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GENERAL ARTICLE

Medical management of patients with inflammatory arthritis undergoing total hip arthroplasty and total knee arthroplasty

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Abstract

Total joint arthroplasty (TJA) including total hip arthroplasty (THA) and total knee arthroplasty (TKA) are performed for patients with primary osteoarthritis (OA). Also, there are patients who undergo TJA for management of inflammatory arthritis (IA), including patients with rheumatoid arthritis (RA), Spondyloarthritis (SPA) including ankylosing spondylitis (AS) and psoriatic arthritis (PSA) and systemic lupus erythematosus (SLE).

The purpose of this review was to evaluate the current knowledge about the risk of complications after TJA in patients with IA and perioperative management of antirheumatic drugs.

THA and TKA are orthopedic surgeries that help patients with arthritis restore function, mobility and reduce pain. Patients with inflammatory arthritis have systemic disorders that cause a high rate of complications associated with the surgery.

Patients with inflammatory arthritis, including RA, SPA, and SLE who need TJA have a higher risk of developing complications compared to patients with OA.

Information about cardiovascular risk factors and other comorbidities is important to better control and reduce the risk of postoperative complications.

Abbreviations

TJA = total joint arthroplasty, THA = total hip arthroplasty, TKA = total knee arthroplasty, OA = osteoarthritis, SPA = spondyloarthritis, IA = inflammatory arthritis, RA = rheumatoid arthritis, AS = ankylosing spondylitis, PSA = psoriatic arthritis, SLE = systemic lupus erythematosus, DMARDs = Disease-modifying antirheumatic drugs, PJI = prosthetic joint infection, VTE = venous thromboembolism, HCQ = hydroxychloroquine, SSZ = sulfasalazine, TNF = tumor necrosis factor, GS = corticosteroids.

Keywords: total joint arthroplasty, total hip arthroplasty, osteoarthritis, spondyloarthritis

Introduction

Total joint arthroplasty (TJA) including total hip arthroplasty (THA) and total knee arthroplasty (TKA) are performed for patients with primary osteoarthritis (OA) [1]. Also, there are patients who undergo TJA for management of inflammatory arthritis (IA), including patients with rheumatoid arthritis (RA), Spondyloarthritis (SPA) including ankylosing spondylitis (AS) and psoriatic arthritis (PSA) and systemic lupus erythematosus (SLE) [2]. Lower extremity arthroplasty is a successful way to decrease pain and improve function and mobility for patients with inflammatory arthritis [3].

In the past decades, rates of arthroplasty for patients with SPA have risen by 50%, for patients with SLE by 100% and for patients with RA have remained stable [4,5]. Orthopedic surgery for inflammatory arthritis may not be equivalent to patients with osteoarthritis due to joint deformities, bone loss and immunomodulatory medication [2,6,7].

Patients with IA are at higher risk of developing medical or surgical complications after orthopedic surgery because they have a systemic disease [2,8]. As an example, myocardial infarction has been reported to be between 0,6% and 6,5% for this population [9,10]. Also, patients with IA are at higher risk of infection, mechanical complication and transfusion [2]. Surgical site infection is two to four times higher in patients with RA than those with OA [10].

Immunosuppressive medication taken by patients with IA determines difficulty of perioperative management [6]. There are different types of treatments for patients with rheumatic disease. Corticosteroids are used to reduce inflammation. Synthetic disease-modifying antirheumatic drugs (DMARDs) and biologic DMARDs are used to suppress the immune system [3,11,12].

Guideline for the Perioperative Management of Antirheumatic Medications in Patients with Rheumatic Disease Undergoing Elective Total Hip or Total Knee Arthroplasty in 2017 is the collaboration between the American College of Rheumatology and the American Association of Hip and Knee Surgeons [13].

The purpose of this review was to evaluate the current knowledge about the risk of complications after TJA in patients with IA and perioperative management of antirheumatic drugs.

Complications

Patients with IA have a higher risk of severe complications after TJA than patients with OA [1]. The complications are different depending on the type of IA. Some studies have shown that SLE has a higher risk of complications than other IA [2,14]. Of all IA, most of orthopedic issues occur in the case of juvenile RA [2,15].

