

QUESTION 2: Does the risk of surgical site infection/periprosthetic joint infection (SSI/PJI) increase when the surgeon performing the arthroplasty procedure has an upper respiratory infection?

RECOMMENDATION: It is unlikely that the risk of SSIs/PJIs is increased in patients undergoing orthopaedic procedures when the surgeon or surgical team has an upper respiratory infection.

LEVEL OF EVIDENCE: Moderate

DELEGATE VOTE: Agree: 85%, Disagree: 8%, Abstain: 7% (Super Majority, Strong Consensus)

RATIONALE

Reports of the transmission of hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) from healthcare workers to patients during invasive procedures have raised the question of whether physicians infected with upper airways pathologies should perform invasive orthopaedic procedures such as joint arthroplasty. [1,2]. It has been previously suggested that surgeons affected by HBV, HCV and/or HIV should not (strong recommendation: against) perform major joint arthroplasty surgery (e.g., hip, knee, shoulder and elbow), open spine surgery and/or open pelvic surgeries because of the very high risk of disease transmission to patients [3]. However, very little is known on the risks of potentially increased SSIs/PJIs when the surgeon performing the arthroplasty has an upper respiratory infection. On the other hand, Navalkele et al. demonstrated that surgical site infections were more likely to develop in patients who had respiratory tract infections within 30 days prior to surgery (20 vs.6.6%, odds ratio (OR): 3.42; 95% confidence interval (CI) 1.62 to 7.22, $p = .0034$) [4].

Surgical site contamination by airborne particles is ascribable in some cases to direct settling of the particles on the wound. Condensation droplets measuring less than 5 μm , produced with coughing and sneezing are able to contaminate the surgical site if the surgeon is not isolated by a helmet sealed within a gown [5]. If the principal pathogens responsible for common cold, rhinitis and influenza (rhinovirus, coronavirus, parainfluenza virus, influenza virus, respiratory syncytial virus) are generally not responsible for SSIs, other microorganisms are commonly associated with a viral respiratory disease. *Staphylococcus aureus*, coagulase-negative *Staphylococcus*, *Streptococcus*, gram-negative bacteria and methicillin-resistant *S. aureus* (MRSA) (measuring 0.2 – 5 μm) can adhere to the condensation droplets to form colony-forming units (CFUs), and be infectious in short-range scenarios (less than 1 meter), theoretically leading to SSIs. Operating room counts lower than 10 CFUs are mandatory for knee and hip arthroplasty [6].

A sneeze can generate up to 40,000 droplets, [7] which can evaporate to produce droplets of 0.5 to 12 μm , while a cough can generate about 3,000 droplet nuclei, the same number as talking for 5 minutes [8].

Despite all these potential risks, there is strong evidence that personal protective equipments (PPEs) including gowns, facemasks and gloves, in addition to the usual contact–transmission prevention precautions (i.e., hand washing, avoiding touching mucous membranes of the eyes, nose and mouth), are effective in reducing surgeon-to-patient disease transmissions [9,10]. Additionally, many environmental factors controllable in a standard OR (i.e., temperature, humidity, air flow and ultraviolet radiation) affect the viability of an infectious agent further reducing the risks of disease transmissions and PJIs afterwards [11–14].

As a result, we conclude that the widespread use of PPEs, in addition to the usual contact-transmission prevention precautions, protect the susceptible patient from disease transmission and PJI development. However, the lack of high-level evidence results in a moderate level of strength for this recommendation.

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