Original Article

Exploratory laparotomies in the emergency room: increasing burden and implications in Pakistan

Waqas Hasan Syed, Raheel Ahmed, Usman Qureshi, Jahangir Sarwar Khan, Salman Shafique, Faryal Azhar, Sarosh Afzal Farooqi

Departments of Surgery, Holy Family Hospital, Rawalpindi and Princess Diana Hospital, Grimsby, United Kingdom.

Objective: To evaluate the spectrum of laparotomies in the emergency department of a tertiary care setup in Rawalpindi, Pakistan.

Methodology: An observational retrospective study was conducted in Surgical Unit 1 of Holy Family Hospital, Rawalpindi, from June 2014 to April 2018. All patients undergoing midline exploratory laparotomy above 12 years of age, for trauma or non-traumatic reasons, were included in the study.

Results: Out of 501 patients, 297 (59.28%) were males and 204 (40.72%) females. Majority (n=402, 80.2%) were non- traumatic causes of laparotomy. Peritonitis (58.2%) followed by intestinal obstruction (28.6%) were the most common indications of laparotomy in non-trauma patients whereas blunt trauma abdomen was the most common indication in trauma patients. Tumors and tuberculosis formed a minority of indication for laparotomy.

Conclusion: In resource limited countries like Pakistan, we need more specialized centers at grass root level to share burden of emergency. Moreover, proper screening at primary and secondary level healthcare facilities may help decrease morbidity and mortality associated with tumors and tuberculosis presenting as acute abdominal emergencies. (Rawal Med J 202;45:798-801).

Keywords: Emergency exploratory laparotomies, intestinal obstruction, peritonitis.

INTRODUCTION

Mortality rate after emergency laparotomy ranges between 10 to 20% in the best medical centers of the western world, while that for a 3rd world country is less well defined.[1] The importance of midline exploratory laparotomy can never be undermined as even in the most advanced set ups, this remain as the sole lifesaving procedure in emergency setting. Despite increase in the indications of surgically curable ailments, this field remains neglected globally.[2] Abdominal surgical emergencies present a diagnostic as well as a therapeutic challenge to a resource limited country like Pakistan. They vary widely in their presentation and some of them are limited to 3rd world countries only e.g. intestinal tuberculosis and advanced malignancies presenting as abdominal emergency.[3]

Recently, the number as well as the complexity of exploratory laparotomies done in the emergency set up has increased at an alarming rate. Both traumatic as well as non-traumatic abdominal emergencies are increasing the financial burden on health care set up as well as taking a huge toll on physical and psychological health of surgeons. Peritonitis is the most common abdominal emergency leading to laparotomy, mostly from perforation of the duodenum or the ileum.[4]

Recently, abdominal trauma has increased exponentially and is now one of the leading causes of laparotomies in some countries.[5] The major work force dealing with these abdominal emergencies are the surgical residents leading alarming burn out rate.[6] Two third of the surgical residents meet the criterion for burn out, which is greater than 1/3rd suffering from depression.[7] The purpose of our study was to show the work burden of exploratory laparotomies, wide spectrum of their presentation and their management in emergency department of our tertiary care setup.

METHODOLOGY

This retrospective observational study was done at surgical Unit-1 Holy Family Hospital, Rawalpindi, Pakistan from June 2014 to April 2018. All patients

above 12 years presenting to our emergency department directly or referred from any other facility who underwent midline exploratory laparotomy in our hospital were included in the study. All those who were referred to our center after operation in any other setup were excluded from the study. Informed written consent was obtained from all patients.

All patients received intravenous fluids, broad spectrum antibiotics, nasogastric suctioning and urethral catheterization. In case of trauma, management was done according to hemodynamic status and available facilities. Age, demographics, etiology, preoperative and intraoperative findings, surgical procedure and outcomes were noted.

Statistical Analysis: Statistical analysis was performed using SPSS version 20. Categorical variables were reported as frequency and percentages.

