

CIVIL GUNSHOT INJURIES OF THE RECTUM - 25 YEARS OF EXPERIENCE

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ABSTRACT

The first medical literature report for gunshot injuries of the rectum (GIR) appear after the end of the American Civil War. They show a mortality rate of 100%. Our 25 year experience, consisting of 22 cases with GIR is shared. The injuries were from light gunshot weapons and predominantly of criminal character. 12 (54,5%) from the wounded developed shock. The following specific features of GIR have been found out: inner/outer wound in the region above the symphysis - 11 (50,0%); inner/outer wound in the region above the sacrum - 5 (22,7%); inner/outer wound in the region of the perineum - 1 (4,55%); excretion of faeces through the wound - 2 (9,1%); rectorrhage - 5 (22,7%); blood in rectal touche - 8 (36,4%). 5 (22,7%) intraperitoneal, 13 (59,1%) extraperitoneal supraleveatorial and 4 (18,2%) infraleveatorial injuries. In addition small intestines have been wounded in 11 (50,0%), urine bladder 8 (36,4%), sigma 4 (18,2%), sacrum 5 (22,7%), urethra 1 (4,55%), anal sphincter 1 (4,55%), aorta 1 (4,55%). The operative interventions for treatment of GIR were: primary suture of the intraperitoneal part (9,1%), primary suture with colostomy 2 (9,1%), Hartmann's operation 7 (31,8%), colostomy with presacral drainage 5 (22,7%), colostomy 7 (31,8%), distal rectal washout 6 (27,3%). Postoperative complications were a result of massive faecal contamination with following severe infection, diffuse peritonitis 18 (81,8%), pelvic phlegmona 7 (31,8%), haemorrhage 3 (13,6%), sepsis 9 (40,1%), necrotic fasciitis 6 (27,3%), pneumonia 8 (36,4%), pulmonary thrombembolism 5 (22,7%). 9 patients died (mortality rate of 40,1%). The most common cause was multiorgan insufficiency 5 (22,7%), followed by pulmonary thrombembolism 3 (13,6%) and severe haemorrhage 1 (4,55%).

Keywords: injuries of the rectum, colostomy, Hartmann's operation

INTRODUCTION

Gunshot injuries of rectum (GIR) have about 150 years history in medical literature. They are a subject of an evolution in their diagnosis, treatment and prognosis. During the American Civil War the mortality rate is 100%, and before and during I World War is about 90% (1,2,4,7,11,14,16,17,18). After the introduction of decompressing and diverticular colostoma during II World War and the Korean conflict, the mortality rate in cases of gunshot injuries of rectum decreases to 30 - 45% according to the different authors. (1,3,4,8,10,15,20) During the War in Vietnam, after the introduction of distal rectal irrigation, mortality rate decreases below 25% (8,15,19,20). Thereafter began the use of presacral drainage, which also has a positive role for the decrease of complications and lethality due to GIR. (4,15,20)

Gunshot wounds of rectum are among the most difficult for diagnosis and treatment. This is caused by the complexity of its topographoanatomic structure and the relations with several diverse organs and tissue structures. Another reason

for the interest towards GIR is the lack of consent over the surgical strategy. The complications and mortality rates are extremely high. There is also no agreement over the classification which can serve as a basis for surgical behavior. (1,2,4,7,11,14,16,17,18)

In general the operative tactics in this kind of injuries is based on the following concepts:

- diversity of intestine passage;
- presacral drainage;
- distal irrigation of the rectum;
- restoration of anatomic integrity, if possible (4,6,11,15,21)

MATERIAL AND METHODS

In our investigation were studied 22 men with gunshot injuries of the rectum for a period of 25 years. They have been diagnosed and treated in the surgical clinics of Military Medical Academy - Sofia and Medical Institute of the Ministry of Interior. The injuries are predominantly of criminal character and the shot has been made from a distance less than 15 meters. The weapons are light and are in use in the army, police and the criminal contingent. In the

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next table are presented the weapons by which were caused the rectal injuries.

