injured patients undergoing negative laparotomy, small bowel obstruction, ileus, wound infection, myocardial infarction, iatrogenic visceral injury, and even death have been reported secondary to unnecessary laparotomy.[8]Fortunately, with few exceptions, it is not necessary to determine in the emergency department which intra-abdominal organs are injured, only whether an exploratory laparotomy is necessary or not.[12]

AIM OF THE STUDY:

To evaluate the expediency and safety of selective nonoperative management in penetrating abdominal injuries.

PATIENTS AND METHODS:

This prospective study was achieved at Al-Imamain Al-Kadhimain Teaching Medical City over a two years from (October 2018 to October 2020) the study covered all injured patients with penetrating abdominal injuries from level of fifth intercostal space to the level of pubic symphasis. Patients with signs of peritonitis (significant tenderness away from the wound or rigidity), haemodynamically unstable, those who need an extra abdominal surgical intervention under general anesthesia or associated head or spinal cord injury were operated immediately. conscious patients with no signs of peritonitis haemodynamically stable were assessed by CT scan with intravenous contrast. The all area from the level of the nipples to the pubic symphysis was scanned. The region between the entry and exit site or retained bullet was scanned with 3-mm slices. If there is free intraperitoneal or retroperitoneal air, free intraperitoneal fluid in the absence of solid organ injury, localized bowel wall thickening, or bullet tract close to a hollow viscous with surrounding hematoma will be considered as diagnostic or highly suspicious sign of hollow viscous injury. All patients with penetrating solid organ injury and didn't have CT scan findings suggestive of hollow viscous injury were selected for conservative management. All observed patients were admitted to a monitored area. Any patient developed signs of peritonitis or a significant drop of the hemoglobin requiring acute blood transfusion, was operated. Otherwise, the patient was discharged 48 to 72 hours after admission, unless associated injuries required further inpatient care.

RESULTS:

During the study period, there were 143 patients with penetrating abdominal injuries, gunshot injuries 51.74% (74 patients), shells injuries 29.37% (42 patients) and stab wounds 18.88 (27 patients). Overall, 89 patients (62.22%) with haemodynamically unstable, signs of peritonitis, or those with major extraperitoneal injuries requiring an operation or spinal cord or head trauma operated immediately. The remaining 54 patients (37.76%) were selected for CT scan evaluation and clinical observation.

Immediate Operation Group

Eighty nine patients (62.22%) operated immediately because of signs of peritonitis, hemodynamic instability, or clinically unevaluable abdomen (Table:1).

Table1: Immediate Operation Group.

Mechanism of injury	Ant. Abdomen	Rt. thoracoabdomen	Lt. thoracoabdomen	Back region	Total
Gunshot injury	38 patients	3 patients	6 patients	4 patients	51 patients
Shell injury	Multiple	Multiple	Multiple	----------	32 patients
Stab wound	3 patients	1 patients	2 patients	0 patients	6 patients
Total					89

Patients selected for nonoperative management

Fifty four patients (37.76%) did not have guideline criteria for immediate surgical intervention and were selected for assessed with CT scan (Table:2). All 54 patients investigated by CT-scan of the abdomen 11 patients of them have CT-scan findings of hallow viscous injury so they underwent explorative laparotomy. The remaining 43 patients underwent observation by serial of clinical examination, abdominal ultrasound and laboratory investigation for 48 hours.

2 patients (4.65%) developed signs of peritonitis so failed to be managed conservatively one of them after 8 hours of observation was explored right nephrectomy was done with minor ascending colon injury primary repair and the second after 21 hours was explored descending colon injury was identified and primary repair was done, and both of them uneventfully recovered. The remaining 41 patients (28.67%) had been managed nonoperatively successfully.

