

Pelvic ramus fractures in the elderly

50 patients studied with MRI

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Background Whilst it is well known that fractures of the pelvic rami in the elderly are frequently associated with posterior ring injuries, the extent of this second injury is less well known. We evaluated this question by MRI scanning a group of elderly patients presenting at our unit with pelvic rami fractures.

Patients and methods We investigated 50 consecutive elderly patients (45 women) with fractures of the pelvic rami using an MRI scan of the pelvis in order to assess the competency of the pelvic ring.

Results On MRI, 45 (95% CI 42–48) patients had a sacral fracture. At 5-month follow-up, 39 (of 41 reviewed) still complained of posterior sacral tenderness.

Interpretation Pelvic rami fractures in the elderly are nearly always associated with posterior ring injuries. This probably explains why these patients take longer to rehabilitate than might be expected if only the anterior injury is considered, and it also explains why they experience long-term back pain.

Several previous studies have recognized that pelvic rami fractures in the elderly are associated with posterior pelvic ring injuries (Önnerfält and Brismar 1989, Koval et al. 1997, Schadel-Hopfner et al. 2002), but the extent and nature of this posterior element is less well known. It was originally hypothesized that it is possible to break the pelvic ring at only one place (Watson-Jones 1976) so that pelvic rami fractures were probably stable, but it was quickly realized that because of the rigidity of the pelvic ring, a break at one side must always be associated with a break at a second point and

as a result, all such injuries are potentially unstable (Burgess et al. 1990, Apley 1994, Rockwood and Green 2001). The low-energy fractures of the pelvic rami that occur in the elderly are classified as lateral compression type 1 lesions, and these always accompany sacral compression fractures on the side of the impact (Young et al. 1986).

We examined a consecutive series of 50 elderly patients with apparently “stable” fractures of the pelvic rami by clinical criteria and MRI.

Patients and methods

The study was approved by the hospital ethics committee. All patients agreed verbally to take part in the study, and an information sheet was provided.

We studied 50 consecutive patients (45 women) who had sustained a low-impact injury with pelvic rami fractures and who were admitted to our unit from the emergency department. The mean age was 78 (68–93) years. They all had a plain AP and lateral pelvic radiographs.

In addition to the normal medical management, precise details were taken of the circumstances and mechanism of the fall, and the presence or absence of painful symptoms around the bony pelvis and sacrum. Whilst in hospital, all patients received a pelvic MRI scan to allow assessment of the full extent of the pelvic injury.

Most patients were rehabilitated relatively quickly and were discharged home as appropriate. Most surviving patients were then followed up at a special clinic after an average of 5 months and

Table 1. The change in mobility in the 44 surviving patients as a consequence of their injury

	Mobility change	
	Before fracture (n)	After fracture (n)
Walking distance		
0 yards	0	7
0–10 yards	9	24
10–100 yards	25	10
100+ yards	10	3
Walking aid		
None	32	5
One stick	6	30
Two sticks	2	3
Zimmer frame	4	5
Chair-bound	0	1
Difficulty on stairs	11	34

were examined to assess the extent of their recovery, their overall mobility and any residual symptoms around the pelvis. For logistical reasons, a home visit was necessary for 10 patients.

Results

The majority of patients lived alone and independently. All but 6 were either fully mobile or had needed a single stick as a walking aid before

Table 2. The relationship between the anterior pelvic fracture and the sacral fracture

Pelvic fracture	Left ramus	Right ramus	Bilateral rami
Plain radiograph	20	24	6
MRI – No sacral fracture	2	3	0
– Left sacral fracture	14	1	4
– Right sacral fracture	2	18	0
– Bilateral sacral fracture	2	2	2

admission (Table 1). All sustained low-impact injuries. Most fractures (44/50 patients) were unilateral (Table 2). On plain radiographs, 22 of these appeared to be isolated fractures of a single ramus (Figure 1).

