Injury, Int. J. Care Injured 41 (2010) 400–404

Contents lists available at ScienceDirect

Injury

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

Health-related quality of life and life satisfaction in patients following surgically treated pelvic ring fractures. A prospective observational study with two years follow-up

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ARTICLE INFO

Article history:
Accepted 18 November 2009

Keywords:
Pelvic
Fractures
Surgery
Treatment
Quality of life
SF-36
Li-Sat11

ABSTRACT

Background: Pelvic ring fractures caused by high-energy trauma are severe injuries with well described radiological and clinical outcomes, whereas description from the patient's perspective is less well documented. The purpose of this study was to investigate patient-reported outcome following surgical treatment of pelvic fractures using quality of life instruments.
Methods: All 54 patients (28 male/26 female, ages 16–68) with pelvic fractures referred to our institution for surgical treatment 2003–2005 were prospectively included. The most common trauma was motor vehicle accident (44%). Additional injuries were seen in 74% and in 31% the ISS was ≥16. There were 31 B and 23 C type fractures. Patients were followed for two years using two validated questionnaires, SF-36 and LiSat-11, the latter an instrument consisting of 11 questions for evaluation of satisfaction with different aspects of life.
Results: 45 patients could be followed according to the study protocol for two years while 2 were untraceable and 1 died from unrelated causes. Of 6 nonresponders, 5 were unable due to psychiatric disorder. At two years pelvic fracture patients scored lower than the reference population in both physical and mental domains (SF-36). Highest mean score, 68, was in the domain Social Function (norm 89) while lowest mean score, 38, was in the domain Role Physical (norm 86). The mean score closest to the normative was for general health with 61 for patients and 78 for the normative group. In LiSat-11 pelvic fracture patients scored lower than the reference population in all areas. Satisfaction with life as a whole was 31% compared with 60% in the normative group.
Conclusions: Two years after surgical treatment of pelvic ring fractures, patients reported substantially lower quality of life for both physical and mental domains, when compared with a reference population, even when radiological and clinical outcomes were considered favourable.

Introduction

Pelvic ring fractures and disruptions requiring surgery are severe injuries often caused by high-energy trauma, and frequently associated with other injuries. There is considerable morbidity not only due to the pelvic injury itself but also due to, for instance, associated vascular, neurological and urological injuries.[2,7,22] Common indications for surgery are instability and/or displacement, with the goal being restoration of stability within an anatomic or near anatomic position of the pelvic ring. There are numerous reports in the literature describing radiological and clinical results.[8–10,12,17] For instance, it has been shown that an adequate reduction of any posterior displacement is associated with less pain compared with pelvic fractures or disruptions with persistent malreduction of the posterior part, leading to a malunion.[14]

To get a better global understanding of the outcome following various injuries and diseases, studies including patient-reported outcome have in recent years provided new and valuable insights. For patients treated with surgery due to pelvic fractures, however, there is only very limited information available on the outcome using patient-reported outcome instruments.[6,14] This is despite the fact that pelvic fractures are usually severe injuries, often in younger people, and commonly associated with other injuries. With this in mind there is reason to believe that these injuries might have long-term consequences on general health-related quality of life.

The purpose of this study was to prospectively evaluate patients, surgically treated for acute pelvic fractures and disruptions, using general health-related quality of life instruments, i.e. patient-reported outcome.

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doi:10.1016/j.injury.2009.11.006

Patients and methods

Study design

All patients with pelvic fractures referred to Uppsala University Hospital, Sweden, for surgical treatment 2003–2005 were prospectively included. The study was approved by the research ethics board and patients gave informed consent for their participation. Patients younger than 16 years of age were excluded. In total thirty hospitals referred patients after providing primary care. All patients were followed after surgery prospectively for two years. At two years they were asked to report outcome using two health-related quality of life instruments, SF-36 and Lisat-11, and in addition conventional radiographs were obtained and assessed by one observer who had not been part of their treatment.

Patients and treatment

Patients were operated at our department 1–21 (median 6) days after the trauma by one or two out of three surgeons. Delay more than five days was usually due to concomitant injuries. Indications for surgery included instability and/or displacement exceeding 5 mm.

There were 54 patients, all with closed fractures or disruptions. The gender distribution was 28 males and 26 females, with a mean age of 34 (range 16–68). Only one patient was older than 65. The most common trauma mechanism was a motor vehicle accident in 21 patients (39%), followed by jump from height in 12 (22%) or fall in 7 patients (13%). One or several additional injuries were seen in 40 (74%) of the patients with the most common location being a lower extremity fracture (Table 1). Seventeen patients (31%) had sustained a severe polytrauma corresponding to an ISS $\geq$ 16. The surgical approach was open in 20, percutaneous in 14 and combined in 20 patients. One reoperation was performed due to inadequate reduction based on the postoperative radiographs. Low-molecular weight heparin was used in all patients as prophylaxis against venous thrombosis for at least one week after surgery or longer based on level of mobilisation. Antibiotics, usually cloxacillin, were given perioperatively for prophylaxis against infection.

Radiology

Diagnostic conventional radiographs and a trauma CT scan with 3 mm slice thickness was done at the referring hospitals, as part of their trauma imaging protocol. In addition a new CT scan with 1 mm cuts and 3-D reconstructions were made in almost all cases at arrival to our institution as part of the preoperative planning. Postoperative conventional radiographs included AP pelvis and inlet–outlet views. All the radiological assessment, including classification according to AO/OTA[11] as well as the assessment on the postoperative and follow-up radiographs was done by one of the authors who was not otherwise involved in the treatment of the patients.

The most common fracture types were B2 and C1 (Table 2). Reduction was assessed on AP and inlet–outlet views and measured according to the German pelvic study group.[15] Reduction of the posterior components was anatomic or within 5 mm residual displacement in 46 patients and more than 5 mm in 8 patients when assessed on the postoperative radiographs. Thirty-one patients presented with anterior displacement involving the symphysis. Reduction of the symphysis was $\leq$5 mm in 23 patients, with residual displacement of the symphysis 6–10 mm in 6 patients and >10 mm in 2 patients according to postoperative radiographs. In cases where the posterior stability was considered adequate following posterior fixation a limited anterior displacement of rami fractures was accepted. Thirty-eight patients presented with rami fractures. Postoperative radiographs showed 27 patients with residual displacement of the rami fractures of <10 mm and in 11 patients $\geq$10 mm residual displacement. Two years after surgery final conventional radiographs including AP and inlet–outlet views were taken at the patient's local hospital. The images were digitally transferred to our unit for assessment, done according to the same protocol for all images. In addition, all medical records from referring hospitals were collected and scrutinised for any possible adverse events and complications that might have occurred during the follow-up period without being reported to our unit.

Table 1
Anatomical location of associated injuries.

Head	7
Chest	27
Abdomen	15
Extremities	
Upper	14
Lower	40

Table 2
OTA classification in pelvic fractures.

Fracture type	Number
B1	9
B2	14
B3	8
C1	12
C2	7
C3	4
Total	54

Patient-reported outcomes

Patients were followed using two validated questionnaires, SF-36 and LiSat-11. The two instruments were chosen as they were considered complementary to each other in areas of specific interest following pelvic injuries. SF-36 is a well-known, widely used and validated generic health outcome that consists of eight dimensions. Higher scores are associated with better quality of life and state of health. Age- and gender-matched normative data from Sweden were used as references.[19] LiSat-11 is a one-page generic 11 items questionnaire on life satisfaction. The first item characterises satisfaction with "life as a whole". The remaining items characterise satisfaction with "ADL-capacity", "physical health", "psychological health", "sexual life", "partner relationship", "family life", "leisure", "friends and acquaintances", "work" and "financial situation". Each item has six-graded answering alternatives: 1—very dissatisfied/2—dissatisfied/3—rather dissatisfied/4—rather satisfied/5—satisfied/6—very satisfied. The instrument has been validated in a representative sample (n 2218) of Swedish men and women aged 18–74 years. It has adequate test–retest reliability, discriminate and specificity validities.[5] The scale can validly be dichotomised into being satisfied (answer alternatives 5 or 6) versus not being satisfied (answer alternatives 1–4), where being satisfied indicates that the individual is well adapted and has little or no gap between aspirations and goal achievement. In contrast, being not satisfied means that the individual experiences an aspiration–achievement gap.[3] For the present investigation a reference sample of those 1898 individuals (1014 men, 884 women) ages 18–74, who had perceived their health as good, with no history of long lasting (more than one month) disease/disability restricting their life situation and had not been