Table 2::Summary of results. -

Type & site of injury	Immediate laparotomy	+ve CT-scan finding	Observation 48 hours	Nonoperative Mx. failure	Nonoperative Mx. success	Total
Gunshot	**51 (68.91%)**	**6 (8.1%)**	**17 (22.97%)**	**1 (5.88%)**	**16 (21.62%)**	74 (51.74%)
Back	4 (26.66%)	1 (6.66%)	10 (66.66%)	1 (6.66%)	9 (60%)	15
Rt. tho. abd.	3 (50%)	1 (16.66 %)	2 (33.33%)	---------	2 (33.33%)	6
Lt. tho. abd.	6 (75%)	1 (12.5%)	1 12.5%)	---------	1 (12.5%)	8
Ant. abd. wall	38 (84.44%)	3 (6.66%)	4 (8.88%)	---------	4 (8.88%)	45
Shell injury	**32 (76.19%)**	**3 (7.14%)**	**7 (16.66%)**	**1 (14.28%)**	**6 (14.28%)**	42 (29.37%)
Stab wound	**6 (22.22%)**	**2 (7.4%)**	**19 (7037%)**	**----------**	**19 (70.37%)**	27 (18.88%)
Back	---------	---------	4 (100%)	----------	4 (100%)	4
Rt. tho. abd.	1 (7.14%)	---------	13 (92.85%)	----------	13 (92.85%)	14
Lt. tho. abd.	2 (50%)	1 (25%)	1 (25%)	----------	1 (25%)	4
Ant. abd. Wall	3 (60%)	1 (20%)	1 (20%)	----------	1 (20%)	5
Total	89 (62.23%)	11 (7.69%)	43 (30.06%)	(4.65%)	41 (28.67%)	143

DISCUSSION:

Selective nonoperative management of stab wounds to the abdomen has become an accepted guideline of care nationwide. About 50% of stab wounds to the anterior abdomen and about 85% of stab wounds to the posterior abdomen can safely be managed nonoperatively.[1,2]

Gunshot wound

Overall 16 patients of 74 (21.62%) with gunshot wound to the abdomen in our study succeeded to be managed nonoperatively and failure (5.88%), while Demetriades et al.[4] in 2014 achieved (29.8%) successfully managed nonoperatively and failed in (13.2%), George C. Velmahos, et al.[8] in 2011 achieved (24%) successful nonoperative management and failed in (21%) and Nertisha Singh & Timothy C. Hardcastle reported in collective review study in 2015 a total of 37 studies were included of which 22 were prospective, 14 were retrospective and 1 case series.[9] A total of 21330 patients with gunshot wounds to the abdomen 5510 patients (25.83%) succeeded in selective nonoperative management and failure was in 958 patients (14.81%).

Of all three studies the result slightly higher than of our and we have failure rate less than them for overall patients with abdominal gunshot injury and that is because almost all our patients injured by high velocity missile and most of them had multiple injuries, unavailability of CT-scan with contrast in our emergency department and the special situation of our country and fears of our surgeons about society and legal responsibility.

Stab wound

We have successful rate of stab wound to the abdomen overall (70.37%) have been managed conservatively. Pradeep H. Navsaria, et al[6] in 2015 achieved in prospective study (67%) success and failure (3.5%), Walter L. Biffl, et al[7] 2017 report (73%) success and failure (2.5%) in review study and Dayananda, et al[11] 2017 report in prospective study (68.7%) successful selective nonoperative management and no fail. Overall our study is almost concurrent with comparable studies.

Shell injury

We succeeded in management 6 patients of 42 (14.28%) conservatively with multiple shells injury to the abdomen and other parts of body and failed in one that underwent delayed laparotomy. Unfortunately we didn't find any comparable study and unfair to deal with them as gunshot wound because they have multiple and extensive injuries.

CONCLUSION:

Selective nonoperative management of penetrating abdominal injuries can be practiced with use of CT scanning and is workable and safe in trauma centers with easy 24 hours access to operating room. Nearly 1 in 4 patients does not need a laparotomy. Shortening of hospital staying two days instead of seven to ten days in white laparotomy and that's lowering the cost of patient hospitality. Solid organs injuries can be managed conservatively even with extensive injury such grade 4 injury in liver and kidney and grade 3 in spleen injury. All patients that failed conservatively have hallow viscous injury. There is no difference in prognosis or duration of hospital staying between immediate operated group and delayed operated group.

RECOMMENDATION:

Selective nonoperative management of penetrating abdominal injury is recommended as a guideline in trauma centers with high level surgical facilities and expert surgical teams.

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