MRI showed that 45 (95% CI 42–48) of the patients had an associated vertical compression fracture of the sacrum (Table 1, Figure 2), 42 of these involving the ipsilateral side or both sides of the sacrum and 3 involving the contralateral side only. Most posterior sacral fractures could be diagnosed clinically, but there was one false negative. In 44 cases, sacral pain was associated with a sacral fracture. Of the original study group of 50 patients with pelvic fractures, only 44 patients were reviewed, as 6 had died. Although not an integral part of this study, the mortality rate was



Figure 1. Plain radiograph illustrating a classic “simple” fracture of the pubic ramus. Note that the sacro-iliac region appears to be intact.



Figure 2. MRI scan illustrating a typical fracture of the sacral wing on ipsilateral side of the ramus fracture.

similar to that of other reported series (Watson-Jones 1976, Rockwood and Green 2001). Of the 44 patients who survived, 41 still complained of sacral symptoms, mostly on the side of the sacral fracture. In 34 patients, this was severe enough to interfere with their activities of daily living.

Before their injury, 38 of the final 44 individuals reviewed were reasonably independently mobile, with 35 being able to walk distances which were adequate for their age group, although 6 of these required a walking stick if the distance was appreciable (Table 1). 6 patients had very limited mobility and required considerable support. At review, on average 20 weeks after their fracture, 9 patients were now significantly disabled, needing a wheelchair, zimmer frame or two walking sticks. 30 patients needed one stick for walking any significant distance. Only 13 were now able to walk more than 10 yards. As a result, 38 required substantial increased support from relatives and 11 still needed (and were receiving) appropriate physiotherapy.

Sacral back pain remained a problem in 41 cases. Only 2 of the 44 survivors did not need any analgesia, and 8 required large doses most of the time. In 22 patients, the sacral back pain was sufficiently severe to cause sleeping problems due to night pain, compared with only 2 prior to the injury.

Discussion

We found that most pelvic rami fractures occurring in elderly people are associated with compression fractures of the ipsilateral wing of the sacrum—and correspond to lateral compression fracture type I of the Young classification (or Tile B2-1). There are thus two significant fractures rather than one in these patients, and the second (i.e. the posterior fracture) may actually be the more significant of the two.

Interestingly, 6 patients sustained bilateral fractures of the pubic rami and 2 of these were associated with bilateral fractures of the sacrum. Close questioning revealed that both had fallen into a sitting position on the floor, which of course raises the question as to how lateral compression could be applied bilaterally in such a fall. Somewhat controversially, it is tempting to speculate that these might represent mild vertical shear-type fractures.

Clinical examination at presentation revealed that most patients had sacral tenderness posteriorly on the same side as the pelvic ramus fractures, and that usually this tenderness was a fresh symptom and was related to the underlying sacral injury. Surprisingly, at review, the majority of these patients were still significantly disabled by their injury—with the posterior ring tenderness having settled in only a few of them.

Chronic pain remained a problem, with 49 patients requiring regular analgesia. This contrasts with the findings of Koval et al. (1997) who found little long-term morbidity, but agrees well with those of Morris et al. (2000) whose results were very similar to those presented here.

We feel, therefore, that pelvic rami injuries in the elderly may represent a far more significant injury than has been suspected previously, which explains why the rehabilitation time is longer than might be expected. This may also go some way to explaining their increased long-term mortality, as reported in the literature (Spencer and Lalanadham 1985, Rossvoll and Finsen 1989, Hill et al. 2001). However, in our series there was no relationship found between mortality/morbidity and the presence or absence of a sacral fracture.

We therefore recommend that clinicians involved in the care of such patients with pubic rami fractures should maintain a high level of suspicion for

the presence of associated sacral injuries, particularly in the presence of posterior sacral tenderness. We would also suggest that the injuries be given more weight than that described previously, since they probably represent a significant twin-fracture injury in this elderly group of patients.

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