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CORR Insights®: Do Various Factors Affect the Frequency of Manipulation Under Anesthesia After Primary Total Knee Arthroplasty?

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Where Are We Now?

The gold standard for the surgical treatment of patients with advanced arthritis remains TKA. Its reliability in relieving pain and improving function in the short- and long-term is well proven. Despite our best efforts, however, joint replacement

surgery is not without its complications. In particular, the development of arthrofibrosis can be substantially disabling to the 1% to 12% [2, 6, 9] of patients who develop it. The etiology is multifactorial, often unknown, and frequently resistant to treatment.

There is a large quantity of literature on arthrofibrosis. Recent studies [11] have identified both patient-dependent and independent risk factors, which include limited ROM preoperatively, prior knee surgery, complex regional pain syndrome, lack of patient compliance with therapy, and diminished patient pain threshold. Other patient-related factors associated with the development of arthrofibrosis include nonwhite race younger than 65 years of age, diabetes, hypercholesterolemia, and smoking [5]. Technical factors include “overstuffing” the knee (both tibiofemoral and patellofemoral compartments), component malalignment in all planes,

instability, balance flexion-extension gap failure, joint line elevation, infection, and heterotopic ossification [10]. But even when these risk factors are absent, some patients can still develop the condition through an exaggerated fibroblastic response, tissue metaplasia, or revision interventions [4].

Numerous treatments options have been used, but their results are inconsistent. These options include manipulation under anesthesia with or without arthroscopic intervention, open arthrolysis, and revision surgery [3].

Where Do We Need to Go?

Despite the frequency of arthrofibrosis and the amount of published research, we still are unable to recognize the at-risk patient. Although we have identified some general risk factors that increase the likelihood someone may develop arthrofibrosis, many patients with these risk factors do not develop the condition. In fact, to our great consternation, some patients with no risk factors develop resistant knee stiffness after TKA. Recent studies [8]

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have shown that recognizing and modifying risk factors for adverse outcomes including Methicillin-resistant *Staphylococcus aureus* nasal screening and decolonization, BMI modification prior to surgery, improving glycemic control in diabetics, and smoking cessation programs can decrease adverse outcomes.

The ethical considerations in delaying or even denying surgery in patients in need of joint replacement when patients do not make an effort to modify their risk factors has also been recently published [1]. With the evidence of increased arthrofibrotic manifestations in diabetics, smokers, and patients with elevated lipid levels, the justification for risk factor modification only becomes stronger.

Although technical factors are well established in their causative role, the further elucidation of a molecular component is essential. Specimens from arthrofibrotic knees exhibit an abnormally high level of macrophages and lymphocytes along with elevated levels of myeloperoxidase, clearly establishing a more complex series of biological responses as the basis of some incidences of arthrofibrosis.

How Do We Get There?

In any process that is multifactorial, we need to further understand why certain patients react to any of these

aforementioned factors with no ill effects, while others manifest a condition far worse than existed preoperatively.

Needless to say, technical factors are the low-hanging fruit in lowering the frequency of arthrofibrosis. More thorough patient education is also essential. Evidence from the Danish knee registry [7] shows that presurgical patient education can moderate the incidence of arthrofibrosis.

We need to more aggressively screen and intervene with patients with modifiable risk factors. For example, we may consider more aggressive pain management approaches with a combination of intra-articular injections and indwelling femoral nerve catheters in patient groups where rehab may be limited by patient compliance. The use of early dynamic splinting could be utilized as soon as patients are exhibiting an inability to reach full extension. Inasmuch as arthrofibrosis has exhibited an inflammatory component, and with the increasing use of NSAIDs preoperatively as a means of preemptive pain management, it would be interesting to study the incidence of arthrofibrosis in patient groups using NSAIDs before surgery.

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