World’s largest trial of robotic knee replacement reveals surprising results

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Why is in news?

*The RACER-Knee trial, coordinated by the University of Warwick and University Hospitals Coventry and Warwickshire NHS Trust, found that **robot-assisted knee replacement** offered greater surgical precision but did not produce meaningful improvements in pain, mobility or recovery compared with conventional surgery after one year.*

The findings were published in The Lancet.

About the RACER-Knee trial

- It is the ***world’s largest double-blinded***, randomized controlled trial comparing conventional total knee replacement with robot-assisted surgery using the ***Stryker Mako robotic system***.
- The UK-wide study involved 339 patients, 33 surgeons and 10 hospitals.
- The trial compared patient-reported outcomes and clinical measures after robotic-assisted and conventional total knee replacement.

Key findings

- At 12 months, both groups showed comparable levels of pain relief, mobility and recovery.
- There was no meaningful difference in the primary outcome measure, the ***Forgotten Joint Score***, which assesses how much a patient is conscious of an artificial joint during everyday activities.
- Other outcomes—including walking ability, pain during hospitalisation and recovery, and likelihood of another operation—were also comparable.
- Robotic assistance improved the precision with which surgeons could position instruments and make bone cuts, but this technical advantage did not translate into better patient outcomes during the first year.
- No increased risk of serious adverse events was found in the robotic-assisted group.

How does robotic knee replacement work?

- ***Total knee replacement*** is a surgical procedure in which damaged joint surfaces are replaced with artificial components, commonly to treat severe knee arthritis.
- In conventional surgery, the orthopaedic surgeon uses standard instruments and clinical experience to position the artificial joint.
- In robotic-assisted surgery, the surgeon controls a robotic arm that helps guide instruments and allows greater accuracy in the angles and depth of bone cuts.

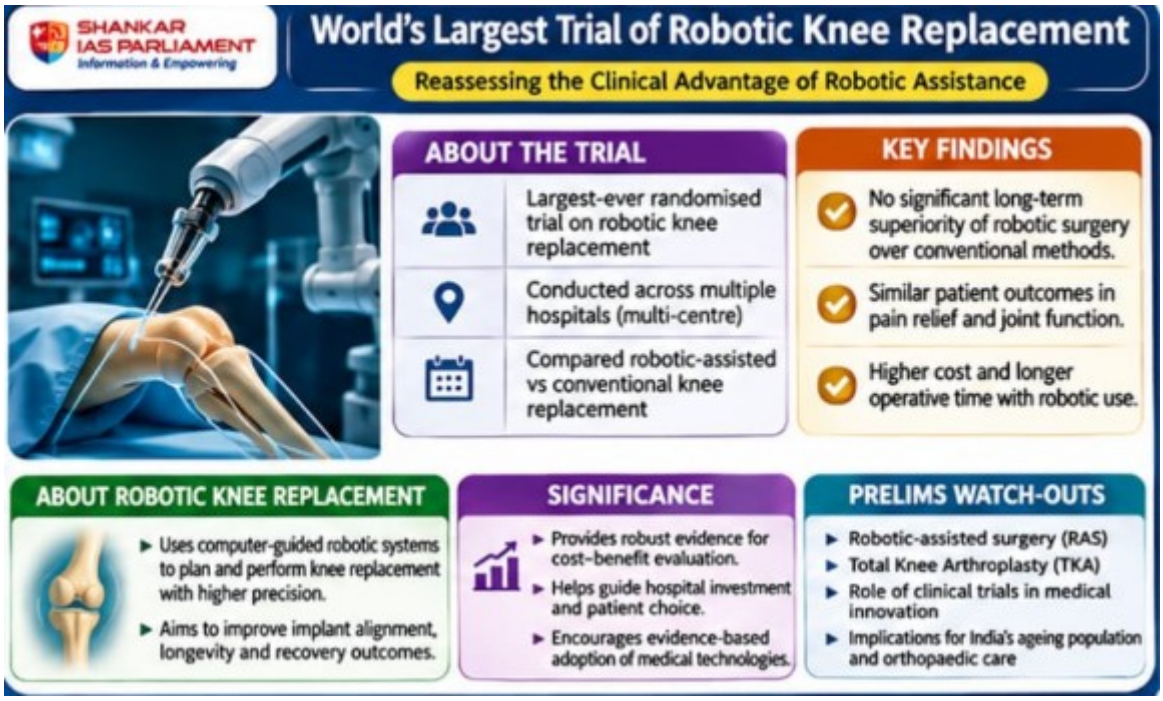
- The technology can help tailor the procedure to an individual patient's anatomy; the robot assists the surgeon and does not independently perform the operation.

Cost and limitations

- Robotic-assisted operations took, on average, 10.5 minutes longer and cost approximately £950 more per procedure in the trial.
- At prevailing NHS spending thresholds, the technology was not considered cost-effective during the first year after surgery.
- Researchers will monitor participants for ten years to examine whether longer-term differences emerge, including whether robotic assistance reduces the need for revision surgery.

Significance

- The study highlights the distinction between technological precision and meaningful patient-centred outcomes.
- It underlines the importance of evidence-based adoption of medical technologies, health-technology assessment and cost-effectiveness before large-scale public procurement.
- It does not rule out future benefits; better personalisation and further research may help convert precision into improved recovery and mobility.



Reference

The Hindu | Robotic knee replacement trial and its findings

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