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War rectal injuries with its complications during civil violence in Iraq

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ABSTRACT

Background: Traumatic injuries to the rectum is not uncommon in war surgery, increasing numbers of rectal injuries were encountered by Iraqi surgeons due nature civil violence in Iraq. Failure of adequate management of such injury can lead to serious complications like perineal and pelvic sepsis and even death.

Objective: To define the wound pattern, injury mechanism, incidence, surgical treatment and associated complications of war rectal injuries suffered in the civil violence of Iraq war.

Patients and methods: A retrospective study. In all, 3650 war injured patient with penetrating injuries to the pelvis and abdomen were admitted to the Ameria AL-Fallujah Hospital. Anbar, Iraq and the Al-Yarmouk Teaching Hospital, Baghdad, Iraq from Feb. 2004–May 2008. Of these, 62 (1.7%) patients had rectal injuries.

Result: Of 62 injured patients, 40 (64, 5%) were civilians injured patients and 22 (35, 5%) were Iraqi military injured patients. 50 males and 12 females. The age ranges from 16 to 58year. The rectal injuries were caused by an improvised explosive device in 40 (64.5%) patients and by individual firearms in 22 (35.5%). The surgical treatment included diversion and distal washout in 13 (21%) patients, diversion in 31 (50%) patients, distal washout, drainage and diversion in 6 (9%) patients, presacral drainage with diversion in 7 (11%) and 5 (8%) patients just suturing of serosa. The complications were found in 36 (58%) of injured patients. No death in this study.

Conclusion: War rectal injuries were caused mainly by improvised explosive device. Most of the injured patients were civilians and a minority was military stuff. War injuries of the rectum were successfully managed by proximal fecal diversion, and presacral drainage, recommending that distal washout may be not always necessary in the management of war rectal injuries. Despite that rectal injury still combined with a high rate of complications.

1. Introduction

"He who wishes to be a surgeon must first go to war."Hippocrates, (c. 460–377 BC).

Modern combat has changed over recent years. The cause of injury is particular to the nation, individual conflict, and armed service [1]. A cohort analysis of warfare injuries sustained by US army showed considerable differences in injury manners sustained in the most recent Iraq and Afghanistan warfare compared with World War II, Vietnam, and Korea. In the recent conflict, the head and neck injuries were more common than thoracic, abdomen and extremity, because of the increased use of body armor and personnel protective equipment [2]. The development of explosive patterns of injury is because of the increasing use of Improvised Explosive Device (IEDs) within warfare. IEDs have been the signature weapon within operations in Iraq and Afghanistan [2]. It was the major cause of death among coalition troops in Afghanistan and Iraq [3].

The treatment of war rectal injuries has developed through many military conflicts. When the surgeons firstly began to perform fecal diversion and creation of an ostomy during World War I there was an improvement in survival from penetrating rectal injuries. With experience gained during World War I there was an improvement in survival from penetrating rectal injuries, however, the reported mortality was high at 50% [4]. after the introduction of transperineal presacral drainage during World War II the mortality

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rate decreased further to 30% [5]. the mortality rate decrease after addition of distal washout for rectal war injuries during Vietnam conflict [6]. the experience gained from these battles lead to accepting that all war rectal injuries require distal washout, diversion, and presacral drainage [7].

Blast wounds and large calibers ballistic wounds may contain contaminated fragments or dirty clothes [8]. Rectal traumas during the Iraqi warfare have been limited to conflict injuries amongst Coalition troops [9,10,11].

The urban civil violence has been flared up everywhere in our country from the beginning of the war in Feb. 2004, and became a living hell for most of the people. Urban civil violence in our country Iraq become an endemic level during the four years from 2004 to 2008, and the civilian[s] people were daily exposed to violent acts in the markets, streets and even in their houses.

2. Patients and methods

All the 3650 injured patients with penetrating injuries to the pelvis and abdomen were received at Ameria AL-Fallujah Hospital/Anbar/Iraq and Al-Yarmouk Teaching Hospital/Baghdad/Iraq from Feb. 2004–May 2008. Once they arrived to the hospitals, resuscitation was started as control of shock and evaluation of the injuries. Some cases need immediate surgical exploration by the surgical team. Of the 3650 injured patients, 62 (1.8%) patients had war rectal injuries.

