Injury, Int. J. Care Injured xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Flexible 3D laparoscopic assisted reduction and percutaneous fixation of acetabular fractures: Introduction to a new surgical option

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ARTICLE INFO

Article history:
Accepted 26 June 2016

Keywords:
Laparoscopic assisted acetabular fracture reduction
Percutaneous acetabular fracture fixation
Fractures of the acetabulum
Laparoscopic retroperitoneal 3D dissection

ABSTRACT

The gold standard for fractures of the acetabulum is to perform an open reduction and internal fixation in order to achieve anatomical reduction. In a well-defined subset of patients, percutaneous techniques may be employed but achieving reduction by closed means can be challenging especially for fractures with large degrees of displacement. Such patient may include elderly patients who may not have the physiologic reserve to withstand open approaches. In our paper, we present a new option using laparoscopic assisted reduction of the acetabular fracture and percutaneous fixation. The young obese patient refused all forms of blood products transfusion and presented with a displaced transverse posterior wall fracture. While we do not recommend routine use of such technique and recognize its numerous limitations, we present it as an alternative strategy in a small subset of patients.

Introduction

The gold standard for the treatment of displaced acetabular fractures remains open reduction internal fixation (ORIF) [1–5]. Most open surgical approaches require significant soft tissue dissection and result in mean estimated blood losses ranging between 400 cc and 1200 cc depending on the fracture type and approach used [6–10]. Recently, minimally invasive fixation techniques have developed with the aim to reduce surgical time, blood loss and improve recovery [11–13]. Indications for such less invasive strategies include young patients with non-displaced but unstable acetabular fractures and the rising population of elderly patients with acetabular fractures [14]. The main challenge with such techniques is to obtain anatomical reduction. Various reduction strategies have been employed but those are limited and wide degrees of displacements are arduous to treat with purely percutaneous means. To our knowledge, the use of laparoscopy to assist in the placement of reduction tools for acetabular fractures has not yet been described. We describe the case of a young, obese patient who did not consent to any form of blood product transfusion. She presented to us with a displaced transverse/posterior wall acetabular fracture following a motor vehicle accident. Because the treatment of this patient using ORIF technique posed too high of risk of complications, she was offered laparoscopically assisted reduction and percuteous fixation of her fracture. The aim of our paper is to present this novel surgical technique which combines a collaboration between urology (for the laparoscopic guidance of the reduction tools) and Orthopaedic trauma. In addition, we present a set up that allows bolting of the patients pelvis to the OR table with application of continuous longitudinal traction.

Case report

Patient

We describe the case of a 22-year-old morbidly obese female (BMI 40) who was involved in a motor vehicle accident. She was admitted to our level I trauma center for the management of a left femur subtrochanteric fracture and a displaced transverse/posterior wall fracture of the right acetabulum (Fig. 1). The patient was cleared by trauma surgery to undergo surgical treatment of her orthopaedic injuries. She was placed in skeletal traction for the

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http://dx.doi.org/10.1016/j.injury.2016.06.033
0020-1383/

