

Dr. Travis Dekker:

Hello, once again, welcome to the Arthroscopy Association's Arthroscopy Journal Podcast. Welcome everyone, I'm Dr. Travis Dekker coming from the United States Air Force Academy. And today I'll be talking to Dr. Harris Sloan coming from the Medical University of South Carolina. He's an extremely talented young mind and surgeon in advancing sports medicine research in the fields of both shoulder and knee reconstructive procedures. He currently serves as an associate professor and the program director for the residency program and enjoys mentoring young and bright surgeons.

I recently had the privilege of being on the traveling fellowship trail with Dr. Slone and grew to appreciate his insight and out of the box thinking as he tackles complex dynamic procedures, as it pertains to common sports orthopedic pathologies. Today, I'll be focusing on an article within Arthroscopy published in March of 2019 entitled, Preoperative Shoulder Injections Are Associated With Increased Risk of Revision Rotator Cuff Repair.

Harris, welcome to the podcast as I'm excited and eager to learn and apply the lessons you've taken away from this study to my own practice, as I truly do believe that this has been a practice changing article for many. Harris, congratulations on all of your early career achievements and contributions, and once again, welcome to the podcast.

Dr. Harris Slone:

Travis, thanks a lot for having me.

Dr. Travis Dekker:

All right, Harris, let's begin. You begin the article by giving a great review of corticosteroid injection use to aid in the treatment of multiple ailments. Can you give a review for us on what historical recommendations have been in practice, both in your own and from your own observation in the treatment of rotator cuff tears specifically?

Dr. Harris Slone:

I think that our thought and approach to treating rotator cuff tears, especially with steroid medication and really a lot of other orthopedic ailments with steroid medication has certainly evolved over time. It's fairly common for people with partial thickness cuff tears or even full thickness cuff tears to have a trial of non-operative treatment. And historically that usually has included a steroid injection. I think people are certainly more cognizant of some of the deleterious effects of steroid medication and are a little bit more judicious in their use of steroid medicines, especially in patients who may be surgical candidates.

Dr. Travis Dekker:

I think that's very well stated. I've seen a change across even from when we began training at residency to where I think we were pretty open to the use of consistent corticosteroid use to try and control symptoms. And as we saw those eventually wear out, people would still have these drastic tears that were uncompensated, couldn't get back and had a lot of pain and then led to secondary changes to their rotator cuff itself. And I think now most of us know that there's detrimental effects of corticosteroids throughout the body, specifically the deleterious effects to the cartilage and to the tendon architecture. And so really not to get too far into the weeds on this, but can you tell us some of the basic science behind what is actually happening to the tissues that we're treating and then when we use the steroids and why this could lead to an increased risk of rotator cuff retear incidents?

Dr. Harris Slone:

First of all, I think that we rely on the inflammatory response for healing after rotator cuff repair. And we know that cortisone decreases the inflammatory response, so intuitively, it just kind of makes sense that these are probably bad in the perioperative period. We also know that steroids cause fibroblastic apoptosis, they disrupt the collagen bundles, and there's been lots of studies that have shown that steroid injections prior to cuff repair, just result in poorer quality tissue overall.

Furthermore, we know that locally anesthetics, such as lidocaine, for example, have been shown to have cytotoxic effects as well, specifically to rotator cuff tenocytes. They can induce apoptosis, delay collagen organization, and certainly there's similar untoward effects to chondrocytes as well. I think we're all a lot more aware of some of these problems, but how that translates into the clinical outcome, I think we're just still learning.

Dr. Travis Dekker:

Well, I always find it fascinating to actually learn a little bit of the basic science behind the interventions, especially the non-operative interventions that we're doing. I think that we continue to drive research along biologic lines, but corticosteroids are still one of the most common used, non-operative intervention across orthopedics, regardless of ailment type. And I think that goes with knee osteoarthritis as we come to see it, but especially within rotator cuff pathology. I think your help in what this article brings out is, what we're actually doing at the cellular level, which can have an impact on outcomes, which ultimately I think all of us are concerned about. Let's get down to the basics of your article now. And can you tell us what led you to ask the question that you did and the methods behind how you included the patients in your study? And in addition, can you hit on some of the limitations that could be inherent in this type of search and inclusion criteria?