Infections occur more frequently in patients with inflammatory arthritis. Prosthetic joint infection (PJI) is a major complication of orthopedic surgery [16,10]. There are studies that show that PJI occurs 1,6-8 times more frequently in patients with IA than in patients with OA [17,18]. Bacteria that spread into the surgical wound are most often from skin flora and less commonly hematogenous spread. PJI is most commonly caused by Staphylococcus epidermis and the most common pathogen in patients with RA is Staphylococcus aureus [17,19].

In patients with psoriasis, surgeons should avoid making the incision through or near the active psoriatic plaque [17,20].

Patients with IA have an increased cardiovascular morbidity and mortality compared to general population. This is indicated by higher incidence of myocardial infarction, coronary artery disease and congestive heart failure [3,21]. Patients with IA have a higher incidence of traditional cardiovascular risk factors to which chronic inflammation is added [22,23].

Patients with RA, SPA and SLE are at

higher risk of venous thromboembolism (VTE) compared to general population [4,24]. There is an association between inflammation and thrombosis, that is why rheumatic disorders should be controlled before the surgery [4,25].

Perioperative management

In 2017, the American College of Rheumatology and the American Association of Hip and Knee Surgeons developed a guideline for the perioperative management of antirheumatic drugs for patients with IA [13].

Medication used to treat patients with IA suppresses the immune system and may cause delayed wound healing and infection [3].

DMARDs: CONTINUE these medications through surgery.	**Dosing Interval**	**Continue/Withhold**
Methotrexate	Weekly	Continue
Sulfasalazine	Once or twice daily	Continue
Hydroxychloroquine	Once or twice daily	Continue
Leflunomide (Arava)	Daily	Continue
Doxycycline	Daily	Continue
BIOLOGIC AGENTS: STOP these medications prior to surgery and schedule surgery at the end of the dosing cycle. RESUME medications at minimum 14 days after surgery in the absence of wound healing problems, surgical site infection, or systemic infection.	**Dosing Interval**	**Schedule Surgery (relative to last biologic agent dose administered) during**
Adalimumab (Humira)	Weekly or every 2 weeks	Week 2 or 3
Etanercept (Enbrel)	Weekly or twice weekly	Week 2
Golimumab (Simponi)	Every 4 weeks (SQ) or every 8 weeks (IV)	Week 5 Week 9
Infliximab (Remicade)	Every 4, 6, or 8 weeks	Week 5, 7, or 9
Abatacept (Orencia)	Monthly (IV) or weekly (SQ)	Week 5 Week 2
Certolizumab (Cimzia)	Every 2 or 4 weeks	Week 3 or 5
Rituximab (Rituxan)	2 doses 2 weeks apart every 4-6 months	Month 7
Tocilizumab (Actemra)	Every week (SQ) or every 4 weeks (IV)	Week 2 Week 5
Anakinra (Kineret)	Daily	Day 2
Secukinumab (Cosentyx)	Every 4 weeks	Week 5
Ustekinumab (Stelara)	Every 12 weeks	Week 13
Belimumab (Benlysta)	Every 4 weeks	Week 5
Tofacitinib (Xeljanz): STOP this medication 7 days prior to surgery.	Daily or twice daily	7 days after last dose
SEVERE SLE-SPECIFIC MEDICATIONS: CONTINUE these medications in the perioperative period.	**Dosing Interval**	**Continue/Withhold**
Mycophenolate mofetil	Twice daily	Continue
Azathioprine	Daily or twice daily	Continue
Cyclosporine	Twice daily	Continue
Tacrolimus	Twice daily (IV and PO)	Continue
NOT-SEVERE SLE: DISCONTINUE these medications 1 week prior to surgery	**Dosing Interval**	**Continue/Withhold**
Mycophenolate mofetil	Twice daily	Withhold
Azathioprine	Daily or twice daily	Withhold
Cyclosporine	Twice daily	Withhold
Tacrolimus	Twice daily (IV and PO)	Withhold