RESULTS

There were 501 laparotomies over a period of 34 months. Out of these, 297 (59.28%) were male and 204 (40.72%) female and male to female ratio was 1.69:1. Patient age varied from 12-97 years. We noted that 402 (80.24%) patients presented with non-traumatic cause whereas 99 (19.76%) patients had history of abdominal trauma (Table 1).

Table 1. Intraoperative findings in non-trauma patients.

Finding	Total	Percentage
Intestinal perforation	132	32.83%
Adhesions/strictures	52	12.93%
Tumors	20	4.97%
Abdominal cacoon	30	7.46%
Mesenteric ischemia	21	5.22%
Perforated appendix	44	10.94%
Obstructed hernia	30	7.46%
Volvulus	7	1.74%
Negative laparotomy	14	3.48%
Others*	52	12.93%

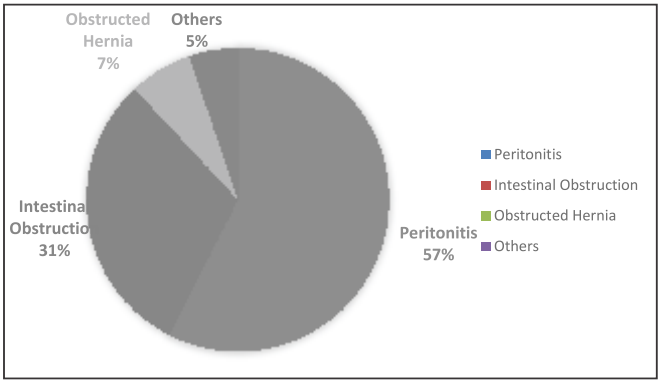
Table 2. Intraoperative findings in penetrating (n=62) and blunt (n=37) abdominal trauma.

Finding	Total	Percentage
Penetrating trauma		
Intestinal perforation	33	53.22%
Solid organ injury	09	14.52%
Combined	11	17.74%
Diaphragmatic injury	05	8.06%
Negative laparotomy	04	6.45%
Blunt trauma		
Intestinal perforation	10	27.03%
Solid organ injury	15	40.54%
Combined	5	13.51%
Diaphragmatic injury	2	5.40%
Retroperitoneal hematoma	3	8.11%
Negative laparotomy	2	5.40%

Table 3. Operative management in non-trauma (n=402) and trauma patients(n=99).

Procedure	Total	Percentage
Non-trauma		
Omentopexy	102	25.37%
Resection and anastomosis of intestine	46	11.44%
Stoma formation	98	24.38%
Strictureplasty	8	1.99%
Primary repair of perforation	11	2.74%
Only biopsy	9	2.24%
Adhesiolysis	32	7.96%
Appendectomy	46	11.44%
Hernia repair	23	5.72%
Others	27	6.72%
Trauma		
Resection anastomosis	31	31.31%
Primary repair	15	15.15%
Damage control	15	15.15%
Splenectomy	13	13.13%
Nephrectomy	5	5.05%
Stoma	9	9.09%
Others	11	11.11%

Fig. Indications of exploratory laparotomy in non-trauma patients.



The indications of exploratory laparotomy in non-trauma patients are shown in the Fig. Intestinal perforation was the most common per operative finding both in non-trauma and trauma patients (Table 2). The detailed description of operative procedures is shown in (Table 3).

DISCUSSION

On an average, about 173 emergency laparotomies are performed per year. Comparing this number with a similar study carried out in the UK, it clearly shows that the burden of emergency surgeries is far greater in 3rd world countries.[8] Patients included in our study were predominantly male, which is also the pattern seen globally.[9,10] The major burden of patients presented to our emergency department and undergoing exploratory laparotomy were between 20 to 50 years.[11, 12] Among the indications of laparotomies in non-trauma patients, peritonitis was the most common one (231, 57.6%). Many studies supported this evidence.[13,14]

In developed countries like England, peritonitis remains the most common cause of exploratory laparotomy in non-trauma patients.[8] In our study, the most common per op finding in non-trauma cases was intestinal perforation (32.74%) followed by adhesions/strictures (13.15%), which is comparable to the results of Barrow et al.[8] Different studies carried out in Pakistan also support this evidence.[15]

Abdominal tuberculosis is a common site of extra pulmonary involvement and a very common cause of intestinal obstruction in Pakistan. In our study, 7.46% of the laparotomies showed abdominal cocoon formation suggestive of abdominal Tuberculosis. None of these patients had history of HIV infection, which is the most common precedent of abdominal tuberculosis in the western world. Undiagnosed cancers of the gastro intestinal tract presenting as acute abdominal emergency formed almost 5% of non-traumatic laparotomies.