Tabl. 1. Weapons, by which were caused the rectal wounds

Weapon	Alive		Deceased		Totally	
	N	%	N	%	N	%
Pistol "Makarov"	2	9,1	2	9,1	4	18,2
AK - 7,62	5	22,7	3	13,6	8	36,3
AK - 5,45	5	22,7	2	9,1	7	31,8
Hunting rifle	1	4,55	2	9,1	3	13,6

From the specific investigations in all 22 patients was done rectal digital examination and only in 2 - rectoscopy was used as a diagnostic method, which was not applied in emergency conditions.

RESULTS

From all 22 patients with gunshot wounds of the rectum 12 (54,5%) had shock, which demanded the whole spectrum of reanimation actions.

Besides the common diagnostics for abdominal injuries, we cannot omit some specific suspect signs of gunshot rectal injuries, found in our patients - table 2.

Tabl. 2. Specific signs in GRI

Sign	Alive		Deceased		Totally	
	N	%	N	%	N	%
Inner/outer wound in the region above the symphysis	7	31,8	4	18,2	11	50,0
Inner/outer wound in the region above the sacrum	3	13,6	2	9,1	5	22,7
Inner/outer wound in the region of the perineum	1	4,55			1	4,55
Excretion of fleeces through the wounds	2	9,1	3	13,6	5	22,7
Rectorrhage	5	22,7	7	31,8	12	54,5
Bleeding during rectal touche	8	36,4	9	40,1	17	77,3

Rectal digital examination is still often omitted in emergency conditions, but actually remains one of the main criterions for diagnosis of GIR, as is seen in our contingent. Based on the anatomical principles, we divided the injuries

to intraperitoneal and extraperitoneal. The last were classified as supraleatory and infralevatory. Table 3 shows the distribution of our patients.

Tabl. 3. Gunshot rectal injuries classified on anatomical principle

Anatomic location	Alive		Deceased		Totally	
	N	%	N	%	N	%
Intraperitoneal	4	18,2	1	4,55	5	22,7
Extraperitoneal Supraleatory	6	27,3	7	31,8	13	59,1
Extraperitoneal Infralevatory	3	13,6	1	4,55	4	18,2
Totally	13	59,1	9	40,1	22	100

Co-existing gunshot injuries of other organs and structures are an important circumstance which has significant impact on complications and mortality. They are presented in table 4.

The interpretation in this case is not difficult Most often are affected the organs and structures located in closest proximity to the rectum - small intestines, urinary bladder, sacrum, sigma, etc.

The patients studied by us have been subjected to the following operative interventions - table 5.

It is obvious that 13 (59,1%) of the interventions have ended with decompressive colostomy, independently of the type and volume of the rectal operation. Hartmann's resection was carried out for superior rectal third injuries in 7 patients (31,8%).

Presacral drainage was placed in 5 (22,7%) patients with middle third GIR.

Table 5 Operative interventions for GIR

Operative intervention	Alive		Deceased		Totally	
	N	%	N	%	N	%
Primary suture of the intraperitoneal part	2	9,1			2	9,1
Primary suture of the intraperitoneal part with decompressive colostomy	2	9,1			2	9,1
Hartmann's operation	4	18,2	3	13,6	7	31,8
Colostomy with presacral drainage	3	13,6	2	9,1	5	22,7
Colostomy	2	9,1	4	18,2	6	27,3
Distal rectal washout	5	22,7	2	9,1	7	31,8

During the first 10 years of our study, primary colostomy alone in 6 cases (27,3%) was the method of choice, inherited from the II World War. During the last years, there is a trend towards distal rectal washout, applied in 7 (31,8%) of our patients, in 5 of them with a favourable outcome.