Dr. Harris Slone:

Sure. I think we as orthopedic surgeons have this love hate relationship with inflammation. We sometimes want to suppress inflammation because we know it causes pain. Sometimes we want to induce inflammation because we know it promotes healing. Sometimes we use anti-inflammatories on non-inflammatory processes, so it's just a sort of very interesting topic in general, to me. When people started getting excited about the use of biologics to augment certain orthopedic interventions, such as rotator cuff repair, this is in general around inducing a healing response, really an inflammatory response in some capacity. And so it seemed counterintuitive to me that we would be injecting anti-inflammatory medications really into the operative site. Then at the time of surgery, going in and trying to induce an inflammatory response that may or may not still be blunted because of the preoperative steroid intervention. And so we wanted to look, we know that it can have deleterious effects on tissue quality.

And so we wanted to look, what are the outcomes? Does it lead to an increased risk of rotator cuff failure, specifically revision rotator cuff repair. And this is not an easy thing to study. And as a result, we looked at a big database to evaluate whether or not there was an increased risk of revision rotator cuff repair in the three years following surgical intervention.

Obviously that is one of the biggest limitations of this study is that it is a large database study and we're unable to really get granular in some of the details. We actually can't confirm what percentage of these injections, were actually steroid injections, so it is possible that a lot of the coded injections based on the database work steroid, although intuitively, I think we can all probably agree that the vast majority of the injections given, probably were steroid injections. And I do think that's probably just the biggest limitation of this study is the database nature of this study. But sometimes,

there's a lot of good and bad that can come from big data. And this is one of the areas where it does allow you to take at least an initial look at this to see if there might be something there.

Dr. Travis Dekker:

Harris, I think you do a great job in reviewing kind of a basic at being able to ask a basic scientific question and the reason behind it. And in addition to that, acknowledging some of the shortcomings of any search strategy and doing your best to find an answer, especially when there's such low numbers of retears and it's hard to be able to pull that data. You have to go to a big database, but understanding where that might be, you might be losing some of the capture and some of the weaknesses of the databases are extremely important.

I went through, looked at your results, which of course are interesting. And what I specifically thought was really interesting is can you really break down the findings in terms of what time points are critical to avoid when giving these perioperative injections? And I also found it really fascinating is, why do you think there's a difference between the groupings of zero to three months and then three to six months?

Dr. Harris Slone:

I had a feeling that you were going to ask that question. The summary of the results of the article are really that, we found that preoperative injection prior to rotator cuff repair between both zero and three and three and six months, resulted in an increased risk of revision rotator cuff repair. And I even in our hypothesis, in the article, we hypothesized that the risk would be increased within the first three months. And obviously we found that, that risk carried out all the way up into the six month mark. I do think it's important and we note in the discussion of the article that, the vast majority of the injections given in the three to six month mark, were skewed towards the three month side, so usually between after month three, but before month five. And so I do think that there is likely a time dependent relationship between injection and surgery.

And so just when I was actually able to look at the raw numbers and just sort of see how everything was distributed, I do think that the three to six month mark should still be noted. But again, I do think it probably is more likely it's worse closer, when the time is closer between the surgical intervention and the injection. After six months, we did not find a significant increased risk of revision, rotator cuff repair.

The other thing that should be noted is that the confidence interval in that three to six month group was definitely wider than it is between the zero to three months. Still statistically significant, but the confidence interval's a little bit wider. I don't know how much stock I put into the injection between three and six months being worse than zero to three, even though the results of the article suggest that there's a higher risk. I think that's probably just how the numbers fell out and much more likely to be a time dependent relationship.

Dr. Travis Dekker:

Harris, I think that you've taught us a great lesson and just kind of the practical application of then how we should approach these studies, is that there definitely can be a difference in statistics versus that of just practical application, when you look and dive into the numbers, that it probably is kind of closer to that grouping in that three to four month mark, that probably has a more drastic effect, even though the actual raw number and raw data output may kind of be naturally push it into groupings. I think either way, that you've shown that there is a time dependent effect, that causes an increased risk of rotator cuff re-tear, which drives us to change our practice. And so I find it to be a very practical article. And in

conclusion at this point, what's your recommendation on the perioperative use of corticosteroids in terms of timing, prior to repair? And in addition, what injections type and frequency do you feel comfortable with using in the setting of a rotator cuff tear?

