

Original Research Article

Penetrating and Stab Injury of Abdomen: A Prospective Study in a Tertiary Center

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ABSTRACT

Background

Stab wound has been rising at a phenomenal rate and has become a source of worry for the society. Stab wound is more commonly encountered in urban population than rural.

Aims and Objectives

(1) Epidemiological study of stab wound abdomen, (2) to study the relationship between mode of injury, clinical presentation, and severity of injury, and (3) to study these cases in terms of hospitalization, operation, mortality, and morbidity.

Methods

A prospective study was carried out in patients of stab injury admitted to the Department of Surgery, R.M.C. Jalaun, over 1½ years from July 2018 to December 2019.

Results

In our study, stab wound of abdomen constituted 5.1% of all surgical admission over 18 months.

Conclusion

A total of 60 patients of stab injury abdomen were admitted and exploratory laparotomy was performed in around 35 patient and small bowel was most frequently injured viscous. With proper treatment, most patients make good recovery and can return to duty and useful occupation.

Key words: Abdomen, Exploratory laparotomy, Stab injury.

INTRODUCTION

As we are becoming more and more civilized, (so they say) some of the hazards of civilization are becoming apparent, that is, road traffic accident, warfare, pollution, etc., Urbanization has had its toll with the increase of population and increasing competition in life along with a hard-hit economy. Some very primitive traits in the human being are coming up in the form of revenge which is basically physical with the intent of harming, threatening, or killing the victim. Stab injury has become frequent in our society. It may be accidental or suicidal; also however, they also take a toll in deaths. Of late, the incidence of Penetrating injury has been rising at a phenomenal rate and has become a source of worry, not only for the society, law, and

state but also for the hospitals, doctors who are ultimately involved in it. The patient has to be treated not only for the trauma but also the psychological aspect also has to be considered.

MATERIALS AND METHODS

The present study was conducted at the Department of Surgery, R.M.C. Jalaun, with the cooperation of the staff of: (1) Medicolegal section (2) Central record room and the help of the Resident. This is a prospective study carried out for a period of 1 ½ years from July 2018 to December 2019. The present study includes 60 cases of stab injury admitted to the Department of Surgery, R.M.C. Jalaun, over this period. This study includes patient who reported to hospital with a history of stab injury (Chaku, Gupti Sword, and Arrow) and required hospitalization for further management. Those patients who were discharged on the outpatient basis after minor repair in casualty are not included in this study. The remaining patients who sustained fatal injuries and were resuscitated in casualty and admitted to the wards and subjected to appropriate management. Of these who were admitted, the records were collected from the central record room and the ward paper was also studied, that is, Residents note and operative interference were done. The ward patients were examined in the prospective study. Cases studied comprised patients of stab injury with or without associated injury of any nature. On admission to hospital patient's name, age, sex, address, and registration number were noted. Date and time of admission was also noted. Detailed history of injury and time of injury were recorded. Nature of weapon used was noted such as Chaku, Arrow, Sword, Gupti, and Broken glass piece. If patient was conscious and not under the effect of any narcotic drugs or alcohol, his presenting complains were noted mainly pain, vomiting, distention of abdomen, and hematuria. Exact site of injury was recorded according to the region mentioned, that is, head and neck, chest, abdomen, gluteal region, and limbs. On admission to hospital, resuscitation and evaluation of injured patient began simultaneously. If patient was in state of shock often with internal injury or associated injury present, his cardiorespiratory status was assessed. Recording of vital signs was made immediately and in order of priority, establishment of adequate ventilation, control of major hemorrhage done. Insertion of large, one or more intravenous lines is accomplished and a blood sample dispatched to blood was done as required. With respiratory and circulatory efficiency restored, vital signs recording continued at 15 min intervals. Detailed physical examination and local examination were then performed. Urinary catheter inserted for recording hourly output and urine sampling to evaluate integrity of urinary track. A Ryle's tube inserted for nasogastric suction wherever necessary in abdominal injury. Resuscitation was continued throughout the period of evaluation until a treatment plan, surgery, or observation was established. The external injury was noted in detail and findings such as the presence of surgical emphysema and evisceration. Tenderness, guarding, rigidity in relation to abdominal quadrants, state of bowel sounds whether sluggish or absent, and profuse bleeding were recorded. Details of associated injury were recorded. All patients with suspected stab injury to chest, abdomen, and gluteal region were subjected to following investigation, a complete blood count, hemoglobin, differential count, urine analysis chest X-ray, and abdomen X-ray in standing or sitting position. This may revealed (a) hemothorax, (b) pneumothorax, (c) hemopneumothorax, and (d) free gas under the diaphragm, accidental pathological finding which may be relevant to the diagnosis. The patient having evisceration or profuse bleeding from suspected vascular injury was shifted to O.T. for immediate surgical exploration, immediately after resuscitation in casualty

