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Advances in Total Knee Replacement surgery

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TKR surgeries are now being increasingly performed in the younger age groups.



Total Knee Replacement (TKR) helps relieve pain and restore motion in patients with severe knee Arthritis. It is estimated that over 1,20,000 TKRs are performed in India annually. TKR surgeries are now being increasingly performed in the younger age groups. Traditionally, the advice was to delay TKR as much as possible; the focus now is on providing better function and quality of life to the patient, irrespective of age. This paradigm shift can be attributed partly to availability of better quality, longer lasting implants and greater acceptance of TKR by the population. Younger patients are more active and likely to place excessive load on the artificial joint. This puts them at an increased risk of accelerated wear and failure. Revision or re-do surgery is required if the first TKR wears out or is not functioning well. Hence, it is crucial that the lifespan of artificial joint replacement is maximised especially in younger patients.

Recent data from the Australian Joint Replacement Registry showed that computer navigated TKR had significantly lower rate of re-do surgery as compared to conventional TKR in younger patients (less than 65yrs). Computer navigation helps improve accuracy during TKR so that the artificial knee joint is aligned correctly. Data from the Norwegian Joint Replacement Registry showed that computer navigation reduced the rate of re-do surgery for mal-alignment.

Computer navigated TKR-

Computer navigated TKR is performed using an advanced system with a highly specialized software, infrared camera and trackers. During surgery, trackers are temporarily attached to the patient's knee bones which transmit data to the infrared camera. This data is processed by the computer to provide real time 3D information about the patient's knee joint and leg alignment. The surgeon uses this information to plan bone cuts, adjust soft tissue tension, customize implant position and insert the artificial knee joint accurately. Precise implant positioning is likely to reduce joint wear, and improve the lifespan of the artificial joint. This technology also forms an important part of robotic TKR. The reported benefits of computer navigated TKR include better alignment, improved patient satisfaction, superior clinical outcomes, lesser blood loss and lower blood transfusion rates. It also results in lesser post-operative inflammation which may reduce pain and swelling aiding early mobilization and recovery.

The world's first computer navigated TKR was performed in France two decades ago. The technology has undergone extensive upgrades since then. The current generation of systems are comprehensively validated for accuracy, have enhanced functionality and are more user-friendly. As a result, its use is growing in India and the rest of the world. To illustrate, the proportion of computer navigated TKR in Australia has jumped from 2.4% in 2003 to 30.8% in 2016. In Germany, about 40% of knee surgeries are performed using this technology.

Enhanced “fast track” Recovery After Surgery (ERAS)

ERAS protocol is a multi-modal, multi-disciplinary (surgeon, anaesthetist & rehabilitation specialist) care pathway for patients undergoing surgery in order to help them achieve early recovery. It helps shorten hospital stay, improve outcomes and reduce complications. Specific techniques like Minimally Invasive Surgical (MIS) approach, avoidance of surgical drains, optimum anaesthetic and pain management, balanced fluid administration, early mobilization and allowing patients to drink and eat on the same day of operation are implemented to facilitate fast track recovery. In contrast, with the classical approach which is still followed, patients usually stay in the hospital for 5-6 days after surgery.

To give an example, we performed computer navigated TKR on an 83 years old male patient with Diabetes Mellitus and Parkinson's Disease who had symptomatic left knee Osteoarthritis. As per our usual practice, we implemented ERAS protocol in his care. The patient was able to walk within few hours of surgery and was fit to go home within 48hrs. Early mobilization, especially in such elderly patients can help prevent complications like blood clots, chest infection and urinary infection among others.

It is projected that the number of TKRs performed in India will continue to grow in the coming years. Advanced techniques like computer navigation will ensure accuracy and pathways like ERAS will help patients recover early after surgery. Routine utilization of these techniques can help improve outcomes and reduce complications after TKR.

Dr Siddharth Shah, Joint Replacement Surgeon, SL Raheja Hospital, Mahim-A Fortis Associate