Series

Hip and knee replacement 1

Hip replacement

Rory J Ferguson, Antony JR Palmer, Adrian Taylor, Martyn L Porter, Henrik Malchau, Sion Glyn-Jones

Tutor
Professor Jin Qunhua

Student
Tian Xiaoping

2019-12-18

Introduction

Modern total hip replacement can improve patient quality of life more than any other elective surgical procedure.Since the pioneering work of Wiles,Charnley, and others in the mid-20th century, implant technology has steadily improved.

Although the era of major design innovation is probably over,incremental improvements continue. Research efforts focus on three key goals: extending implant lifespan, improving functional outcomes, and reducing complications.

Epidemiology

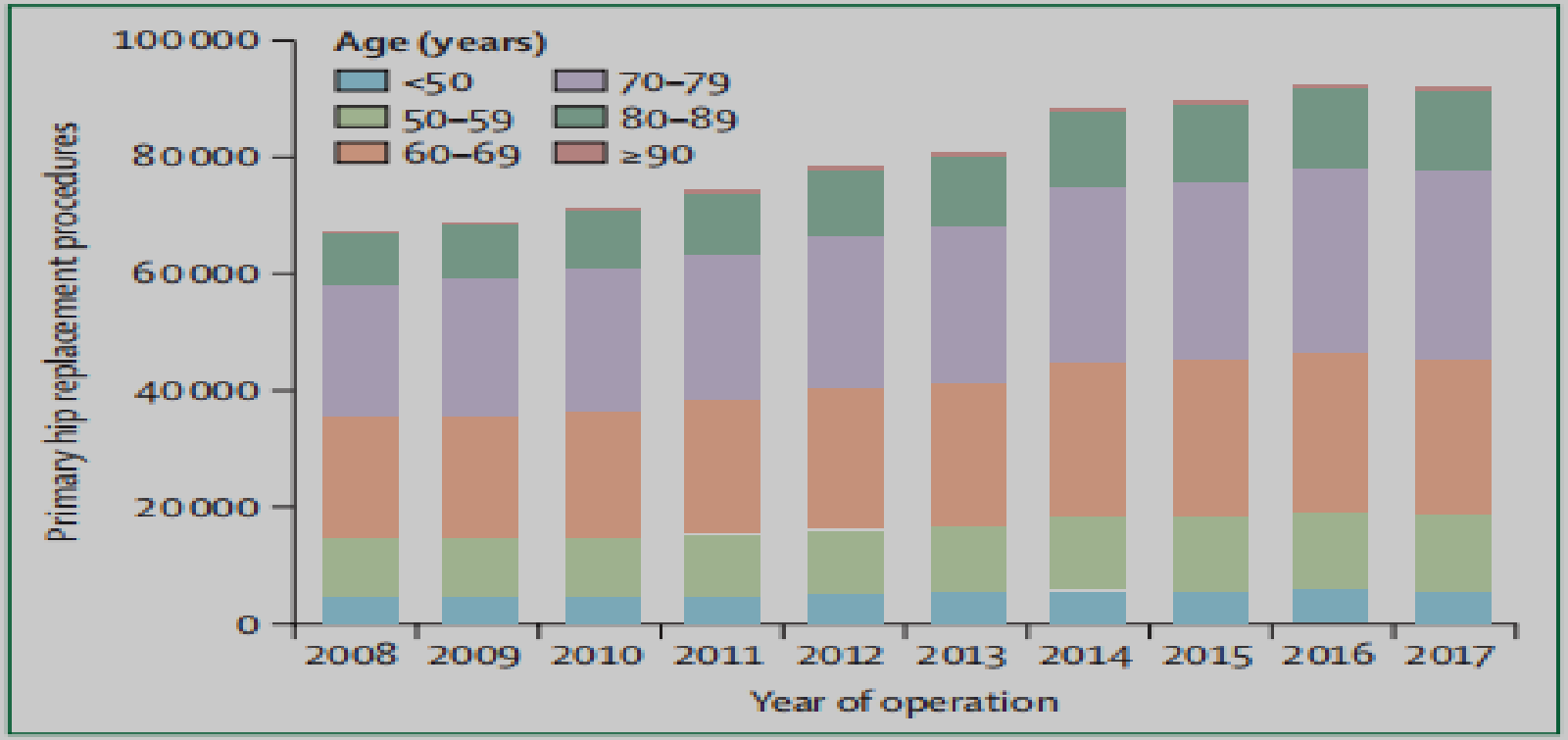

Figure 1: **Distribution of primary hip replacements by age in England and Wales since 2008**

Data are taken from the England and Wales National Joint Registry.[10]

Figure 1

Causation

The principal causal indications for THA are osteoarthritis (which accounted for 90% of procedures in the UK in 2017), fractured neck of femur (5%), avascular necrosis (2%), dysplasia (2%), and inflammatory arthritis (1%).