M.O.T. without shifting of the patient to radiology department for X-ray examination. Abdominal paracentesis was another procedure which was done only in few cases of doubtful internal injury. It was not done in large number of cases because such injuries were explored for any possible visceral injury and those cases who showed diagnostic X-ray findings such as gas under the diaphragm. It was also not done in those cases which showed no deterioration but on the contrary on serial examination showed improvement and these were the cases which were kept on conservative line of treatment from the beginning only. Abdominal paracentesis was not performed in cases who presented with signs of shock and local abdominal signs, that is, hypoactive bowel sounds increasing area or degree of tenderness or rigidity extended to untraumatized areas or when finding exceeded those explainable by the known injury. The decision for tube thoracostomy (I.C.C.) was taken when X-ray chest showed either hemothorax, pneumothorax, or hemopneumothorax. When the decision for exploratory laparotomy was taken on the basis of following indications, the patients were prepared for same and the pre-operative management comprised proper amount and quality of intravenous fluids, blood transfusions, broad-spectrum antibiotics, nasogastric suction, and maintaining the input and output charts. Same steps were taken for the patients who were observed and other signs improved.

RESULTS

In Department of Surgery, R.M.C. Jalaun from July 2018 to December 2019, 60 patients of stab injury were admitted. The observations made on these patients in different perspectives are present in the table with discussion following them. Table 1 shows the distribution of cases in various age groups. Highest number of cases is in the third decade. Maximum number (36.6%) of cases are from 11 to 40 years. Table 2 shows the distribution of cases in various sex groups. There were 57 male (95%) and 3 female (5%). Table 3 shows that 47 patients (78.33%) came to hospital within 6 h of injury. Only 13 number of patient came to the hospital after 6 h of injury. This duration of injury has been recorded from the OPD. Slip of the patient or by the direct enquiry made from patient. Table 4 shows that Chaku was the most common weapon used for stabbing. The next most common weapon used was arrow. Table 5 shows that 63.3% of patients came with single stab injury abdomen and 36.6% of patients came with multiple stab injury abdomen. 41.6% of patients came with associated injury (chest, face, upper and lower limb) 5% of patients came with evisceration. Table 6 shows gastrointestinal tract injury was the most common among it. Ileal (16%) was most common with gastric tear (10%) next common. Among solid organ injury, spleen and liver show same incidence (5%) of injury each. Table 7 shows 36.6% of patients required exploratory laparotomy and simple repair of perforation. 6% of cases required resection and anastomosis. 6% of cases required ICTD. Vascular repair, splenectomy, and colostomy were done less frequently. Table 8 shows that the wound infection and burst abdomen were the most common complications 8% each. Other complications were less frequent.

Table 1: Age Incidence

Age (Year)	Total Number of Patient (%)
0-10	2 (3.3)
11-20	16 (26.6)
21-30	22 (36.6)
31-40	12 (20)
41-50	3 (5)

51-60	5 (8.3)
61-70	0 (0)

Table 2: Sex Incidence

Sex	Total Number of Patient (%)
Male	57 (95)
Female	3 (5)

Table 3: Incidence of Duration of Injury

Duration of Injury	Total Number of Patient (%)
1-6 h	47 (78.33)
7-12 h	9 (15)
> 12 h	4 (6)

Table 4: Incidence of Weapon Used

Types of Weapon	Total Number of Patient (%)
Chaku	49 (81.6)
Arrow	7 (11.6)
Razor	2 (3.3)
Sariya	1 (1.6)
Ballam	1 (1.6)

Table 5: Type of Injury

Types of Injury	Total Number of Patient (%)
Single stab injury abdomen	38 (63.33)
Multiple stab injury abdomen	22(36.6)
Associated injury	25 (41.6)
Evisceration	3 (5)

Table 6: Incidence of Various Internal Organ Injury

Organ Injury	Total Number of Patient (%)
Stomach	6 (10)
Duodenum	2 (3)
Jejunum	5 (8)
Ileum	10 (16)
Cecum	0 (0)
Colon	2 (3)
Ilium	0 (0)
Liver	3 (5)
Spleen	3 (5)
Pancreas	0 (0)
Heart	0 (0)
Urinary bladder	0 (0)
Kidney	2 (3.3)
Diaphragm	1 (2)

Table 9 shows that 40% of cases required hospital stay for 1-3 days (conservative management). 28.5% of cases required 7-12 day (operated cases). 25% of these cases

required 4-6 day hospitalization. Only 6.6% of cases required more than 12-day hospitalization.

DISCUSSION

One of the most baffling problems of surgery can be a patient suspected of having stab injury that requires surgical intervention as a life-saving measure. Surgeon would admit the difficulties of the diagnosis and the anxieties, frequently associated with the treatment of such injuries. After analyzing the given data, we are now in a position to discuss the factors which are important in the causation, diagnosis, treatment, morbidity, and mortality in stab injury cases.

In this study, stab injury cases accounted for 6.1% of total admission on surgical side. Incidence of this nature is more obvious in a civilian institution like ours in this country. People often try to settle interpersonal relationship and political problems by means of stabbing.

In our opinion, the incidence what our present series reflects is directly related to geographical cultural and social factors of the particular community.

In the present series, maximum number (83.3%) of patients was in the age group of 11-40 years and highest number (36.6%) of cases is in the third decade (21-30 years). The next most common decade was second decade (11-20 years) which comprised 26.6% of cases. This shows that young lads of educational institutions and various industrial and business institutions are more exposed to violence. In a study of 403 cases of stab wound were in the age group of 20-40 years while the age range was 13-74 years.

Table 7: Details of Surgical Procedure

Procedure	Total Number of Patient (%)
Simple repair of perforation of viscus	22 (36.6)
Vascular repair	0 (0)
Splenectomy	1 (1.6)
Colostomy	0 (0)
ICTD	4 (6)
Resection and anastomosis of bowel	4 (6)

Table 8: Incidence of Various Complication

Complication	Total Number of Patient (%)
Infection	4 (8)
Burst abdomen	4 (8)
Fecal fistula	0 (0)
Subphrenic abscess	0 (0)
Pelvic abscess	0 (0)

Table 9: Details of Stay in Hospital

Duration of stay	Total Number of Patient (%)
1-3 days	24 (40)
4-6 days	15 (25)
7-12 days	17 (28.5)
>12 days	4 (6)

In the present series, male patients constitute about 95% and only 5% of cases were female. This shows that females are not subjected to stab injury. The males are the victims of a fight for money, land, women, alcohol intoxication, and in some cases very trivial reason. There were a few who get involved in trying to save other people. The females were mostly victims of home quarrels.

In a study at Mt. Sinoi Hospital New York, 83.6% of cases were male. There is preponderance of male patients in practically all published series as reported by Ballinger et al.¹ and similar incidence was observed in the USA.

In this series, various weapons are used for stabbing, but knife (Chaku) is the most common being used in 81.6% of cases and arrow in 11.6% of cases. Incidence of this nature is more obvious because assault by stabbing is much more common in this part of the country. Stabbing by Chaku is explainable by the fact, that it is easily available, and especially the firearms are less readily available to low- and middle-class strata in our country. And also, because no license is needed to carry a Chaku of <6 inch. In a study carried out of Sinoi Hospital, New York, 94% were homicidal wound and in 90% cases, blades were used.

In our series, 78.3% of cases reported to hospital within 6 h of injury, whereas other stab injury patients who reported more than 6 h of injury were those who were referred from different peripheral health centers. In a study conducted at Sinoi hospital, New York, 95% of stab injury patients reported to hospital within 3 h of injury. Those patients who came directly to the hospital were within 1-3 h of injury but those brought by police took longer time and arrived after 3-6 h of injury.

In this series, stab wounds over abdomen were most common, that is, 50% of cases, whereas second most common site was stab wound over chest seen in 47% of cases. Stab wounds over limbs were seen in 31% of cases. Melby and Denny² in a study of 399 patients of stab injury reported following incidence: Abdomen - 12%, chest - 14%, and limbs - 35%. The figures in our observation differs mainly on the ground that our study included only those cases of stab injury who required hospitalization (suspected complicated injury) for further management, whereas a large number of stab injury cases managed on O.P.D. basis only are not included in this study.

In our series, 63% of cases had single stab wound and among the stab wound over the abdomen, about 36.6% of cases had multiple abdominal stab wound. Wilder and Kudchadkar³ in 1980 reported that 15% of cases had more than one stab wound over abdomen.

In this study, the incidence of stab wound in relation to various anatomical areas of the body revealed that left back of chest, left lumbar region, left gluteal region, and left upper limb were more commonly involved. Hence, above mentioned incidence showed that left side stab wound is much more common than the right side because most of the right-handed people are more likely to hit the left half of the body and most of them having been hit from sides or behind, and more common upper limb injury were probably caused by defensive action. Jones et al.⁴ reviewed that out of 35% of upper limb stab, 60% are in left arm.

In this series, out of total complicated injury, visceral injury complication was most common, that is, 59% of total stab wound of abdomen. Sanbrasage⁵ in 1977 had reported 30-40% incidence of visceral injury in stab wound of abdomen. De Maynard and Oropeza⁶ in a study of 46 patients of abdominal stab reported that 87.4% had injury of intra-abdominal organs. Jarvis et al.⁷ in a study of 105 patients found, 37% of the cases had multiple organ injuries.

In our series, Roentgenography was necessary to exercise judgment in diagnosis and treatment of stab injury cases. Wilder and Kudchadkar³ in 1971, reported that X-ray confirmation for exploration in stab wound of abdomen was disappointing and time-consuming. The negative finding may lull the surgeon into false sense of security.

About 6% of cases of stab injury chest required intercostal drainage studies.

Ordog et al.⁸ in 1994, reported in a study of 4, 106 cases of stab injury chest that 88% were treated conservatively 10% required intercostals drainage and 2% required thoracotomy.

Among stab abdomen, 45% of cases required exploratory laparotomy, whereas incidence of negative laparotomy (non-therapeutic laparotomy) was 4.5%, Koseki⁹ in 1974 reported that nearly onethird of abdominal stab wound never penetrated the peritoneum and half of those that entered never needed any surgical treatment. Wilder and Kudchadkar³ in 1971 reported the incidence of negative laparotomy to be 25% in stab injury case.

De Maynard and Oropeza⁶ reported that out of 46 cases of stab abdomen, 84.7% required exploratory laparotomy and 10.8% had negative laparotomy.

On analysis of various internal organ injury, small bowel injury was most common, that is, 27% of cases. Rodkey in 1968 reported the incidence to be 8%. The majority of authors have found that the jejunum and ileum are most commonly injured (Davis 1976). From the above incidence, it is evident that small bowel is most frequently injured because it occupies a large portion of the abdominal cavity.

Among the solid organs, liver injury was most commonly seen, that is, 6% of cases. Incidence of liver injury reported in 30% cases of abdominal stab injury by Amerson and Ston¹⁰ in 1970. Elerding et al.¹¹ in 1979 reported that more than 85% of liver injury are minor and can be managed by simple repair and drained.

Heyns and Van Vollenhoven¹² in 1992 reported that average duration of hospital stay was 3 days in conservative groups and 10 days in surgical group. However, in our series, average hospital stay was 3-6 days in conservative group and 10-12 days in surgical group.

In the present series, the most common complications were wound infection 8% and burst abdomen 8% of cases which was of a very minor nature as it only delayed the hospital stay of the patient. Not accounting the wound infection as a post-operative complication, other complications were fecal fistula, jaundice, and pelvic abscesses are not common.

CONCLUSION

Following conclusion have been arrived as a result of the present study.

1. Stab wound has been rising at a phenomenal rate and has become a source of worry for the society. Stab wound is more commonly encountered in urban population than rural.
2. Males in third decades of life are the most vulnerable group.
3. Management of all the patients has been carried out according to the accepted principal, that is, early resuscitative measures and operation as when necessary.
4. There is a definite role of conservative management in these patients, whereas clinical features and investigations do not reveal any intestinal perforation or ongoing bleeding, therefore saving a negative laparotomy and its complications.
5. In this series, the conservative treatment was done successfully in 50% of cases.

6. The most common cause of prolonged hospitalization is high incidence of wound infection.

With proper treatment, most patients make good recovery and can return to duty and useful occupation.

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