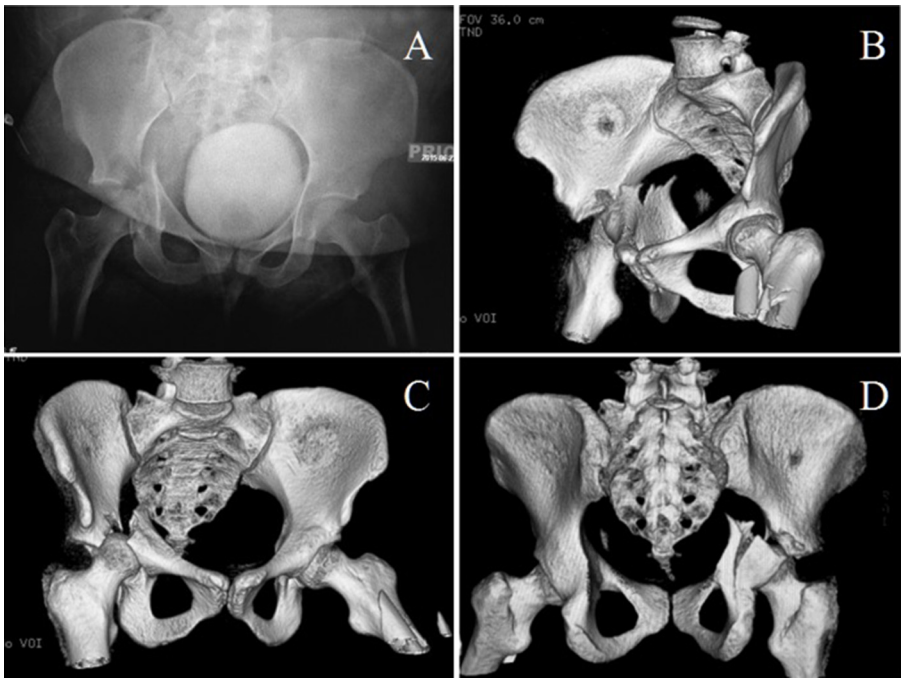

Fig. 1. Pelvic radiograph AP view (A) of the right transverse posterior wall acetabular fracture and 3D CT reconstructions of the right acetabular fracture (B–D).

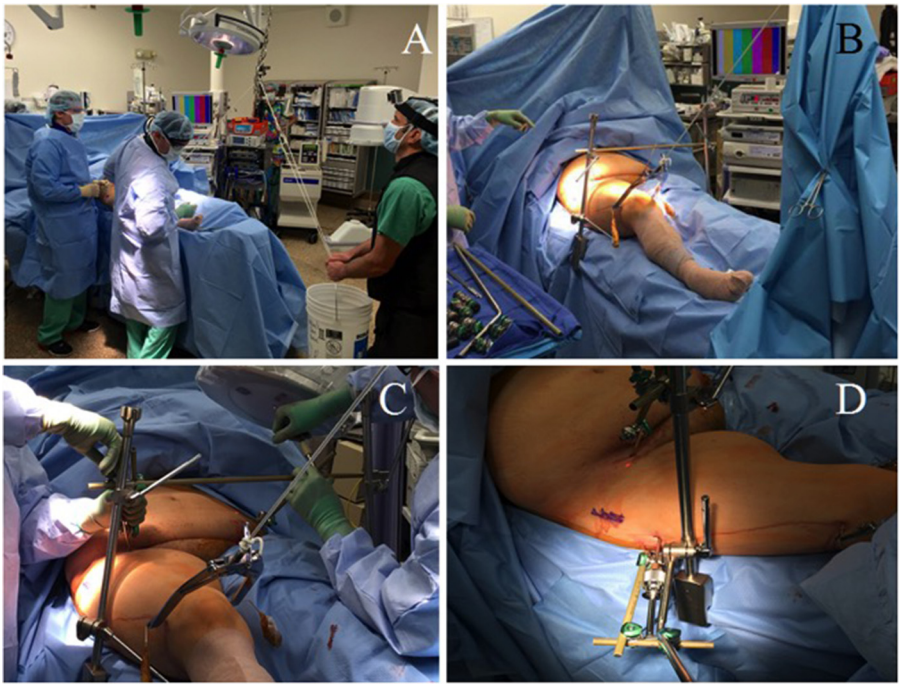

Fig. 2. In A, the distal femoral traction bow is connected to a ceiling pulley system through a sterile rope attached to a 5-gallon bucket, which can be filled with saline/sand bags. In B and C images the patient's pelvis has been bolted to the flat top table using external fixation connected to sterile Thompson table attachments. In Fig. 2D, a Schanz pin has been placed in the femoral neck and attached laterally in order to obtain a lateral vector of traction.

Please cite this article in press as: C. Mauffrey, et al., Flexible 3D laparoscopic assisted reduction and percutaneous fixation of acetabular fractures: Introduction to a new surgical option, Injury (2016), http://dx.doi.org/10.1016/j.injury.2016.06.033