Worldwide, as populations age, the incidence of osteoarthritis is predicted to rise.

Decision making for surgery

Shared decision making benefits patients and surgeons. Patient-specific predictions of surgery outcomes are central to the decision process, and patients should be provided with clear personalised information.

Risk prediction tools,which calculates the risk of morbidity and mortality on the basis of preoperative health status, are useful adjuncts.

Furthermore, age at surgery has a significant effect on revision risk.

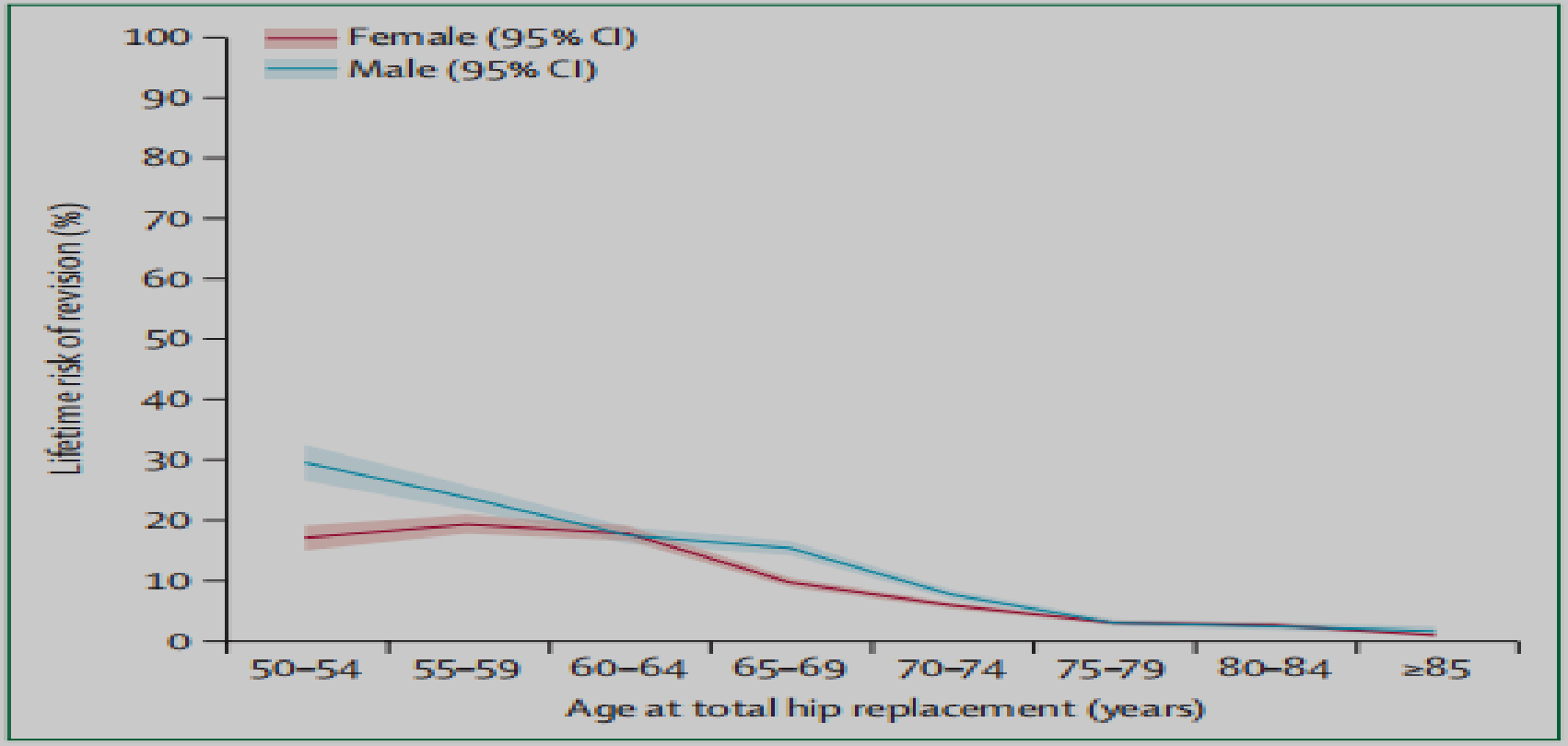

Figure 2: **Lifetime risk of revision after total hip replacement**
Estimates of lifetime risk of total hip replacement revision against age at the time of total hip replacement primary surgery (in 5-year age bands), stratified by sex (results adjusted for lost and censored population). Reproduced by permission of Bayliss and colleagues.[4]

Figure 2

Assessment of outcome

The primary method used to assess the outcome of surgery is Kaplan-Meier survival analysis with revision surgery as the endpoint.Joint replacement registries are resources for tracking the revision rate of individual implants. the NJR reports an overall 14-year implant survival of 92.7% .

