
Postoperative Management and Radiography

Pain control

In the early postoperative period, good pain control is essential. Regimes of pain management appropriate for total knee arthroplasty may not be suited to the very rapid mobilisation that is possible after UKA through a minimally invasive approach. A multimodal approach is best with minimal opiate use. Different regimes are used successfully in different institutions.

Intraoperative local anaesthesia

We have found that a useful technique is a local anaesthetic block injected into the damaged tissues in the last stages of the operation. Our technique was developed from that of Kohan L and Kerr D¹.

Ropivacaine 300 mg, ketorolac 30 mg, and epinephrine 0.5 mg are made up to a total volume of 100 ml with normal saline. Adrenaline is added to a ratio of 1:200,000. The mixture is put into two 50-ml syringes. Before the components are implanted, the mixture is injected through a 19 gauge spinal needle into any tissue that was damaged during the operation. This is done methodically so that no area is missed, with particular attention being paid to the posterior capsule, the periosteum around the implant, and the margins of the incision in the quadriceps muscle. The skin is infiltrated up to 3 cm from the margins of the wound and 10 ml is reserved until the end of the procedure to inject around the drain site, if a drain is used.

This treatment usually results in very little pain when the patient wakes from the anaesthetic, allowing immediate resumption of knee flexion and walking. Occasionally, however, the local anaesthetic is slow to work and patients awake with severe pain. Pain immediately after the operation can be more reliably avoided by regional nerve blocks given at the beginning of the procedure. They have the additional advantage of minimising the dose of general anaesthetic required, which helps with more rapid recovery. However, femoral and sciatic nerve blocks with bupivacaine, and epidural anaesthesia, may have motor effects that delay mobilisation. Therefore, we now use prilocaine nerve blocks or a short-acting spinal anaesthetic. The effects of these have usually worn off 2–3 hours after the operation when the patients start to walk.

Severe pain may occur on the second day when all these drugs have ceased to act (so called 'rebound pain'). This can be controlled by instilling local anaesthetic into the joint through a fine (epidural) catheter inserted into the knee before wound closure. The catheter should be fitted with a bacterial filter to minimise the risk of infection. The morning after surgery, 20 ml of 0.5% bupivacaine is instilled into the joint. (If a suction drain was used it should be clamped.) The catheter (and drain) are then removed. In a randomised controlled trial, we found that this technique can provide good pain relief for a further 24 hours².

In recent years, long acting local anaesthetic (liposomal bupivacaine) has been used for pain relief after UKA. It is reported to last for up to 72 hours, allowing UKA to be performed as a day case in the majority of cases (J Barrington - personal communication). We do not have experience with the use of liposomal bupivacaine as it is not licensed for use in the UK.

In addition to the local anaesthetic, we use high doses of oral non-steroidal anti-inflammatory drugs with a gastroprotective agent such as ranitidine or omeprazole.

Blood loss

The amount of blood lost is small and transfusion is rarely required. We routinely use a thigh tourniquet for the operation. Occasionally, in a patient with a compromised circulation, we have carried out the procedure without a tourniquet but it is much more difficult.

We insert a vacuum drain into the joint at the end of the operation. It is placed in the lateral gutter of the knee so that it does not interfere with early knee flexion. Occasionally, in the absence of a drain, there are acute haemarthroses in the post-operative period which can delay rehabilitation. The drain is removed the morning after surgery (or 4–5 hours postoperatively if the patient is to go home on the day of operation).

We have recently started to use Tranexamic acid. The evidence suggests that whether this is used topically or intravenously just before the tourniquet is released, it is effective at decreasing blood loss³. With this approach a drain is not necessary⁴.

It is our belief that unless patients are very high risk, and have for example had a previous DVT/PE, that anticoagulant drugs such as Warfarin or Low Molecular Weight Heparin are not necessary. This is because the risk of thromboembolism is low with rapid mobilisation the UKA patient. Furthermore they tend to cause knee and leg swelling and bruising which slows recovery. Unfortunately we currently are required to use this kind of medication.

Rehabilitation

Range of motion

Patients recuperate from UKA more rapidly and more predictably than after TKA and do not require formal exercise regimes or outpatient physiotherapy appoint-

ments to recover knee movement. Vigorous exercises are counterproductive by making the knee more painful and swollen.

