CASE REPORT

Hemipelvectomy images of loss caused by war

Tal Salamon,^{1,2} Shokrey Kassis,³ Alexander Lerner^{4,5}¹Department of Vascular Surgery, Ziv Medical Center, Safed, Israel²Faculty of Medicine in the Galilee, Bar-Ilan University, Safed, Israel³Ziv Medical Center, Safed, Israel⁴Ziv Medical Center, Safed, Israel⁵Faculty of Medicine in the Galilee, Bar-Ilan University, Safed, Israel**Correspondence to**Dr Shokrey Kassis,
kassis.shokrey@gmail.com

Accepted 13 June 2014

SUMMARY

As we treat our 230th patient from the Syrian conflict, the pathology we see is more debilitating and the humanitarian needs of the wounded have become even more obvious. This case presents some graphic images of the realities of war. Care in the most advanced units cannot restore broken limbs, let alone broken lives. We present a case of a young war-injured man, who suffered severe crush injury to the pelvis and lower limb, arriving at our medical facility after a delay of hours. The lower limb was shattered from the pelvis down (essentially a traumatic hemipelvectomy). His life had been saved in Syria by ligation of the femoral vessels in an unknown facility by an unknown medical team. On arrival in a centre in Israel for definitive care of an unsalvageable leg, formal hemipelvectomy was performed.

BACKGROUND

The border between Israel and Syria has officially remained closed since the last Arab-Israeli war in 1973. There is a demilitarised zone between the two countries monitored by United Nations forces. The two countries are considered enemy states with no official diplomatic relations. In spite of this, casualties of the Syrian civil war continue to find their way to the border where they are met by Israeli Defence Force medical teams, stabilised and then transferred to Israeli district hospitals for further treatment. Among the wounded are soldiers, civilians, women and children. Further information about their background or homes is neither known, requested, nor disclosed.

Some patients have been treated within Syria and may occasionally present with Syrian medical documentation. Many, however, have had no treatment or rudimentary care to stop major haemorrhage on their way to Israel. It is not known whether this care is provided within medical facilities by trained staff or whether emergent care is delivered by well-meaning individuals who find themselves caring for patients with life-threatening injuries. What is clear, however, is that care is improvised, and in instances has permitted patients with severe injuries to survive as far as the border. From there they are transferred to Israel for definitive care.

This case highlights three important points relevant to modern war surgery. First, patients are receiving care in neighbouring countries not at war and where advanced healthcare services are available. Second, war surgery is not simply trauma surgery—the delay in patient transfer for definitive care means that they are in advanced stages of sepsis. Third, after 4 years of civil war, malnutrition

is a huge factor in physiological well-being at the time of injury and convalescence.

CASE PRESENTATION

A 20-year-old man wounded in the Syrian civil war was brought to the emergency room of an Israeli district hospital by the Israeli Defence Force ambulance service, approximately 6 h after massive trauma in Syria. Exact details of the injury are unknown. The left lower limb and pelvis were crushed, possibly run over by a vehicle, although the exact mechanism of injury remains unclear.

Details of treatment and transfer within Syria are not known but within Israel he was transported by road 60 km from the Israel-Syria border, an approximately 1 h drive by ambulance, under the care of a military paramedic and military physician. In the ambulance he received 2 L of normal saline (0.9%) and 2 units of O-ve blood (packed cells). On arrival (figures 1 and 2) he was conscious; the pulse rate was 80 bpm and blood pressure 112/92 mm Hg.

There was no evidence of head, neck, upper limb or chest and abdominal injury. External pelvic stabilisation was in situ (an improvised blanket).

INVESTIGATIONS

On examination, the left pelvis was crushed and unstable, with an open wound extending anteromedially from the inguinal region, through the medial thigh and scrotum, and posteriorly, a few centimetres from the anus. Left lateral rotation of the thigh revealed a fractured and dislocated pubic bone with a dislocated femoral head lying in the upper thigh. The thigh and calf were crushed and swollen. The thigh muscles were detached and formed an oval mass under the skin. The knee and dorsal foot had become degloved (figure 3).

On vascular assessment, the common iliac vessels were found to be ligated enbloc, probably in the field by a Syrian surgical team; this undoubtedly saved the patient's life. The leg was pale and cold with mottled skin and no evidence of capillary filling. Neurologically, there was no sensation or movement in the toes, calf or thigh. The anal sphincters were intact and rigid sigmoidoscopy revealed no injury.

A urinary catheter was already in place. There was no haematuria and no clinical evidence of urinary tract injury.

CT angiogram was performed to confirm the absence of injury to the rest of the body (figures 4 and 5) and confirmed a crushed pelvis, fractured iliac bone and dislocation of the sacroiliac joint. The acetabulum and femoral head were displaced caudally—lying in the thigh. No blood flow or

CrossMark

To cite: Salamon T, Kassis S, Lerner A. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-204479

Figure 1 Crushed pelvis, with an improvised external fixation.

bleeding below common iliac artery was evident in arterial or late venous phases.

TREATMENT

With clinical intent to save the limb, the patient was transferred to the operating room and the inguinal and pelvic wounds opened and explored. There was discontinuity of all soft tissues distal to the peritoneum; the leg was effectively suspended on a segment of dorsal soft tissue and torn obturator vessels and nerves. As the lower limb was unsalvageable, the decision was taken to perform hemipelvectomy (figure 6). The amputation was completed with muscular flap closure from the thigh to the inguino-scrotal-anal skin, and a defunctioning loop colostomy was constructed (figure 7).

