

Advances in orthopaedic surgery



CPD 

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AS IN ALL BRANCHES OF MEDICINE, there are continual changes in the field of orthopaedics. Some of the advances are in areas that affect the practice of general orthopaedics, while others may be more specific to subspecialty practice, such as refinements of surgical techniques. Many of the themes are not dissimilar to areas of advancement in other fields. Some advancements worthy of discussion include the development of large databases, a recognition of when surgical management is optimal, adjuvant medications, rapid recovery protocols, peripheral nerve blocks and the increasing use of technology in the operating theatre.

The value of data collection

The collection of 'big data' is currently a fashionable topic in many areas of medicine, and orthopaedics is no exception. Fortunately, extensive data collection has occurred for many years and has proved its merit extensively.

The Australian Orthopaedic Association (AOA) has long regarded the National Joint Replacement Registry (NJRR)¹ as one of its most valuable data resources. The registry collects information about the vast majority of joint replacements

performed in Australia. These data include basic patient demographics, diagnosis and implant details. The database has recently been expanded to include patient body mass index and American Society of Anaesthesia (ASA) score. Joint replacement revision surgery is its primary end-point. It published its twentieth annual report in 2019.

Every year, in addition to reporting the performance of joint replacements in Australia, the registry highlights an area of interest to surgeons. In the 2019 report, the registry examined the practice of surgeons over its 20 years of reporting. It was pleasing to note that evidence indicated that orthopaedic surgeons were modifying their practice on the basis of the outcomes reported in the NJRR, opting to incorporate factors that lowered the risk of revision surgery.¹ Despite the increasing volume of joint replacements being performed in Australia, the incidence of revision surgery continues to decrease.¹

For instance, with respect to total hip replacement, it has been shown that use of femoral head sizes ≥ 32 mm (as opposed to smaller femoral head sizes) reduces the risk of dislocation. This has led to an increased use of larger head sizes in general.¹

As a result of the success of the NJRR, many other areas of orthopaedics have built or are in the process of building similar registries. This includes areas

such as spine surgery, hip fractures² and anterior cruciate ligament reconstructions. In particular, the Hip Fracture Registry has already begun to highlight areas of optimal patient care in order to improve outcomes for this challenging patient cohort, developing a *Hip fracture clinical care standard* that highlights seven areas of hip fracture care.²

When is surgery indicated?

One of the advantages of the passage of time is the ability to monitor the success or otherwise of the procedures performed. In recent years, there has been a growing body of evidence that has indicated that surgical management once recommended for certain conditions is not the most appropriate management. In particular, the performance of knee arthroscopy in the management of osteoarthritis of the knee has been shown to be ineffective.³ This evidence has altered the practice of surgeons in Australia, and this procedure is now performed less frequently on patients with osteoarthritis.⁴ Another Australian study has examined the role of surgical management for minimally displaced Weber B type ankle fractures. This showed that non-surgical treatment was equivalent to open reduction and internal fixation, while avoiding the risks of surgery itself.⁵

Adjuvant medications

Improvement in the medical management of many conditions has altered patient presentations to orthopaedic surgeons. A prime example is rheumatoid arthritis, which was once a condition that often led to severely debilitating arthritis. However, newer medications are altering the course of disease. Fewer patients are presenting to surgeons with the destructive disease that was once common.

Additionally, medications such as tranexamic acid have begun to be routinely incorporated in the practice of orthopaedic surgery. Tranexamic acid has a history of use in obstetrics and cardiac surgery before showing its utility in orthopaedics. Its use in joint replacement surgery, hip fracture surgery and trauma surgery is now common. It has been shown to reduce the incidence of transfusions and therefore the associated morbidity.⁶

Rapid recovery protocols

Rapid recovery protocols, otherwise known as enhanced recovery after surgery (ERAS) protocols, have become popular in many areas of surgery in which patients have an extended length of stay. Joint replacement surgery is well suited to the use of such protocols. As most surgeries follow a typical course of recovery, a structured protocol for progress at each stage helps to guide the patient and treating team in a safe and efficient manner. ERAS protocols have proven to be highly effective at reducing length of stay without increasing complications or negatively affecting patient satisfaction or outcomes.⁷ Most ERAS protocols start at the pre-operative stage with basics such as planning who will be transporting the patient home following surgery. Protocols extend to early post-operative mobilisation and an adjustment of patient expectations in terms of their length of stay and post-operative outcomes.

Peripheral nerve blocks

In the current context of minimising opiate use, peripheral nerve blocks have become a useful adjunct for pain management in orthopaedic surgeries.

Previously their use was primarily for aiding anaesthesia during an operation for patients who were unsuitable for general or spinal anaesthesia. Now their use has extended beyond the operating theatre. The ability of anaesthetists to place catheters under image guidance allows them to deliver local anaesthetic infusions for up to 48 hours after an operation. For procedures such as knee replacements, which are notoriously painful, these interventions improve the patient experience.⁸ For knee replacements in particular, the local anaesthetic catheter can be placed in such a site that it relieves the pain from the surgery without inhibiting the function of the quadriceps, allowing patients to mobilise in the usual manner. The blocks reduce the quantity of narcotics consumed, thus reducing the incidence of post-operative nausea, vomiting and constipation.⁸

Technology in the operating theatre

Orthopaedics as a specialty has had a long affinity for technology. Joint replacement surgery is one area with a history of technological evolutions, including computer navigation and image-derived instrumentation (IDI). IDI is the use of custom-made, patient-specific pin guides and saw cutting blocks that have been derived from pre-operative computed tomography or magnetic resonance imaging. The latest enthusiasm is directed at robotic-assisted surgery, initially popularised in areas such as urology and obstetrics.

For orthopaedics, a number of robotic devices exist, each associated with certain implants and procedures. Each varies slightly but can be generalised somewhat. In the arthroplasty setting, robotic-assisted surgery has two key components. First is the planning software. This allows the surgeon to plan the surgery in detail. There is also a requirement intra-operatively to confirm the patient's anatomy matches with the pre-operative imaging, and an opportunity to modify the pre-operative plan. The second component is a device to cut bone. This can be either a burr or a saw. The robot does not act independently of the surgeon but sets a boundary within

which the surgeon can work. The aim is improved accuracy and reliability in the execution of the surgical plan.

Each new technological inclusion takes time for assessment and understanding of its risks and benefits, and in a specialty such as joint replacement surgery, this can take many years. At the present time, the NJRR has shown a reduced rate of revision for loosening in patients <65 years undergoing total knee replacement surgery using computer navigation when compared with those without computer navigation.¹ There is no difference in the rate of revision of total knee replacements when IDI is used in comparison to when it is not used. Robotic-assisted surgery is in its infancy and is yet to have the history of use to show an improvement of outcomes. Despite this, surgeon enthusiasm has ensured its growing popularity and now its extension to other areas of orthopaedics such as hip arthroscopy, anterior cruciate ligament reconstruction and spine surgery. Common to all changes to the surgical sphere, these modifications will be assessed for their risks and benefits.

Conclusion

As with practitioners in all areas of medicine, orthopaedic surgeons constantly aim to optimise their practice and improve patient outcomes. Continued evaluation of these changes will see some that are adopted to wider practice, and others that are discarded once proven to be of limited benefit. Ultimately, the focus is on the patient and caring for them in the best possible manner.

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