In a study by Omari et al on patients with penetrating trauma and confirmed fascial penetration, only 48% had to undergo exploratory laparotomy.[18] Blunt trauma abdomen is far more challenging in this regard. In our study, 37 patients underwent exploratory laparotomy for blunt trauma and the frequently observed finding was solid organ injury with gut perforation as the second most common finding. Hollow viscus injury after blunt trauma presents a peculiar case as many patients present late and even in the current era of sophisticated diagnostic modalities, it is difficult to manage.[20]

In a systemic review by Harmston et al, there was a significant rate of mortality (17%) in patients explored for hollow viscus injury[21] and diaphragm was mostly injured in penetrating trauma. A study from a trauma center in South Africa showed that penetrating trauma was the leading mechanism (94%) for diaphragmatic injury.[22] All patients with solid organ injury like liver, spleen and kidney were graded according to American Association for the Surgery of Trauma (AAST) guidelines.[23]

Negative laparotomies and missed injuries go hand in hand. According to a study from USA, the rate of negative laparotomies was 3.9% and missed injuries were 1.3%, most of the negative laparotomies being in penetrating trauma.[24] Burn out causes decreased efficiency and thus overall management of patients and result in missed diagnoses and thus contribute to morbidity as well as mortality.[6,7] Another area that is suffering due to increased rates of emergency surgeries is decreased number of elective surgeries being done in tertiary care setup. Through this study, we recommend development of specialized trauma centers, at least at secondary health care facilities and screening centers at primary level to cope and share the burden of abdominal emergencies.

CONCLUSION

Many patients if screened early in the periphery, especially abdominal Tuberculosis and tumors,

could result in avoidance of abdominal emergencies and thus decrease burden on tertiary care hospitals.

Author Contributions:
Conception and design: Syed Waqas Hasan, Raheel Ahmad
Collection and assembly of data: Syed Waqas Hasan
Analysis and interpretation of the data: Usman Qureshi
Drafting of the article: Raheel Ahmad
Critical revision of the article for important intellectual content: Jahangir Sarwar Khan
Statistical expertise: Faryal Azhar, Salman Shafique, Sarosh Afzal
Final approval and guarantor of the article: Dr Usman Qureshi
Corresponding author email: Syed Waqas Hasan: swh_rmc@yahoo.com.
Conflict of Interest: None declared
Rec. Date: Nov 27, 2018 Revision Rec. Date: Aug 17, 2020 Accept Date: Nov 14, 2020

