Delays in definitive reconstruction of complex pelvic and acetabular fractures

M. Bircher, A. Lewis, S. Halder
From St George’s Hospital, London, England

There are unacceptable delays in the management of pelvic trauma in the United Kingdom. In 2003 this became a political issue after TV and radio coverage. Changes to the service were introduced, including trauma coordinators and a special tariff, but has it made a difference?

A recent study from Switzerland has described the results of percutaneous fixation of acetabular fractures in the elderly.¹ The principles of such management are subject to debate but it took a mean of only four days (2 to 6) from the time of injury for this highly technical surgery to be undertaken in the 21 patients. Was this because these patients were elderly or is the trauma system within Switzerland better resourced and organised than in the United Kingdom? Or are there other reasons?

When an elderly patient sustains a fracture of the neck of the femur in the United Kingdom, every effort is made to assess the patient medically and to stabilise the fracture as soon as possible, usually within 48 hours of injury. Of course, these fractures are common and can be treated surgically by most orthopaedic specialists, and special trauma lists are usually available. The clinical outcome is considerably better when surgery is carried out at an early stage. Most of the benefits are ‘medical’ rather than surgical.

This sense of urgency seems to be lacking when younger patients sustain more complex orthopaedic fractures, particularly to the pelvis and acetabulum. Why is this? In 2003 and 2004, widespread publicity drew attention to unacceptable delays in two of the units undertaking definitive reconstruction of fractures of the pelvis and acetabulum.² An audit at our unit showed that the mean delay between injury and reconstruction was 12 days. The situation was worse at a sister unit with a mean delay of 19 days. Clinicians, managers and politicians all agreed that these delays were wholly unacceptable. A series of meetings between the three major units in the South of England and the specialist commissioners resulted in some minor changes. A special tariff was introduced to cover the costs of definitive reconstruction. At our unit, attempts were made to define our catchment area in order to match the tertiary hospital with the appropriate resources. It was also suggested that a coordinator be appointed in the South of England to disperse patients to the tertiary units. As yet, because of severe financial pressures in the NHS, this has not happened. Our impression is that the changes which have occurred have made little or no difference to these delays.

We therefore undertook a prospective audit between June 2004 and June 2005, carefully measuring the times between injury and operation, identifying the reasons for the delays and, more importantly, attempting to discover what happened to patients not accepted at the time of referral to the tertiary unit because of lack of resources. We present these results and discuss the reasons for continuing delays.

Patients and Methods

All referrals were recorded in a logbook. We concentrated particularly on the period between June 2004 and June 2005 and analysed every patient who had been referred to the Pelvic and Acetabular Unit. We received 177 referrals, of which 95 were accepted for surgical treatment at our unit and 82 were not. The mean time between injury and referral from the receiving hospital was 4.3 days (1 to 35). It took a mean of 2.4 (1 to 18) days for radiographs to arrive by courier when requested. Once they had arrived a further 1.4 days (1 to 8) were needed to decide whether or not surgery was indicated and if operating slots were available. The mean time between injury and definitive reconstruction at the unit was a disappointing 12.6 days (4 to 31). The time...
between injury and the initial referral was recorded and the reason for any delay in referral noted. During the first telephone call, advice was given to the receiving unit as to the acute management of the pelvic and acetabular injury and details of other injuries were also recorded. These included other fractures and local damage to soft tissues such as the bowel, bladder, nerves and skin. It was usually suggested that associated fractures be stabilised at the receiving hospital unless there were contraindications such as ipsilateral fractures of the acetabulum and femur. If it was obvious during the first telephone call that the pelvic injury required specialist surgical treatment an operating session was identified and urgent arrangements for transfer were initiated. Occasionally, patients with severe multiple injuries were referred acutely but were only accepted if there was a bed in the intensive-care unit. However, there was rarely spare capacity in this unit. If, following referral, it was decided that a patient needed surgery and that no operating time was available, it was suggested that another similar specialist unit be contacted. If it was not possible to decide on the need for reconstruction, it was then suggested that the radiographs be couriered urgently to the tertiary centre.

In order to give an appropriate opinion on such fractures, anteroposterior (AP) and Judet views of good quality, plus a CT scan are necessary. Some radiology departments at District General Hospitals refuse to take Judet views, but we are prepared to give an opinion without such views in order to minimise delays, although clearly a full set of plain radiographs facilitates decision-making. Once the films had arrived they were studied by one of the senior members of the team and if an operation was deemed to be appropriate and an operating time was available, the transfer of the patient was arranged. The bed manager usually arranged this to take place on the day before surgery. On a number of occasions the consultant at the specialist unit asked for the patient to be admitted a day or two before the planned surgery for further assessment. This was rarely possible because of pressure on beds, and still remains a major issue. Later, during the audit, the referring units were contacted again in an attempt to find out what had happened to the patients who had not been accepted, including those who did not require surgery, were not accepted because of lack of capacity due to unavailability of beds in the general or intensive-care wards, lack of available theatre time, or absence of an appropriate surgeon. A number of patients who had been declined at the first telephone call were re-referred two to three weeks later because of the inability to find a specialist unit to carry out their reconstruction. They had been referred to other units within the South of England, but were turned down due to lack of capacity.