Postoperatively the patient continued intravenous antibiotics (Amikacin and Metronidazole—an empirical regimen developed for all casualties from Syria as there has been widespread antimicrobial resistance), nutritional support and returned multiple times to theatre for debridement and lavage of the amputation stump and wounds. Split skin graft was then performed to cover the stump 5 weeks from amputation.

He has received social and psychological support and 3 months later is able to transfer from bed to chair. He mobilised with a prosthetic leg for the first time over 3 months after initial surgery. His discharge is planned but follow-up and continued rehabilitation remain considerable challenges and of great concern to the hospital staff.

DISCUSSION

Traumatic hemipelvectomy (hindquarter amputation) is a severe injury associated with a high rate of morbidity and mortality. Improved prehospital resuscitation and efficient transfer time^{1–8} achieves better survival rates but little is known about the

Figure 2 Pelvis and lower left extremity crush and dislocation.

Figure 3 Degloving of the foot.

emergency medical and surgical services available within Syria at the moment.

Traumatic hemipelvectomy is a rare injury—0.6% of all pelvic fractures⁸ and aggressive and efficient resuscitation is mandatory for survival. Without ligation of the common iliac vessels in the field of conflict, it is unlikely that this patient would have survived. Unlike many other Syrian wounded, he presented within hours of injury (some patients with severe injuries may take up to 5 days to reach the border). This short delay to definitive care

Figure 4 CT reconstruction of the crushed left lower extremity.

Figure 5 CT reconstruction.

was also crucial to his survival. McLean was the first to report a case of hemipelvectomy in 1962.⁹ Since then there have been at least 70 cases reported in the literature.^{7 8 10 11}

Although the exact mechanism of injury in this patient is not known and close questioning of the Syrian wounded is

Figure 6 CT reconstruction posthemipelvectomy.

Figure 7 Pelvic stump-thigh-to-inguinal/perineal flap.

discouraged, it is likely that he was run over and possibly dragged some distance by a motor vehicle, in common with the most common causes of this injury—motor vehicle accidents where the pelvis is crushed (run over) or where the leg is caught while the body is dragged in the opposite direction with considerable force (which may also occur in industrial accidents).^{7 11 12}

The morbidity from this catastrophic amputation is usually due to associated intestinal, genital and intraperitoneal injury; and, salvage surgery is usually complicated by flap necrosis and extensive soft tissue infection.¹² Damage control surgery and intestinal diversion (colostomy) decrease the risk of septic complications and improve outcome.

With rehabilitation, this patient might be able to mobilise with a prosthesis, albeit, with difficulty initially, in view of the position of the colostomy. After discharge, it is unlikely that he will have specialist follow-up within Syria. Follow-up is of huge concern to the medical teams involved in his treatment. He is likely to encounter difficulties caring for the colostomy, and this should be closed as soon as the stump is healed and he is able to manage personal hygiene. The prosthesis will also need readjustment. Dedicated psychosocial support is paramount but follow-up in Israel is dependent entirely on his risking the journey to Israel once again. To mitigate this, discharge is with detailed instructions in English, but information sharing, even

Learning points

- ▶ Early ligation of the femoral vessels in the field saved the patient's life.
- ▶ Early transfer for definitive care may improve clinical course and outcome.
- ▶ Mutilating surgery is never an easy decision, but is sometimes necessary to save a patient's life.

among medical staff, engenders huge risks to individual patients. Staying in Israel for continued care is an option the patients are not prepared to entertain, even though this would be provided for free, as they want to return as soon as possible to their families struggling in Syria, and for whom they are desperately anxious.

He is one of many young men, too young to have lost a limb in conflict but he is, indeed, a remarkable survivor.

Contributors All authors contributed equally to the manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Beal SL, Blaisdell FW. Traumatic hemipelvectomy: a catastrophic injury. *J Trauma* 1989;29:1346–51.
- 2 Klasen HJ, Ten Duis HJ. Traumatic hemipelvectomy. *Bone Joint Surg Br* 1989;71:291–5.
- 3 Lawless MW, Laughlin RT, Wright DG, et al. Massive pelvic injuries treated with amputations: case reports and literature review. *J Trauma* 1997;42:1169–75.
- 4 Lipkowitz G, Phillips T, Coren C, et al. Hemipelvectomy, a lifesaving operation in severe open pelvic injury in childhood. *J Trauma* 1985;25:823–7.
- 5 Rieger H, Dietl KH. Traumatic hemipelvectomy :an update. *J Trauma* 1998;45:422–6.
- 6 Weiss JS. Traumatic hemipelvectomy: a survivable injury. *Mil Med* 1994;159:164–6.
- 7 Schoderbek RJ, Battaglia TC, Dorf ER, et al. Traumatic hemipelvectomy: case report and literature review. *Arch Orthop Trauma Surg* 2005;125:358–62.
- 8 Labler L, Trentz O, Keel M. Traumatic hemipelvectomy. *Eur J Trauma* 2005;6:543–50.
- 9 McLean EM. Avulsion of the hindquarter. *J Bone Joint Surg* 1962;44:384–5.
- 10 Lasurt S, Combalia-Aleu A. Complete traumatic hemipelvectomy: report of a case after 19years of follow-up. *Injury* 2010;41:874–82.
- 11 Wade FV, Macksood WA. Traumatic hemipelvectomy: a report of two cases with rectal involvement. *J Qanat Sepectrosc Radiat Transf* 1965;5:554–62.
- 12 Moore WM, Brown JJ, Haynes JL, et al. Traumatic hemipelvectomy. *J Trauma* 1987;27:570–2.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow