



Review Article

Prophylaxis with nasal decolonization in patients submitted to total knee and hip arthroplasty: systematic review and meta-analysis[☆]



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ARTICLE INFO

Article history:

Received 11 August 2016

Accepted 28 October 2016

Available online 27 October 2017

Keywords:

Arthroplasty

Prophylaxis

Infection

Decontamination

ABSTRACT

Despite the evolution of the total knee and hip arthroplasty surgery, high postoperative complication rates in the short and long term still persist. Infection is one of the most challenging complications; due to its gravity and treatment difficulties, prophylaxis protocols have been created to decrease its incidence. The objective of this study was to evaluate the impact of the prophylaxis protocol for methicillin-resistant *Staphylococcus aureus* decolonization of the nares in patients previously identified by swab cultures, who were to be submitted to a total joint arthroplasty. A systematic review with meta-analysis was conducted, following the PRISMA-2015 protocol, using the descriptors: “arthroplasty” and “nasal decolonization,” or “joint arthroplasty” and “decolonization,” or “joint arthroplasty” and “nasal decolonization,” for final selection of four observational studies from 79 references identified. This study included a total sample of 10,179 patients, divided in two groups: the control group (4788 patients) and intervention group (5391 patients). It was observed that the intervention group, in which prophylaxis with nasal decolonization was used, 59 (1.09%) of the patients developed a surgical site infection, while in the control group there were 86 cases of surgical site infection (1.79%). This trend repeated itself in all articles, showing no publication biases, forming a homogeneous sample. The use of a prophylaxis protocol for decolonization of methicillin-resistant *Staphylococcus aureus*, reduced surgical site infection cases by approximately 39%.

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<http://dx.doi.org/10.1016/j.rboe.2016.10.018>

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Profilaxia com descolonização nasal em pacientes submetidos a artroplastia total de joelho e quadril: revisão sistemática com metanálise

R E S U M O

Palavras-chave:

Artroplastia
 Profilaxia
 Infecção
 Descontaminação

Apesar da evolução dos resultados após a artroplastia total de joelho e quadril, a infecção ainda é uma das causas mais desafiadoras para o cirurgião. Em virtude da gravidade e dificuldade do tratamento da infecção articular periprotética, foram criados protocolos de profilaxia para esse tipo de complicação. O objetivo deste estudo foi avaliar a profilaxia infecciosa com a descolonização nasal prévia contra *Staphylococcus aureus* resistente à meticilina, identificados por meio da coleta de material da nasofaringe por swabs em pacientes com programação cirúrgica de artroplastia total de joelho e artroplastia total de quadril. Foi elaborado um estudo de revisão sistemática com metanálise que usou o protocolo PRISMA-2015, no qual foram utilizados os descritores: *arthroplasty* e *nasal decolonization* ou *joint arthroplasty* e *decolonization* ou *joint arthroplasty* e *nasal decolonization* na língua inglesa. Foram selecionados quatro estudos observacionais dentre as 79 referências identificadas. A amostra total foi de 10.179 pacientes, divididos em dois grupos: controle (4.788 pacientes) e intervenção (5.391 pacientes). Foi observado que, no grupo de intervenção, no qual a profilaxia com descolonização nasal foi aplicada, 59 (1,09%) dos pacientes desenvolveram infecção do sítio cirúrgico, enquanto a infecção do sítio cirúrgico foi observada em 86 (1,79%) dos pacientes no grupo controle. Essa tendência se repetiu em todos os artigos estudados, não sendo observador viés de publicação, constituindo em uma amostra homogênea. A profilaxia pré-operatória com descolonização nasal para *Staphylococcus aureus* resistente à meticilina, reduz em 39% os casos de infecção pós-artroplastias do joelho, devendo ser considerada como um protocolo complementar pelos cirurgiões.

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Introduction

Total knee (TKA) and hip (THA) arthroplasties are surgical procedures that aim to improve quality of life, promoting pain relief, functional gain, and correction of deformities of the affected joint.^{1,2}

Each year 600,000 TKAs are performed in the United States; by 2030, a 673% increase in demand is expected worldwide. In Brazil, the number of TKAs is estimated to range between 60,000 and 70,000 per year.^{3,4}

Despite the evolution of arthroplasty results, complications in the postoperative period, both in short- and long-term, still persist. Post arthroplasty infection is one of the most challenging causes of complication for the surgeon.^{5,6} The rate of post-TKA surgical site infections (SSI) can vary between 0.5% and 23%, and has an impact of roughly U\$ 300 million in North American countries.⁷ SSI is one of the main infection types associated with health care, accounting for 17% of those in the United States and 37% worldwide, according to the World Health Organization (WHO).⁷⁻¹⁰

Due to the seriousness and difficulty of treatment of periprosthetic infections (PI), the development of effective measures to minimize these rates is necessary; prophylactic measures in the preoperative period of TKA have been demonstrated in the literature.^{2,10}

Parvizi et al.² have developed a protocol that summarizes the most effective and proven prophylactic measures. These measures include the assessment of nasal colonization by *Staphylococcus aureus* and its methicillin-resistant

strain (MRSA). However, there is still no consensus for recommending universal screening, despite the fact that the decolonization of MRSA carriers decreases the SSI rate.¹⁰

Among the postoperative hospital infections, *S. aureus* has been reported as the main pathogen isolated in culture exams. High levels of nasal colonization by MRSA strains may be a risk factor for SSI onset.¹¹ The nasal epithelium stands out as the site of greatest colonization; its prevalence reaches, on average, 40% in the adult population. As part of the human microbiota, said bacterium does not constitute a risk and can be carried for a long period without damage to the health of individuals.¹²

Collecting samples from the nostrils with the swab technique allows the identification of MRSA by culture or by polymerase chain reaction (PCR) test; both present high positive predictive value and specificity.¹³ This method is indicated for MRSA screening from the nasal region of patients who are candidates for TKA and THA.¹⁴

Topical antibiotics, which act on *S. aureus* strains, are indicated as a prophylactic method. Topical mupirocin is the most frequently used antibiotic and recommended for preoperative nasal decolonization (ND), and should be considered as one of the pillars of anti-infection prophylaxis.¹⁵

Thus, prophylaxis with ND for MRSA may be indicated as an important prophylactic method for periprosthetic joint infection.^{16,17} However, studies that analyzed this subject did not reach a consensus in the validation of prophylaxis through universal MRSA assessment in TKA and THA candidates.²

This study is aimed at assessing whether infection prophylaxis through ND for MRSA in TKA and THA candidates,

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