Fig. 1 Medications included in the 2017 American College of Rheumatology/ American Association of Hip and Knee Surgeons Guideline for the Perioperative Management of Antirheumatic Medication in Patients with Rheumatic Diseases Undergoing Elective Total Hip or Total Knee Arthroplasty. Dosing intervals were obtained from prescribing information provided online by pharmaceutical companies. DMARDs = disease-modifying antirheumatic drugs; SQ = subcutaneous; IV = intravenous; SLE = systemic lupus erythematosus; PO = oral (Source: Susan M. Goodman, Bryan Springer, Gordon Guyatt, Matthew P.Abdel, Vinod Dasa, Michael George, Ora Gewurz-Singer, Jon T. Giles, Beverly Johnson, Steve Lee, Lisa A. Mandl, Michael A. Mont, Peter Sculco, Scott Sporer, Louis Stryker, Marat Turgunbaev, Barry Brause, Antonia F. Chen, Jeremy Gililland,

Mark Goodman, Arlene Hurley-Rosenblatt, Kyriakos Kirou, Elena Losina, Ronald MacKenzie, Kaleb Michaud, Ted Mikuls, Linda Russell, Alexander Sah, Amy S. Miller, Jasvinder A. Singh, Adolph Yates. 2017 American College of Rheumatology/ American Association of Hip and Knee Surgeons Guideline for the Perioperative Management of Antirheumatic Medication in Patients With Rheumatic Diseases Undergoing Elective Total Hip or Total Knee Arthroplasty. The Journal of Arthroplasty. September 2017; 32,9,2628-2638)

Disease-modifying antirheumatic drugs (DMARDs)

Methotrexate is a folic acid analogue. It is most commonly used in the case of patients with RA [11].

Leflunomide inhibits pyrimidine synthesis resulting blockade of T-cell proliferation [3,28].

Non-immunosuppressive disease-modifying antirheumatic drugs (hydroxychloroquine, sulfasalazine) are a therapeutic option for patients who cannot tolerate MTX or is contraindicated. Hydroxychloroquine (HCQ) is an antimalarial agent that inhibits the synthesis of nucleic acids. Sulfasalazine (SSZ) mode of action is unclear [28].

Biologic agents targeting tumor necrosis factor (TNF) increase the risk of infection, including surgical site infection. There are five types of anti TNF molecules: etanercept, infliximab, adalimumab, golimumab, certolizumab [28].

Rituximab is anti-CD20 monoclonal antibody and was initially used as a treatment of B-cell malignancies [28].

Corticosteroids (GS) are used in rheumatic disease for the anti-inflammatory and immunosuppressant effect. The most commonly used oral glucocorticoids are prednisone and intravenous methylprednisolone is most frequently used. Benefits of GS include benefits in disease activity and functional status. Patients who undergo long-term glucocorticoids treatment and major surgery must receive a prophylactic stress dose of glucocorticosteroids. 100 mg hydrocortisone three times per day is recommended [3,28].

Discussion

THA and TKA are orthopedic surgeries that help patients with arthritis restore function, mobility and reduce pain. Patients with inflammatory arthritis have systemic disorders that cause a high rate of complications associated with the surgery [1,26].

IA has prevalent complications depending on the subtypes. Some studies showed that SLE has higher complication rates than RA. Studies that evaluated subtypes of IA showed that juvenile RA had the highest orthopaedic complication rates, patients with SLE had high mortality rate and patients with RA and AS had increased wound complications [12,26].

Surgeons must apprize patients with IA that the incidence of periprosthetic joint infection is higher. Antibiotic impregnated cement might be considered in these patients [1,27].

The therapy used to control inflammatory arthritis causes suppression of immune system and increases the risk of infection, cardiovascular events, and delayed wound healing. The challenge is to reach a balance between a good management of the rheumatic disease and a reduced risk of postoperative complication [3,29].

Total joint arthroplasty in patients with rheumatic diseases should be performed after a multidisciplinary team consensus regarding the medication adjustment, to reduce the overall complication rate [4].

Conclusion

Patients with inflammatory arthritis, including RA, SPA, and SLE who need TJA have a higher risk of developing complications compared to patients with OA. It is important to recognize the risk these patients are exposed to in order to apprize them. Patients undergoing biologic treatment should stop the medication before surgery and patients with DMARDs should continue the treatment considering that it does not influence the evolution of the wound. Information about cardiovascular risk factors and other comorbidities is important to better control and reduce the risk of

postoperative complications.

Conflict of Interest statements
Authors state no conflict of interest.

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