Is there a need for early post-operative x-rays in primary total knee replacements? Experience of a centre in the UK

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ABSTRACT

INTRODUCTION Early post-operative x-rays are often taken in total knee replacements (TKRs). Patient mobilisation may be delayed until these x-rays are obtained and this may prolong discharge. The aim of this study was to assess the value of such early x-rays and whether they influenced the early post-operative management of these patients.

METHODS A total of 624 consecutive TKRs performed at the Blackpool Victoria Hospital over a 34-month period were evaluated. Plain anteroposterior and lateral x-rays were examined.

RESULTS Two patients were found to have significant abnormalities: an undisplaced periprosthetic tibial fracture and a partial inferior pole patellar avulsion. Neither of these required further treatment or influenced mobility. No other complications were noted that changed routine post-operative management.

CONCLUSIONS These results question the need for immediate x-rays in primary TKRs.

KEYWORDS

Total knee arthroplasty – Radiography – Post-operative

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Primary total knee replacement (TKR) is a common procedure with approximately 73,000 TKRs being performed annually in the UK.¹ It is common practice to either obtain an x-ray immediately post-operatively or prior to hospital discharge. This often means mobilisation or discharge may be delayed until an x-ray is taken. The aim of this study was to detect any significant findings that would change our normal post-operative management.

Methods

Overall, 628 consecutive TKR procedures performed at the Blackpool Victoria Hospital between 2007 and 2010 were included in the study. Unicompartmental knee replacements and revision cases were not included. Immediate post-operative x-rays were unavailable for 2 cases and 2 patients had no pre-discharge films and were therefore excluded, leaving 624 cases. All procedures were performed by a consultant or a senior orthopaedic surgeon. Most ($n=595$) of the prostheses used were press-fit condylar (DePuy, Warsaw, IN, US). Patients had an anteroposterior and lateral x-ray prior to discharge. These were evaluated by three orthopaedic surgeons for the purposes of this study. The main goal of the evaluation was to identify any pathology that warranted immediate revision or altered post-operative management.

Prior to commencing review of the x-rays, it was anticipated that the number of abnormalities would be minimal. To establish the sample size, an exact binomial distribution was used (since the results could be grouped as positive or negative) with an expected 500 observations. If the true probability of finding a positive result is 0.1%, then there is a 98% chance of there being two or fewer positive findings. Conversely, if the true probability of finding a positive result is 1%, there is an 87% chance of there being more than two positive findings. Hence if 0, 1 or 2 out of 500 observations were positive, the immediate post-operative x-ray would be deemed an inefficient use of resources.

Results

Table 1 summarises the pathologies identified from review of the 624 TKR x-rays. There were two post-operative x-rays that had any of the complications examined. Neither of these influenced the patient's post-operative management. The case notes of these patients were reviewed and no complications were noted at follow-up appointments. The pre-operative x-ray of Case 1 did not reveal any tibial fracture (Fig 1A) but the post-operative x-ray showed an undisplaced periprosthetic medial tibial plateau (Fig 1B). The other fracture was in Case 2 with the post-operative x-ray showing a partial inferior pole patellar avulsion fracture (Fig 2).

Table 1 Pathologies identified from review of 624 total knee replacement (TKR) x-rays

Pathology identified	Total out of 624 TKR x-rays
Tibial periprosthetic fracture	1
Patella fracture	1
Dislocation	0

Figure 1 Case 1: pre-operative x-ray showing no tibial fracture (A) and post-operative x-ray showing an undisplaced periprosthetic tibial fracture (B) **Figure 2** Case 2: immediate post-operative lateral x-ray showing patellar avulsion fracture

Discussion

Out of the 624 early post-operative x-rays examined in this study, no findings were identified that would alter the clinical management after the TKRs. There is therefore sufficient evidence to conclude that there is less than a 0.1% probability of detecting fracture, dislocation or other significant abnormalities.

These findings are in keeping with previous studies. Ververeli *et al* conducted a study of 124 consecutive TKRs comparing recovery room x-rays with pre-discharge x-rays.² Their results showed that there was no change in post-operative management based on the review of these x-rays and they suggested the elimination of the pre-discharge x-ray. Glaser and Lotke reviewed 200 consecutive primary TKRs retrospectively to identify if immediate post-operative x-rays altered the management of these patients.³ No x-rays were identified that changed the normal post-operative course of patients.

Conclusions

Our results question the value of early post-operative x-rays. It is suggested that the first x-ray should be delayed until the first post-operative clinic visit. This is because mechanical failure following an uncomplicated TKR is very rare. On the basis of our findings we recommend that patient mobilisation and discharge should not be delayed while waiting for x-rays to be completed. It should be noted, however, that early post-operative x-rays may be performed in situations where immediate feedback is needed, such as to a training surgeon or to a more experienced surgeon who is still on the learning curve for using a particular implant.

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