The financial burden of hip replacement on health-care systems is high. In the USA alone, the annual cost is in excess of US$15 billion.In patients who do not have a very limited life expectancy, hip replacement is a costeffective intervention.

Causes of revision

The most commonly recorded indication for revision is aseptic loosening, accounting for 48% of revision procedures. Dislocation accounts for 15% of revision operations. Periprosthetic joint infection, which account for 9% of all revision procedures. Other common indications for revision include periprosthetic fracture (10%) and implant malpositioning (5%).

Advances in practice

The ideal bearing interface is chemically inert in vivo, has a low wear rate, produces non-immunogenic wear debris, and is sufficiently tough to resist fracture.modern highly crosslinked polyethylene is more resistant than the early materials.

Debate continues about the best method of fixation in total hip replacement Cemented fixation continues to show excellent long-term revision rates, and achieves a lower overall rate of revision after 14 years than does cementless fixation .

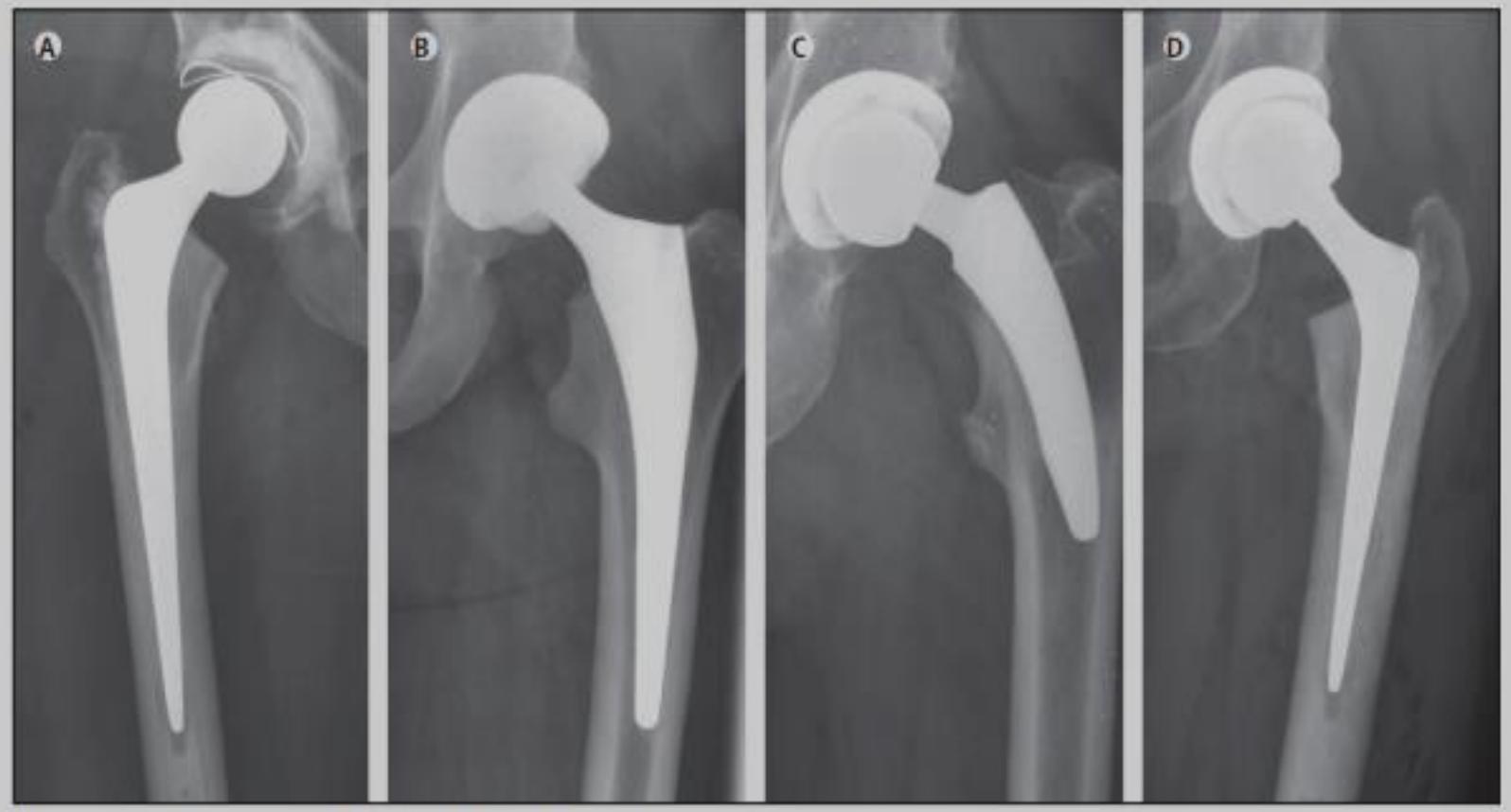

Figure 3: Total hip replacement with different implant designs and fixation

Postoperative radiographs of cemented total hip replacement (A); cementless total hip replacement (B), with conventional length femoral stem; cementless total hip replacement, with short length femoral stem (C); and hybrid total hip replacement (D).