REFERENCES

1. Vashistha N, Singhal D, Budhiraja S, Aggarwal B, Tobin R, Fotedar K. Outcomes of Emergency Laparotomy (EL) Care Protocol at Tertiary Care Center from Low-Middle-Income Country (LMIC). World J Surg 2018;42:1278-84.
2. Bhangu A, Fitzgerald JE, Fergusson S, Khatri C, Holmer H, Søreide K, et al. Determining universal processes related to best outcome in emergency abdominal surgery: a multicenter, international, prospective cohort study. BMJ Open 2014;4:4-8.
3. Abdullah MT, Hanif A, Waqar SH, Shah SF, Malik ZI, Zahid MA. Presentation and Outcome of Acute Abdomen in a Tertiary Care Unit. Ann Pak Inst Med Sci 2011;7: 137-41.
4. Prasad NB, Reddy KB. A study of acute peritonitis: evaluation of its mortality and morbidity. Int Surg J 2016;3:663-8.
5. Prachalias AA, Kontis E. Isolated abdominal trauma: diagnosis and clinical management considerations. Curr Opin Crit Care 2014;20:218-25.
6. Elmore LC, Jeffe DB, Jin L, Awad MM, Turnbull IR. National Survey of Burnout among US General Surgery Residents. J Am Coll Surg 2016;223:440-51.
7. Williford ML, Scarlet S, Meyers MO, Luckett DJ, Fine JP, Goettler CE, et al. Multiple-Institution Comparison of Resident and Faculty Perceptions of Burnout and Depression During Surgical Training. JAMA Surg 2018;153:705-11.
8. Barrow E, Anderson ID, Varley S, Pichel AC, Peden CJ, Saunders DI, et al. Current UK practice in emergency laparotomy. Ann R Coll Surg Engl 2013;95:599-603.
9. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India--review of 504 consecutive cases. World J Emerg Surg 2006;1:1-4.
10. Wani RA, Parray FQ, Bhat NA, Wani MA, Bhat TH, Farzana F. Nontraumatic terminal ileal perforation. World J Emerg Surg 2006;1:7-9.
11. Wani MM, Khan MA, Wani MM, Mannan A, Durrani AM, Singh B, et al. Analysis of Acute Abdominal admissions in surgical emergency room of a developing third world country. Int J Surg 2007;11:1-4
12. Kumar GK, Chakravarthi DS, Kamal VR, Arjuna G, Vijayalaxmi M. Mortality in emergency laparotomy on acute abdomen: A Retrospective study in King George Hospital, Visakhapatnam. Paripex-Indian J Res 2015;4:219-21.
13. Berhane Y, Girmay K, Gebresilassie A. Outcome of emergency surgical operations performed for non-traumatic acute abdomen among adults in Mekellehospital. European J Pharm Med Res 2016;3:106-11.
14. Jain R, Gupta V. A prospective study of epidemiology and clinical presentation of non-traumatic acute abdomen cases in a tertiary care hospital of central India. Int Surg J 2017;4:242-5.
15. Khan TA, Awan SH, Khan SA, Amin S. An audit of laparotomies; Carried out in Combined Military Hospital, Panno Aqil over three years period. Professional Med J 2013 ;20:279-83.
16. Ali N, Hussein M, Israr M: Tuberculosis as a cause of small bowel obstruction in adults. Gomal J Med Sci 2011;9:233-5.
17. Sulis G, Roggi A, Matteelli A, Raviglione MC. Tuberculosis: epidemiology and control. Mediterr J Hematol Infect Dis 2014;6(1):e2014070.
18. Omari A, Bani-Yaseen M, Khammash M, Qasaimeh G, Eqab F, Jaddou H. Patterns of anterior abdominal stab wounds and their management at Princess Basma teaching hospital, North of Jordan. World J Surg 2013;37:1162-8.
19. Pande R, Saratzis A, Winter Beatty J, Doran C, Kirby R, Harmston C. Contemporary characteristics of blunt abdominal trauma in a regional series from the UK. Ann R Coll Surg Engl 2017;99:82-7.
20. Jahromi AH, Johnson L, Youssef AM. Delayed small bowel perforation following blunt abdominal trauma: A case report and review of the literature. Asian J Surg 2016 ;39:109-12.
21. Harmston C, Ward JBM, Patel A. Clinical outcomes and effect of delayed intervention in patients with hollow viscus injury due to blunt abdominal trauma: a systematic review. Eur J Trauma Emerg Surg 2018;44:369-76.
22. D'Souza N, Clarke D, Laing G. Prevalence, management and outcome of traumatic diaphragm injuries managed by the Pietermaritzburg Metropolitan Trauma Service. Ann R Coll Surg Engl 2017;99:394-401.
23. Tinkoff G, Esposito TJ, Reed J, Kilgo P, Fildes J, Pasquale M, et al. American Association for the Surgery of Trauma Organ Injury Scale I: spleen, liver, and kidney, validation based on the National Trauma Data Bank. J Am Coll Surg 2008;207:646-55.
24. Schnüriger B, Lam L, Inaba K, Kobayashi L, Barbarino R, Demetriades D. Negative laparotomy in trauma: are we getting better. Am Surg 2012;78:1219-23.