Prospective collected data from all the patients and were analyzed retrospectively. We record the age, gender whether they are military or civilians, examination of vital signs, the causative injury; firearm or explosive device, associated injured organs, the site of injuries, injury severity score (ISS), initial preoperative resuscitation as (crystalloid, colloid, packed red blood cells, and fresh frozen plasma), the type of surgical treatment and the complications. The excluded patients from the study those whom failed to survive or those patients with no available operative notes. A complete preoperative evaluation was done for most of the injured patients by the urgent intervention of associated injuries to other organs. Sufficient time for postoperative follow-up was not possible in many injured patients because of the dangerous situation and difficulties in Iraq during that period. The surgical treatment of war rectal injuries was analyzed, looking for the use of diversion with an ostomy, presacral drainage, and distal washout (use of povidone iodine to wash distal segment of rectum) and suturing of perforation when accessible. Postoperative complications as bacteremia, pulmonary embolism, septic shock, urinary incontinence, D.V.T (deep vein thrombosis), pneumonia, enterocutaneous fistula, and incisional hernia, dehiscence of the wound, necrotizing fasciitis, cardiac arrest and, intra-abdominal abscess were reported. The injured patients were divided into four groups [12], [4–6] depending on the surgical type of treatment of the war rectal injury. Group I diversion with ostomy, Group II diversion with distal washout, Group III diversion with presacral drainage, and Group IV diversion with presacral drainage and distal washout (suturing of perforation done where accessible), The procedures performed by authorized well trained general surgeons from Iraq. The postoperative complications were analyzed for each treatment group.

3. Results

Of 62 war rectal injured patients, 40 (64, 5%) were civilians injured patients and 22 (35, 5%) were Iraqi military injured patients. All patients were 50 male and 12 female where the male/female ratio was 4:1. The age ranges from 16 to 58year with a median age of 21. The war rectal injuries were caused by an Improvised Explosive Device (IED) in 40 (64.5%) patients and by individual firearms in 22 (35.5%), these injuries due to Mine Explosive Injuries, American Army Bullets and Robbery' s Gangs. All the 62 patients were included in this study they have war rectal injuries. The surgical treatment included diversion and distal washout in 13 (21%) patients, diversion in 31 (50%) patients, distal washout, drainage and diversion in 6 (9%) patients, presacral drainage with diversion in 7 (11%)and 5 (8%) patients just suturing of serosa in cases of absence rectal perforation. Table 1.

The complications were found in 36 (58%) of injured patients. Many patients have more than one complication. In which 13 (21%) patients have enterocutaneous fistula, 10 (16%) patients developed wound infection, 8 (13%) patients have peritonitis and 5 (8%) patients develop pelvic abscess formation. Table 2.

No death was observed in this research

The complications were less observed in patients who subjected to presacral drainage. The most common complication in the study group was intra-abdominal abscess followed by sepsis and enterocutaneous fistula Table 3. In spite of the majority of patients received their definitive therapy at different hospitals. The occurrence of complications was set as dependent on the presence of presacral drainage and doing distal washout of the rectum. The results of this show a relationship between the performance of presacral drainage and the regression of the incidence of postoperative complications. While the distal washout does not affect the reduction of postoperative complications.

The associated injury involved the pelvic bones fractures in20 (32%) patients, Thoracic injuries in 15 (24%) patients, abdominal injuries in 50 (80%) patients, vascular injuries 8 (13%) patients and scrotum and scrotal contents 27 (44%) patients. Table 3.

4. Discussion

We are facing rectal war injuries due to high-velocity spall and explosive injuries. The wartime experience along with these challenges have resulted in the traditional military doctrine of distal washout, diversion, and drainage, for all patients with penetrating rectal injuries [6]. This study shows an estimation in the management of war rectal injuries with importance for a more conservative

Table 1
Shows surgical management of War Rectal Injuries.

Surgical management of war rectal injuries	No.& %
Diversion	31 (50%)
Diversion + distal washout	13 (21%)
Diversion + presacral drainage	7 (11%)
Diversion + presacral drainage + Distal washout	6 (10%)
Suturing of serosa	5 (8%)

Table 2
Shows the complications after surgical treatment of War Rectal Injuries.

