Total knee replacement: the joint of the decade

A successful operation, for which there's a large unmet need

Hip replacements were developed in the 1960s and within a decade had revolutionised the treatment of hip arthritis in elderly patients. This success heightened interest in other joints, particularly the knee. With no constraint on the development and use of surgical implants there was a short period of divergent evolution, and a great variety of knee replacements were produced. Natural selection soon occurred and many designs failed rapidly—hinged knees caused particular problems. Thus, in the 1970s and early 1980s knee replacement was widely considered to be a poor operation. Some designs were successful, however: these attempt to resurface the joint and reproduce normal knee anatomy with a low friction joint. The remaining knee ligaments provide stability, allowing some rotational movement and good function. Total knee replacements have subsequently undergone a period of convergent evolution, and most implants now adhere to the same basic design principles. With this success, knee replacement has become one of the most common major surgical procedures, with almost 35 000 operations performed each year in the United Kingdom.

"How long will my knee replacement last?" is a common question asked during consultations. Survival analysis suggests that 95% will last for 10 years and 85-90% for 15 years.[1] The results are equally good for osteoarthritis and rheumatoid arthritis, but are these impressive figures reliable? Until recently many survival studies considered that patients lost to follow up had a similar chance of failure to those remaining within the study. This may not be true, however. Patients with failed total joints often seek a second opinion and are referred to a subspecialist for revision surgery.[2] Recent studies have introduced "worst case" analysis, where all patients lost to follow up are considered to have failed joints. This gives a more pessimistic (but possibly more realistic) view of joint survival. However, even with these more rigorous standards, many total knee replacements have survival rates of 85% at 13 years.[3] The long term survival of knee replacements appears to be better than that of hip replacements.

"What will my knee be like?" The analysis of outcome after joint replacement has also evolved. Early studies concentrated on the surgeon's view of outcome and produced biased results. Recent studies have evaluated the patient's view and used generic health status questionnaires (such as the SF36) to assess outcome. These outcome measures have emphasised the severe pain and disability associated with knee arthritis compared with common surgical and medical conditions. After total knee replacement significant improvements occur in all dimensions of health, including pain, mobility, well being, and emotional status.[4] These benefits are seen in all age groups, including people aged over 80.[5] As well as improvements in quality of life, increased mobility after knee replacement may reduce social isolation and have other benefits, such as improved cardiovascular fitness.[6]

There is now general agreement that the treatment of choice for patients aged over 55 with severe pain and disability from knee arthritis is arthroplasty. Knee arthritis is slightly more common than hip arthritis and 20 per 1000 people in the general population over 55 years would benefit from knee replacement; 4 per 1000 of these patients have extreme disability but many are not referred for surgery.[7] In women aged over 74 years the incidence is 43 per 1000, and demographic changes are likely to increase demand for knee replacement by 40% over the next 30 years.[8]

Already there is a large unmet need for knee replacement in the United Kingdom, and the waiting time for surgery is often unacceptably long. Waiting list management is becoming a major political issue, and it is possible that standardised priority assessment criteria will be introduced for common elective procedures.[9] If the clinical scoring systems used to prioritise patients accurately reflect the pain and disability associated with knee arthritis, such waiting list management systems are likely to highlight the underprovision of knee replacement surgery in many health districts. The advent of generic outcome measures in orthopaedics will help inform the debate on the allocation of health care resources and take knee replacement forward into the next decade.

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