During the year of the study, our unit when fully staffed had, on average, two operating lists per week available for acute reconstructions. Further lists were also used for later reconstructive surgery. Other slots were available on an ad hoc basis depending on the number of referrals and the availability of anaesthetists, surgeons, theatres and beds. We have attempted to identify the reasons for delays and if they have led to any major clinical problems.

Results
Of the 82 patients who did not receive surgical treatment in our unit, 26 had been refused at the initial telephone call due to lack of capacity, 14 of whom were operated on at other units, while non-pelvic specialists operated on six (Figs 1 and 2). We have been unable to determine the fate of the other six patients. Of the remaining 56 patients about whom advice was given and specialist treatment recommended, 18 did not require surgery, 25 were deemed to be medically unfit for major pelvic and acetabular surgery, and other forms of surgical treatment such as traction or arthroplasty (early or late) were suggested. Multiple injuries were present in nine patients and although their pelvis was thought to require surgery, they were not accepted due to

Refused due to lack of capacity
Lost to follow-up
Died
Pathological fracture
Did not require surgical treatment
Patients not medically fit for acute reconstruction but requiring other operative treatment
No intensive care unit bed

Fig. 1
The 82 patients who were not admitted.

Patients lost to follow-up
Patients operated on by pelvic specialists
Intensive care unit refusals – conservative treatment of fracture

Fig. 2
The fate of the 35 patients that required acute fixation but were refused due to lack of capacity.
lack of capacity in the intensive-care unit. Of the other four patients, one died, one had sustained a pathological fracture and did not undergo surgical treatment and a further two patients were untraceable.

The treatment of these complex fractures is clearly deficient in the South of England. Apart from the 95 reconstructions carried out in the unit, only 18 of the residual 82 patients were deemed not to require surgical treatment. The remaining 64 either required early pelvic reconstruction or some other form of operation. The lack of capacity in our unit and the priority of fixing acute fractures led to the delegation of the treatment of these other patients, mostly to non-specialist units. Our unit has the expertise to carry out complex and unusual hip replacements in these patients, which is not readily available in the periphery. A massive increase in capacity is required in order to provide the full spectrum of pelvic and acetabular services to this volume of patients.

There is insufficient operating time available to deal with the number of cases that are referred. The situation is further complicated by the varying incidence of these fractures from week to week and month to month. In October 2005 we received 29 fractures, which required open reduction and internal fixation. Extra lists were used but a huge strain was put on the support services such as physiotherapy and radiology. An alarming side-effect of the current system is that patients arrive very late at night from referred hospitals. Bed managers bring patients in at the last moment in an attempt to minimise the length of stay. This puts added strain on the radiology department. It is difficult to obtain a good set of Judet views at midnight when less staff are available to assist in positioning the patient. The patients are seen very early on the day of surgery, decision-making can be hurried and significant injuries may be missed or underestimated. If patients arrive in a poor overall condition they may not be passed fit by the anaesthetist, thus leading to the loss of an entire operating list.

A total of seven of our patients who were refused at the time of initial injury were referred to two or three other centres, but not accepted. They eventually came back to our unit. The fractures had begun to unite and greater exposure was required to allow reduction to take place. In these circumstances the chances of obtaining a good reduction are therefore significantly reduced. This has a direct effect on outcome.³ We had to refuse nine patients because of lack of capacity in the intensive-care unit. We have managed to trace seven of them, who had displaced pelvic fractures which we considered required open reduction and internal fixation. None of these had a definitive reduction other than treatment by external fixation. They have therefore received substandard treatment for their fractures. We were unable to obtain details of the remaining two patients.

The medical, orthopaedic and financial costs of delay. Patients waiting for operation are in bed, immobile and can develop infections, pressure sores, thrombosis and become infected with resistant organisms. They may be in bed for up to 12 days with an unstable pelvic fracture. The psychological ramifications cannot be underestimated.

The recent article from Switzerland discusses percutaneous fixation of virtually non-displaced acetabular fractures.¹ When displaced fractures are referred and treated within a few days it is possible to perform closed reduction and percutaneous fixation. Less dissection is required, operating times are shorter and the period of rehabilitation and recovery is lessened. The results of acetabular fractures treated later than three weeks are inferior² and ten days has been suggested as the cut-off point.⁵ The paper from Oxford in this issue clearly underlines the importance of early definitive reconstruction.⁴ With associated acetabular fractures, the odds of obtaining an excellent or good result are reduced by 19% for each day of delay.