On the day of the operation, while the local anaesthetic block is providing good pain relief and the drain is in place, most patients can easily perform an active straight leg raise and flex the knee to 110°. Thereafter, the joint tends to become more swollen, pain relief is less complete, and flexion is more difficult. Exercises to encourage flexion at this stage may make the knee worse, and patients should be allowed to limit knee movement within the range that is comfortable. Education of physiotherapists may be necessary especially if the unit is new to UKA. They may well treat the patient as though they have a TKA which is understandable but counterproductive as the patient often loses confidence if pushed too hard. By the end of the first week, pain and swelling subside. Motion is gradually regained in succeeding weeks, usually recovering to what it was preoperatively after a month and often improving further thereafter.

Ambulation

Most patients can start to walk about 2–3 hours after the operation. Early walking seems to improve the pain relief. If there is quadriceps weakness, splinting the knee may help.

Early discharge

With rapid recovery, it is possible to discharge patients from hospital early. Repicci and Eberle⁵ were able to treat 80% of their patients with less than 24 hours in hospital.

We undertook a randomised study, within the setting of the UK National Health Service 10 years ago, to compare the effect of discharge on the day after operation with our practice at that stage which was discharge on day 4 or 5^{6,7}. In appropriately selected patients, discharge on the day after operation did not prejudice the speed of recovery or increase the incidence of complications. However, it did result in a significant cost saving⁸. In order that patients are suitable for early discharge, they must be relatively fit and live locally, there must be a support system so that patients can telephone if they have problems and be readmitted if necessary.

Increasingly, patients having the OUKA are being discharged on the day of surgery. Up to 80% of patients undergoing UKA in some centres are discharged on the same day. These patients undergo a prior rigorous health check up, have a detailed outpatient consultation including counselling about advantages of day case surgery and are provided adequate support (including visits and 24 hour telephone service) after surgery. Education of patients and staff is essential. In addition reliable pain control and postoperative support is required. Early outcomes have been shown to be better than or as good as those with conventional discharge without any increase in readmission rates or mortality or morbidity⁹.

Duration of recovery

The early rapid recovery of function after UKA tends to slow down in later weeks. Often, at 6 weeks, patients are disappointed that they still have symptoms (although these are usually less severe than those experienced at the same stage after TKA). Therefore, we warn patients before discharge that their rapid rate of recovery may not continue and that they may still have some pain medially, numbness laterally, swelling of the knee, stiffness and restriction of extension and flexion for three months. Night pain around the six week mark is a not uncommon complaint. The patients recover quickly, and therefore stop taking pain relief medication and become increasingly active. As a result they may have increasing symptoms. They should be warned not to stop night time medication too soon. If a patient does have increasing symptoms, they should decrease their level of activity.

Overall, most of the recovery occurs within the first three months. After that the symptoms continue to improve slowly for about a year.

Postoperative radiology

Good postoperative radiographs are necessary as a baseline for comparison with later films and to allow 'quality control' of the surgical technique.

For these purposes, the standard methods of aligning the X-ray beam are neither sufficiently accurate, nor repeatable enough. To assess the positions of the two metal components, the X-ray beam must be centred on one component and aligned with it in two planes. The resulting projection of the other component can then be used to deduce their relative positions. We therefore suggest that fluoroscopically aligned radiographs are taken (screened X-rays). If this is not possible, reasonably good radiographs can be obtained using a digital system. Low dose images are used to adjust the position. When good alignment is achieved, a standard image is obtained.

In the anteroposterior projection, the patient lies supine on the X-ray table and the leg and the X-ray beam are manipulated under fluoroscopic control until the tibial component appears exactly end-on in silhouette. The radiograph is then taken (Fig. 9.1).

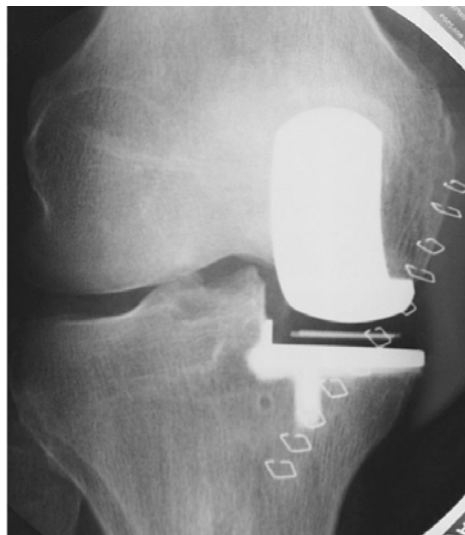


Figure 9.1 Fluoroscopically centred anteroposterior radiograph.