Dr. Harris Slone:

I think that this is still a bit of a moving target for me. I still use steroid injections, fairly frequently. I do try to delay surgical intervention after a steroid injection and at a minimum three months and longer, if I can. If I have a patient who I think is more likely than not, going to end up in a surgical setting or end up having surgery, then I really will try and avoid the use of steroids. If there's someone who maybe is really not a surgical candidate or it's something that I'm very optimistic that we'll be able to manage without surgery, then my threshold for using steroid injections is a little lower, but I definitely am very judicious in their use and I don't frequently do multiple injections.

I've definitely also changed what injections I use. I try to minimize local anesthetics, so most of my injections now are saline, in addition to the steroid medication, I really don't use much local unless I am doing it specifically for a diagnostic tool. And then I used to use a lot of depomedrol and I'm using Kenalog. I do think there's some data out there that would suggest that at least from a cytotoxicity standpoint, Kenalog is a little bit more cell friendly than depo, and some of the other formulations. Sometimes I will also use dexamethasone in a younger patient if I want a shorter acting steroid effect. But again, this is still an area where I'm learning more and more, and I don't know that we really have all the answers.

Dr. Travis Dekker:

Well, I think that on our traveling fellowship, we were chatting earlier about this, but a shout out to the Biologics Association meeting this year that was associated with the AANA meeting in that they had some great debates where they were talking about cytotoxic effects and they used a local and these world's efforts were going up there and being very open about types of injections they use and why, and everybody thinks, "Oh, you're just giving a steroid shot." And I think we're really learning that, it's not just a steroid shot and there's different types, there's different makeups, and then additionally, what we're adding to the steroid mix can really have a drastic effect on the environment that we're putting it into, and so we need to be thoughtful about that. And I think your article highlights that.

I think your article has been great to contribute. Arthroscopy has really put out a lot of articles, I think, to help us in the perioperative management of rotator cuff tears. There's another article same year that you published that talked about the number of injections used that, that can lead to increased risk of retear greater than two injections. And so I think that Arthroscopy's done a great job in kind of helping guide surgeons along a practical path to most effectively and safely treat patients to minimize retear and hopefully optimize outcomes. And I really appreciate you taking the time tonight, Harris, I know you're extremely busy and it was a pleasure having you on the podcast and an even bigger pleasure being able to travel with you on that traveling fellowship. Do you have any parting thoughts on future avenues of research when it comes to non-operative modalities and the use of rotator tears, other types of injections, et cetera?

Dr. Harris Slone:

I think the future is probably in biologics, you taught me on the traveling fellowship. You presented very, very compelling data to suggest that there probably is not a clear benefit to some of the biologics we commonly talk about as an adjunctive to rotator cuff repair. But I do think that biologics are likely to be the future, if you will, of how we operatively and non-operatively manage a lot of the things in

orthopedics and specifically rotator cuff tear. In addition to PRP, there's a lot of excitement around fat and bursa, but I do think we have a good ways before we can, I think, regularly and routinely recommend use of those products. But my guess is that, over the next few years, we will see a tremendous increase in what we know about those adjuvants and when to use them.

Dr. Travis Dekker:

Well, Dr. Harris Slone's Arthroscopy article published in March of 2019 entitled, Preoperative Shoulder Injections are Associated With Increased Risk of Revision Rotator Cuff Repair, can currently be accessed at www.arthroscopyjournal.org. We appreciate all the listeners and all the support of this podcast. We thank you for joining us. Have a great evening and once again, thank you very much for joining us Harris.

Dr. Harris Slone:

Thanks for having me.

Dr. Travis Dekker:

The views expressed in this podcast do not necessarily represent the views of the Arthroscopy Association or the Arthroscopy Journal and are not meant to be treatment recommendations for individual patient.

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