Tabl. 6. Complications after gunshot injuries of rectum

Complication	Alive		Deceased		Totally	
	N	%	N	%	N	%
Diffuse peritonitis	12	54,5	6	27,3	18	81,8
Pelvic phlegmona >abscess	4	18,2	3	13,6	7	31,8
Haemorrhage	2	9,1	1	4,55	3	13,6
Sepsis	5	22,7	4	18,2	9	40,1
PTE	1	4,55	3	13,6	5	22,7
Necrotic fasciitis	4	18,2	2	9,1	6	27,3
Pneumonia	5	22,7	3	13,6	8	36,4

The treatment of GIR is difficult and controversial as it is connected to injuries of other vital structures, massive faecal contamination, followed by inevitable severe bacterial infection. Low anterior resection and abdominoperineal extirpation were not performed in our patients. Usually it was recommended in cases of severe GI of the pelvis and the pelvic organs by high speed projectiles or projectiles of a great caliber from a close distance (pump-rifle). (6,11,12,15,18,20) After treatment of other affected organs and structures the opinion for administration of laparotomy for closure of the abdominal cavity. It has a place in severe gunshot peritonitis, after massive haemorrhage, hypoproteinemia and development of compartment - syndrome (4) The complications in cases of gunshot rectal injuries are presented in table 6.

It must be kept in mind that the most common infectious complications are peritonitis, pelvic phlegmona, abscess and sepsis. In a great majority of cases they lead to multiorgan insufficiency, which is the main cause for high lethality. Causes of death in GIR are presented in table 7.

Tab.e 7 Causes of death in GIR

Cause	Number	%
MOI	5	22,7
PTE	3	13,6
Hemorrhage	1	4,55
Total	9	40,1

The mortality rate of our patients with GIR was 9 (40,1%), and multiorgan injury is the most common cause of death. As it might be expected, pulmonary thrombembolism is the second common death cause. In cases of severe infections and prolonged bed stay, the well developed pelvic venous system becomes generator of micro thrombs, which can cause PTE.

DISCUSSION

Treatment of GIR was subject to a significant evolution, based on the experience from the two World Wars and the Conflict in Vietnam. The implication of diverticular colostomy lead to decrease of the mortality rate from 67% to 30% during World War II. (4,15,20) The improvement of perioperative treatment, antibiotic profilaxis and therapy and aggressive surgical treatment with the use of presacral drainage and distal rectal washout decreased the mortality rate during the War in Vietnam to 14%.

Although the golden standard, including divertizing colostomy, primary reconstruction of the rectum, presacral drainage and distal rectal washout is already determined, many surgeons continue to search for the optimal approach, trying to specify the indications for every manipulation.

Although still disputed, diversion is the main principle for treatment of rectal trauma. It is also considered in cases of colon traumas, but there are some substantial differences. The large intestine is lined with peritoneum, which has very good blood supply and well developed lymphatic drainage. The extraperitoneal part of the rectum is covered with poorly vascularized adipose tissue, in close proximity to the urine bladder. In cases of gunshot injuries there is a great occurrence of retroperitoneal haematomas. These are predisposing factors for development of septic complications. (4,5,6,10,14,15,21) Biryukov has found out that in 24 hours, even in cases of planned surgery and prepared intestine, the sutured wound of rectum is infected.(3) Hartmann's method has rare application in cases of severe rectal injuries in the extraperitoneal part. Primary reconstruction of rectum without diversion can be done in cases of low speed projectile injuries, minimal blood loss and no later than the 2nd hour after the trauma. If primary reconstruction of rectum is not accomplished, diversion is mandatory. Koplastadze proposes the following absolute indications for diversity:

1. total rupture of rectum above the levators;
2. total rupture of rectum below the levators with massive rupture of the peritoneum;
3. impairment of more than 25% from the circumference of the sphincter.(5,6)

Primary rectal reconstruction is not compulsory in all cases. Levy states that it should be considered in the following cases:

1. if it can be performed easily;
2. if broad mobilization of rectum has not been done, due to injuries of neighboring organs and tissues;

3. in cases when complex urogenital injuries are suspected.(14)

Presacral drainage should be used in cases of significant tearings of posterior rectal wall and perirectal tissue, by means of transperineal approach. (4,15,20)

Distal rectal washout is indicated in severe, and caused by high speed projectiles rectal and perineal injuries. In general it is indicated in wartime injuries, whilst in civil trauma it should be made only if the above mentioned indications are present. (4,15,19,20,21)

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