Figure 3

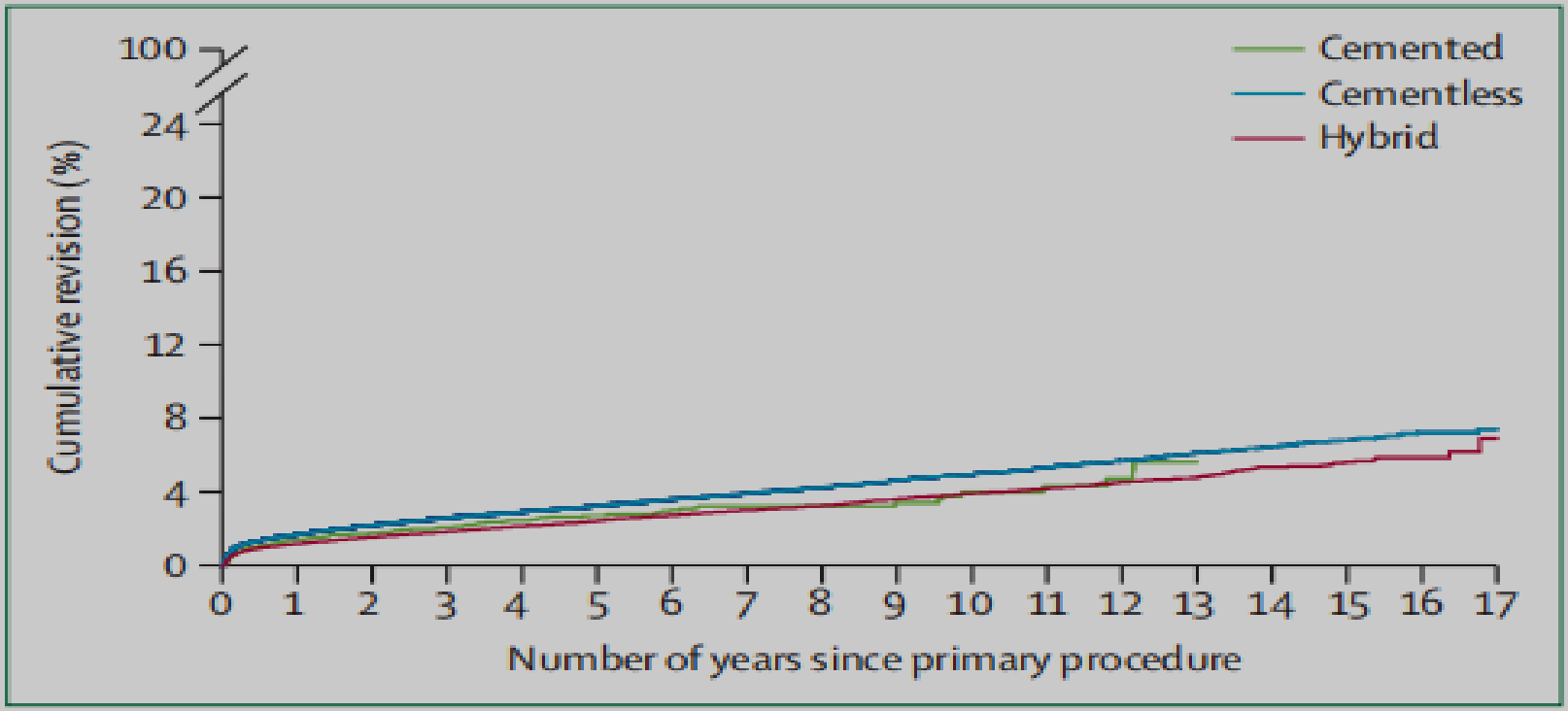

***Figure 4*: Cumulative percentage revision of primary total hip replacement by fixation (primary diagnosis of osteoarthritis)**
Reproduced from the Australian Orthopaedic Association's annual report[9] by permission of the Australian Orthopaedic Association National Joint Replacement Registry.

Figure 4

Conclusion

Hip replacement remains one of the most effective surgical interventions. Further advances have been made in implant material and design, surgical technique, and perioperative managemen.Ongoing challenges include further improvements to implant performance ,ensuring the safe introduction of new implants, and developing strategies to identify osteoarthritis early and slow its progression, to reduce the number of patients requiring major surgery.

Thanks