It is our experience that complex acetabular fractures referred after two weeks require more extensive approaches; of the fractures referred to our unit we estimate that over 75% could be described as complex. Extensive approaches are associated with a higher rate of complications. Likewise, pelvic fractures which have been referred after two weeks rarely reduce sufficiently to allow percutaneous posterior fixation to be done. More extensive anterior and posterior open reduction is required which carries a higher risk of complications.

It cannot make sense to leave a patient in bed for 12 days waiting for treatment. Since length of stay seems to be one of the important parameters by which politicians measure performance of hospital care it seems illogical to leave the most severely-injured patients in bed for these periods. Surely we must aspire to undertake internal fixation of these fractures as soon as possible, ideally within the first few days of injury. These injuries usually occur in young individuals with their whole lives ahead of them.

A simple calculation for the year of our audit assuming a reduction to seven days in the time to surgery, with a mean cost of a trauma patient being kept in hospital of £500 per day, shows possible savings of £332,500.

Discussion

There are many district hospitals in the South of England which receive small numbers of multiply-injured patients. Pelvic and acetabular fractures are often associated with injuries to other systems and represent a challenge to any district hospital. An experienced orthopaedic surgeon should be able to decide at a very early stage whether or not a pelvic or acetabular fracture requires reduction and fixation. Associated injuries often complicate the situation but with a formal pathway in position, it should be possible for the tertiary unit to be informed within 24 hours of injury. This would reduce delays and allow the tertiary unit to prepare for transfer at an earlier stage. The most senior surgeon available, preferably the consultant, should assess and refer these cases. When an early decision cannot be made the tertiary unit will ask for the radiographs to be couriered. The tertiary units themselves are not entirely blame-
less. If an inexperienced registrar is contacted the decision process can be delayed. At present there are not enough fully-trained pelvic surgeons to provide a 24-hour service, seven days a week. It is much easier for a registrar to delegate by sending the radiographs rather than making a decision about accepting the patient on the spot.

Hospitals are now run with bed occupancy of well over 90% and the use of bed managers has turned the simple task of accepting of a patient into a complex and tardy process. With the pressure on hospitals to meet elective targets, bed managers are less willing to accept work from outside the area if it means the cancellation of elective admissions. The reverse is also seen when base hospitals are unwilling to take patients back for convalescence after operation. Their beds are often reserved for elective cases. This then has a ‘knock-on’ effect at the tertiary unit which can become ‘clogged’ causing pelvic referrals to be refused.

The general policy by which tertiary units suggest fixation of other fractures at the receiving unit also causes delays. This advice is given for a number of reasons. The tertiary units are overwhelmed with work and cannot take on the role of a formal polytrauma unit without appropriate resources. These are not forthcoming at the moment. Indeed, there is not enough capacity to deal with the pelvic injury and many extra operations are clearly performed at the tertiary unit because of missed injuries or revision procedures. The future goal must be to have all definitive reconstruction carried out in a co-ordinated way with the minimum number of visits to the operating theatre. Patients should be sent to the appropriate institution at the right time and receive orthopaedic treatment of their injuries at the same time as their pelvic fracture. If there was a trauma system within the United Kingdom whereby patients with pelvic fractures were taken directly to the specialist units, this would immediately save almost five days of delay.

Although our unit has a defined catchment area as a district hospital, that for pelvic fractures is not defined. We cover most of the South-East of England, three-quarters of Greater London and regularly accept patients from further afield. Unless clear instructions are provided by health commissioners, boundaries will become blurred. One major difficulty is that this is an acute clinical problem which requires rapid decision-making. There is no time for permission for treatment to be sought and confirmed. Pathways and protocols need to be in place before patients even enter the system. A recent paper clearly calculated the incidence of acetabular fractures within a defined population. This allowed proper planning. Within the South-East of England there are no real clinical boundaries and it is very difficult to know exactly the extent of the population which each tertiary unit is serving. Although there has been good co-operation over the last two years between the three units in the South of England, patients are still being made to wait because of lack of capacity. The specialist commissioners are reluctant to provide resources when it is not clear what population is being served.

Despite some minor changes in the payment to the tertiary units, considerable delays persist in the definitive reconstruction of fractures of the pelvis and acetabulum. These are costly and, more importantly, are affecting outcomes, with some patients receiving substandard or, even worse, no treatment for their injuries. Trauma remains a low political priority and we do not understand why this situation is tolerable. With the ever-present terrorist threat we feel that trauma services should become more of a priority. The fact that a specialist pelvic service remains unable to meet requirements is an illustration of the inadequacy of overall trauma care within the United Kingdom. There are excellent centres within the United Kingdom, but at present services are patchy and disjointed. Quality trauma care must become a priority.

References