

Retroperitoneal pelvic packing for an abdominopelvic gunshot injury

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ABSTRACT

The objective of the study is to demonstrate the significance of damage control surgery in saving lives and possibly preventing permanent disability in a resource poor environment. This is because in resource limited settings, advanced treatment modalities such as external fixation and angiography with embolization are not available. Moreover, besides being expensive, these treatment methods for pelvic fractures require training and skills to perform. The retroperitoneal pelvic packing is easy to learn and, thus can be used in an emergency to save lives and prevent long-term problems in patients who have sustained life threatening pelvic injuries and severe haemorrhage.

Therefore, specialist surgeons, especially those working in low- and middle-income countries, should be encouraged to learn and consider retroperitoneal pelvic packing as a stabilization and definitive treatment in some cases of pelvic fractures.

Keywords: Pelvic fractures, retroperitoneal pelvic packing, damage control surgery, external fixation, angioembolization.

INTRODUCTION

The pelvic bone has a rich blood supply^[1] so a fracture due to a gunshot wound can lead to torrential haemorrhage. The pelvic bone injuries are mainly limited to direct bullet tract damage. The bone fragments may become secondary missiles causing additional damage to surrounding structures.^[2] Pelvic ring injuries are associated with a high morbidity and mortality.^[3]

Retroperitoneal haemorrhage is the leading cause of death. Gunshot injuries have the highest mortality rate of 15.3%.^[4] The standard management of pelvic fractures in the developed world consists of early recognition, resuscitation with blood and blood products, treatment of associated life-threatening injuries and finally control of pelvic bleeding with a combination of mechanical stabilization and arterial embolization.^[5]

However, in a resource poor environment, where mechanical stabilization and arterial embolization are not available, emergency retroperitoneal pelvic packing alone can be lifesaving.^[6]

CASE HISTORY

A 17-year-old herdsman had been shot when cattle raiders came to steal his cattle about four hours prior to presentation. He was shot in the left lower abdomen and the bullet exited through the left outer upper quadrant of the buttock. On examination, he was sweating, in pain, moderately pale. His vital signs were: Pulse 131/ minute, thready and weak, BP 60/40 mmHg, and temperature 36.7°C.

The abdomen was moderately distended, not moving with respiration. A bullet entry wound of about 2.5cm was in the left lower quadrant and exited on the medial left inner quadrant of the buttock measuring 7cm with some fresh bleeding. There were no faecal or gastrointestinal contents noted on the entry or

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exit wounds. There was generalised tenderness, rebound tenderness and scanty bowel sounds. The abdomen was dull to percussion.

The perianal area and anal sphincter were normal with no evidence of rectal injuries.

He was resuscitated with 3 litres of normal saline and two units of whole blood. His blood pressure improved to 100/60mmHg. Furthermore, he was given intravenous ceftriaxone 1gram; metronidazole 500mg and gentamicin 80mg as stat doses. In addition, he received intramuscular tramadol 100mg. A nasogastric tube (NGT) and a urethral catheter were inserted. After two and half hours, his BP continued to fluctuate between 90/60mmHg and 60/40 mmHg and so he was taken to theatre for laparotomy and control of haemorrhage. Multiple small bowel injuries were found with the largest being 2.5cm in the ileum about 85cm from the ileocecal junction with moderate peritoneal soiling. Non-crushing clamps were applied to the injured bowel to control further contamination.

On further inspection it was noticed that there was still profuse bleeding coming from the pelvis. Bowel loops were retracted away from the site and the bleeding site was identified as the fractured iliac bone as shown in Figure 1. The major blood vessels were spared. As the patient was haemodynamically unstable and there was no more blood available, damaged control measures were instituted by enlarging the bullet tract and the bleeding site was packed with four large gauze packs. The latter were secured with interrupted sutures. The BP immediately improved to 120/70mmHg. The rectus sheath was not closed but skin closed with interrupted nylon no 1. The patient was taken to the recovery room for an hour and when his vital signs were stable he was transferred to the ward for further observation and treatments.

Postoperatively, he continued with ceftriaxone, metronidazole, gentamicin, and intravenous normal saline. He was transfused with two more units of blood and three more units of blood were sourced from family members. He remained haemodynamically stable with normal vital signs. The patient was then returned to theatre after 48 hours, the injured bowels were resected with primary anastomosis to restore continuity and prevent further contamination of the abdominal cavity. The gauze packing was found to be dry, there was no bleeding so the pack was removed. The injury site was closed with continuous suture, vicryl number 1/0.

Postoperative recovery was satisfactory. He had sustained a comminuted fracture of the iliac bone (Figure 1).

He now has left foot drop (Figure 2). A follow up X-Ray taken two months after surgery showed that the comminuted pelvic ring fracture was forming callus and thus healing well (Figure 3).



Figure 1. X-Ray of a comminuted Pelvic Wing Fracture (Credit: Koma Akim)



Figure 2. Patient walking with an axillary crutch as part of his rehabilitation process. The foot drop is very noticeable. (Credit: Koma Akim).



Figure 3. A radiograph of the comminuted pelvic ring fracture taken almost two months after the injury. There is almost complete callus formation on the comminuted pelvic ring fracture.

DISCUSSION

Retroperitoneal pelvic packing is lifesaving especially in resource-constrained environments where external fixation and angioembolization are not available. Serious pelvic fractures are caused by high-energy trauma such as from gunshot, motor vehicle accidents causing crush injuries, and falls from heights. These fractures are usually associated with life threatening injuries, haemodynamic instability, morbidity and mortality. The mortality rates range from 40% to 60%.^[7] The single most important cause of death in patients with pelvic ring fractures is haemorrhage.^[8] In a significant proportion of the patients, the bleeding is from the pre-sacral venous plexus and the fractured pelvic bones.^[9] The standard of care of pelvic fracture consists of resuscitation, stabilization of the fracture with external fixation, control of haemorrhage with angioembolization and or retroperitoneal pelvic packing. However, because most patients experience venous bleeding, retroperitoneal pelvic packing is an effective and lifesaving technique that needs to be considered by surgeons working in resource limited countries.

In general, retroperitoneal pelvic packing is a safe procedure. The main complications associated with it are local infections, and re-bleeding after removal of the packs.^[10] The infection rate was thought to be high especially when the packs were left in for more than a few days i.e. more than 72 hours and in patients who were critically ill and had coexisting impaired immune system. In this category of patients the infection rates was as high as 35%.^[11] The risk of infection was found to be higher especially when

the patient sustained an open pelvic fracture, hollow bowel injuries, perineal injuries and in patients in whom repacking was done.^[12]

CONCLUSION

The study highlights the use of retroperitoneal pelvic packing as an emergency resuscitative and therapeutic intervention in severe pelvic fractures with concomitant haemodynamic instability and thus this method can be used to treat patients with pelvic fractures in developing countries and hostile environments where resources are limited. In lieu of either external fixation or angioembolization.

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