Complications	Number of Patients (%)
Intra-Abdominal Abscess	14 (22.5%)
Sepsis	12 (19%)
Enterocutaneous Fistula	9 (14.5%)
Pneumonia	8 (13%)
Wound Dehiscence	7 (11.2%)
Pulmonary Embolus	2 (3.2%)
Deep Vein Thrombosis	4 (6.4%)
Incisional Hernia	5 (8%)
Necrotizing Fasciitis	1 (1.6%)
Death	0

Note: Some patients have more than one complication.

Table 3
Shows Causes, type of patients, associated injuries and outcome in 62 patients with war rectal injuries during civil violence in Iraq, 2004–2008.

Variable	Rectal injury No. & (%)
Cause:	
Firearm	21 (34%)
IED	41 (66%)
Type of patient:	
Civilian	40 (64.5%)
Military	22 (35.5%)
Pelvic fracture:	
Yes	20 (32%)
No	42 (68%)
Thoracic injury:	
Yes	15 (24%)
No	47 (76%)
Abdominal injury:	
Yes	50 (80%)
No	12 (20%)
Vascular injury:	
Yes	8 (13%)
No	54 (87%)
Scrotal injury:	
Yes	27 (44%)
No	35 (56%)
Outcome:	
Dead	0
Survived	62 (100%)
Gender	
male	50 (80%)
female	12 (20%)

method. The presacral drainage was done by making an incision between the anus and coccyx with the development of space between the rectum and sacrum to prepare dependent drainage area [7]. Many authors have shown that a lack of manifest supports the use of presacral drainage area in the treatment of war penetrating rectal injuries [13–15]. The controversy against the requirement of presacral drainage is the lack of proof that this process offers any advantage related to infection and mortality [14]. The article which supporting this controversy was a prospective study including 48 patients, in which showed that the presacral drainage had no effect on septic complications in the treatment of penetrating rectal injuries [13]. In our study, the patients who had presacral drainage had no observed complications. Though, this procedure was done for only in 13 patients. Admittedly, this shortage of significance may be related to the small number of patients.

During the Vietnam War distal washout was performed with the thinking that the washing out of fecal debris would prevent pelvic contamination. Many authors dispute this practice because of the attention that this technique forces fecal material into the injured tissues which lead to increased incidence of contamination [16–18].

In spite of the use of distal washout and presacral drainage, the use of diversion of the fecal material is an important step in the treatment of war rectal injuries [15,19]. There are many types for fecal diversion as loop colostomy, or end colostomy with a Hartmann procedure.

In our study, the results show that the pattern shift in the surgical management of war rectal injuries is being reflected on the battleground. In spite of all the injured patients involved in this study sustain diversion with an ostomy, the greater part of patients received only diversion with an ostomy. In spite of both loop colostomy and end colostomy were used in this group, all the patients received an open operative procedure. Presacral drains were placed in13 (21%) patients and distal washout was performed in 19 (30.5%) patients. Drainage, diversion, and distal washout were used in only 6 (10%) patients. The complications were found in 36 (58%) of injured patients. The patients who underwent presacral drainage have no developed a complication. In spite of that, there was no statistical relationship between the surgical treatment of the war rectal injury and the occurrence of postoperative complications. Most of the patients were effectively treated without distal washout or presacral drainage. Furthermore, it appears that additional injuries along with the presenting physiologic parameters and resuscitation requirements of the patient had no impact on the surgical management of the rectal injury. No death was observed in this research.

The uses of individual body armor, the coming of surgical teams near to the battlefront and the performance of an advanced trauma center, lead to a decrease in the mortality rate which associated with the wars [15]. One of the limitations of our research includes those immanent to a retrospective study, regarding the postoperative complications as the long-term quality of life and the fecal incontinence of these severely war rectal injured patients. Additional studies are vital to check the effect that diversion and presacral drainage may have on the patients' overall quality of life after a war rectal injury. We ensure you state that the work has been reported in line with the PROCESS 2018 criteria [20].

