The burden of prosthetic joint infection (PJI)

Total hip and knee arthroplasty are clinically and cost effective procedures. The numbers of patients receiving these procedures are estimated to rise by 150–600% for THA and TKA respectively by 2030 (1) in the USA. The trend is similar in Europe (2,3). Along with this trend in hip and knee arthroplasty patients increasingly also have indwelling prostheses of the shoulder, elbow and ankle.

Prosthetic joint infection (PJI) is potentially the most significant complication following total joint arthroplasty. It is challenging for the surgeon to manage, physically and mentally disastrous for the patient and the cost to the health care system and society as a whole is high. PJI has an impact on patients, healthcare delivery institutions and society as a whole. It has significant negative impact on patients' psychological well being (4). The cost of treating PJI is significant. It is estimated that in the US alone the projected spend on the treatment of PJI is $1.62 billion (5). This is despite little improvement in the success rate in terms of eradication of infection (6).

For these reasons there has been an increasing focus on the issue of PJI in the medical literature (6). This paper discusses the incidence of PJI as well as the factors which might account for the current trends and the challenges associated with the contemporary management of PJI.

The incidence of PJI varies with the joint involved (7,8). Reported incidences following total knee arthroplasty, total hip arthroplasty and total shoulder arthroplasty have been reported to be 0.25% to 2%, 0.5% to 1% and less than 1% respectively (9,10). Between 23–25% of revision TKA procedures and 12–15% revision THA procedures are performed for PJI (11,12). Risk factors for PJI are presented in *Table 1* (13). While the incidence remains low the number of patients are likely to increase over time however as the number of arthroplasty procedures performed annually increases.

The incidence of PJI varies throughout the literature. As a result existing data needs to be interpreted with caution. Wang

Table 1 Factors predisposing to prosthetic joint infection

Factors which are potentially associated with prosthetic joint infection
Male gender
Age <60
ASA score >3
Chronic obstructive pulmonary disease (COPD)
Diabetes mellitus
Liver failure
Connective tissue disease
Peripheral vascular disease
Previous septic arthritis
Previous surgery for trauma to the same joint
Inflammatory arthropathy
General anaesthetic
Use of tibial bone graft
Use of posterior stabilised knee prosthesis
Use of constrained condylar knee prosthesis

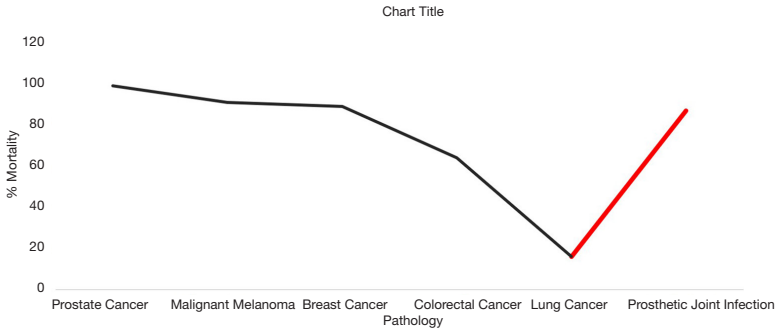

Figure 1 The mortality associated with PJI compared to common cancers. PJI, prosthetic joint infection.

et al. (14) reported a reduction in the incidence of PJI from 1.9% to 0.76% between 2006 and 2014. Likewise, Runner and colleagues (15) reported a reduction in the incidence of PJI from 1.4% to 0.6% between 2008 and 2016. This is at variance with reports from the United States National Inpatient Sample suggesting that between 2001 and 2009 the incidence of PJI in patients having THA increased from 1.99% to 2.18% and 2.05% to 2.18% for patients having TKA (16). Data from the Nordic Arthroplasty Registry has reported an increase in the rate of revision procedures performed for infected THA from 0.46% to 0.71% between 1999 and 2009 (17). Infection is still represented among the five most common indications for revision surgery in all major joint registries. What is clear from the existing literature is that the numbers of total hip and knee arthroplasties are increasing annually. The frequency of these procedures translates a relatively low incidence into a substantial burden of PJI faced by practising clinicians and institutions. What is less controversial is that the physiologic status of patients presenting for total joint arthroplasty is changing. The percentage of patients recorded as American Society of Anaesthesiologists (ASA) Class 1 (fit and healthy) has decreased from 16% to 12% between 2010 and 2018. Over the same period the number of patients classified as ASA Class 3 (incapacitating systemic disease) has increased from 15% to 20% over the same period (18).

PJI is becoming an increasingly important issue in the discipline of reconstructive orthopaedics. The associated 90 day mortality rate is approximately 4% compared to 0.3% combined mortality rate following primary total hip and knee arthroplasty (19).

Mortality rates associated with PJI are significant and concerning. Twenty four percent to 26% mortality has been reported for patients with PJI of the hip. Parvizi and colleagues found significant differences in mortality rates in patients undergoing revision for PJI compared to aseptic loosening at 30–90 days (3.7% *vs.* 0.8%) and 90 days to 1 year (10.6% *vs.* 2%). The mortality rates for PJI is comparable to breast cancer and higher than that for colorectal and lung cancer (20) (*Figure 1*).

This special series focuses on the increasingly important issue of PJI. We present expert reviews of the contemporary and important topics and attempt to shed some clarity on the controversial aspects of management of PJI. We illustrate why this issue is rightly a growing concern in contemporary orthopaedic practice across the globe.

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Footnote

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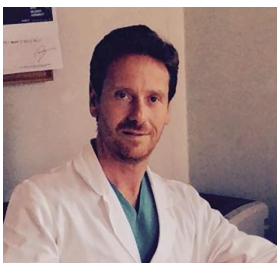

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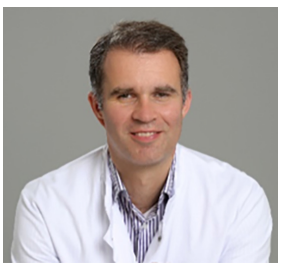

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