Joint replacement in China: progress and challenges

An urgent need for proper management

The United Nations and the World Health Organization declared 2000–10 as the Bone and Joint Decade. Since then, China has made substantial progress in developing artificial joints and joint replacement surgery. Nowadays, joint replacement is widely accepted as a successful treatment alternative in China for many end-stage joint conditions when non-operative measures have been exhausted, which is a significant advance in orthopaedics.

Joint replacement started in the 1970s, when China lagged behind many countries [1]. Lu Shibi, acknowledged as the father of joint replacement surgery, first developed an artificial joint design using titanium along with the clinical application. However, the early applications in this area were unsuccessful because of the inappropriate design and fabrication of prostheses. In the 1980s, successful development of domestic cement and cementless fixation of pearl-surfaced artificial joints [2, 3] resulted in great progress in joint replacement technology, although still fairly new. Many large hospitals became involved in surgery, leading to domestic production of prostheses.

Since the 1990s, China has seen a boom in joint surgery; for example, many hospitals either at or above provincial level have set up joint surgery professional groups, branches or centres. With China’s accession to the World Trade Organization in 1995, many international manufacturers of artificial joints came into the Chinese market. The influx of foreign products promoted the growth of joint replacement surgery as well as triggering local production of artificial joints. In some areas, the technology and practice is close to or on a par with advanced international levels. Meanwhile, the Chinese Joint Surgery Association has grown as an organization, with its members all over the country disseminating knowledge and exchanging academic information. In addition, extensive academic exchanges and co-operation with many international institutions have taken place.

Joint surgery is now an accepted treatment option for people suffering from surgically remediable joint diseases and is routinely done all over China. The number of surgeries continues to rise annually by ~15%. The age range for joint replacement surgery is 15–105 years [4], but the average age of the patients who receive joint replacements tends to be younger. Most joint replacement surgeries are done for OA, while others are for RA, inflammatory arthritides, JRA, femoral neck fractures, bone tumour and developmental dislocation of the hip. Almost all joints can be replaced: not only the large joints such as hip, knee, ankle, shoulder, elbow and wrist, but also small joints like those of a hand or foot.

Despite the rapid growth in joint replacement technology in China, several issues persist. First, the proportion of patients who receive joint replacement shows considerable differences between urban and rural areas. While no official statistics regarding the differences are available, the situation is not hard to visualize. A straightforward joint replacement costs around ¥42,500 ($7000 or £4250) [5], which is beyond the reach of many people in the underdeveloped agricultural areas. Besides the imbalanced distribution of economic resources in China (western China is still poorly developed) and the lack of medical insurance and other financial support, many patients, particularly those in western China, do not have access to joint replacement surgery. It is not done in many under-resourced areas. Secondly, we have an insufficient number of surgeons. So doctors who have not been trained professionally implement joint replacement for patients. In rural areas, most hospitals are in short supply of both surgeons and surgical facilities. The demand for joint surgery nationally still far exceeds supply. Many patients, maybe for different reasons, fail to receive appropriate treatment. Thirdly, the average hospital stay is generally 17 days [6], which, compared with many western countries (average of 4 days), is too long. Fourthly, at present the clinical use of artificial joints depends mainly on foreign imports, and most of the domestic products are an exact imitation of the foreign joints. However, physical differences between Chinese and foreigners in terms of height and bone [7] imply that a simple copy is not an ideal match.

In China, about 1.2 billion people have OA, with 55% of them being >60 years of age [8], but about 50,000 hip or knee arthroplasties are annually performed in China; this number is increasing every year, while this number is ~900,000 for hip and knee replacements performed annually in the USA [9]. Interestingly, >20 million people in the USA have OA.

Some of the steps that are needed to improve and evolve joint surgery in China are highlighted. First, some countries have national joint replacement registers that systematically follow up all patients who have undergone a specific replacement procedure [10], but there is no such nationwide joint replacement registration reporting system in China. Artificial joint surgery in China is still ad hoc. Without a national register, complication rates of
surgery are extremely difficult to measure. The establishment of national registers and standardization of surgical indications and techniques are necessary for patient follow-up and further referral if needed. Secondly, despite significant progress in diagnosis and treatment of joint diseases over the past two decades, basic research related to joint surgery in China is still in its infancy, especially in joint biomechanics. An increase in multidisciplinary collaboration in basic and clinical joint replacement is needed to improve basic joint replacement research and surgical outcomes for people with joint diseases. Taking into account the Chinese anatomy, kinematics and biomechanics of the joints to be replaced, it is critical to design and develop prostheses that have a better fit for Chinese people in structural and mechanical properties.

The good news is that the Chinese government and the Orthopaedics Committee of the Chinese Medical Association are acutely aware of these problems and are taking steps to address them. However, a systematic programme will be needed to overcome these problems, mobilizing many social forces, which cannot be achieved during a short period. All in all, joint replacement surgery in China is heading in a promising direction.

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References