5. Conclusion

The greater number of patients in this group was effectively treated without distal washout. The inability of the distal washout to correlate with a decrease in postoperative complications indicates that these may be unnecessary steps in the treatment of war rectal injuries. The patients who underwent presacral drainage have no developed any complication. War rectal injuries were caused by individual firearms and IEDs with a difference in frequency. Most of the injured patients were civilians and a minority was military stuff. War injuries to the rectum were successfully managed by proximal fecal diversion, and presacral drainage, recommending that distal washout maybe not always necessary in the management of war rectal injuries. Despite active management complications rate still high.

Ethical approval

Ethical approval was given by the ethical committee of Department of surgery, College of Medicine, Almustansiriyah University.

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Author contribution

The study was designed and the data collected and analyzed by the all 3 authors, all of us contribute evenly to all parts of this paper.

Conflict of interest statement

Nil.

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Appendix A. Supplementary data

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References

[1] Champion HR, Bellamy RF, Roberts P, Leppaniemi A. A profile of combat injury. J Trauma 2003;54(5 Suppl):S13–9.
[2] Owens BD, Kragh JF, Wenke JC, Macaitis J, Wade CE, Holocomb JB. Combat wounds in operation Iraqi freedom and operation enduring freedom. J Trauma 2008;64(2):295–9.
[3] Ramasamy A, Hill AM, Clasper JC. Improvised explosive devices: pathophysiology, injury profiles and current medical management. J R Army Med Corps 2009;155(4):265–72.
[4] Wallace C. A study of 1200 cases of gunshot wounds of the abdomen. Br J Surg 1916;4:679–743.
[5] Ogilvie WH. Abdominal wounds in the Western desert. Bull U S Army Med Dep 1946;6(4):435–45.
[6] Lavenson GS, Cohen A. Management of rectal injuries. Am J Surg 1971;122(2):226–30.
[7] Burris DG, Dougherty PJ, Elliot DC, Fitzharris JB, Hetz SP, Holocomb JB, et al. Emergency war surgery. third ed. Washington, DC: Borden Institute; 2004.
[8] Cubano MA, Lenhart MK. Emergency war surgery. fourth ed. Washington, DC: Borden Institute; 2014.
[9] Owens BD, Kragh Jr JF, Wenke JC, Macaitis J, Wade CE, Holcomb JB. Combat wounds in operation Iraqi freedom and operation enduring freedom. J Trauma 2008;64:295–9.
[10] Paquette EL. Genitourinary trauma at a combat support hospital during operation Iraqi Freedom. The impact of body armor. J Urol 2007;177:2196–9.
[11] Serkin FB, Soderdahl DW, Hernandez J, Patterson M, Blackbourne L, Wade CE. Combat urologic trauma in US military overseas contingency operations. J Trauma 2010;69(1 Suppl):175–8.
[12] 1 Loria FL. Historical aspects of penetrating wounds of the abdomen. Surg Gynecol Obstet 1948;87(6):521–49.
[13] Gonzalez RP, Falimirski ME, Holevar MR. The role of presacral drainage in the management of penetrating rectal injuries. J Trauma 1998;45(4):656–61.
[14] Steinig JP, Boyd CR. Presacral drainage in penetrating extraperitoneal rectal injuries: is it necessary? Am Surg 1996;62(9):765–7.
[15] Velmahos GC, Gomez H, Falabella A, Demetriades D. Operative management of civilian rectal gunshot wounds: simpler is better. World J Surg 2000;24(1):114–8.
[16] Tuggle D, Huber Jr PJ. Management of rectal trauma. Am J Surg 1984;148(6):806–8.
[17] Burch JM, Feliciano DV, Mattox KL. Colostomy and drainage for civilian rectal injuries: is that all? Ann Surg 1989;209(5):600–10. discussion 10–1.
[18] Ivatury RR, Licata J, Gunduz Y, Rao P, Stahl WM. Management options in penetrating rectal injuries. Am Surg 1991;57(1):50–5.
[19] Rombeau JL, Wilk PJ, Turnbull Jr RB, Fazio VW. Total fecal diversion by the temporary skin-level loop transverse colostomy. Dis Colon Rectum 1978;21(4):223–6.
[20] Agha RA, Borrelli MR, Farwana R, Koshy K, Fowler A, Orgill DP. For the PROCESS group. The PROCESS 2018 statement: updating consensus preferred reporting of case series in surgery (PROCESS) guidelines. Int J Surg 2018;60:279–82.