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CORR Insights[®]: Is There an Advantage to Knotless Barbed Suture in TKA Wound Closure? A Randomized Trial in Simultaneous Bilateral TKAs

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Where Are We Now?

The use of barbed sutures in TKA remains a controversial topic. Previously published studies have found faster closure

times, stronger repairs, and a more complete seal of the tissue layers [2–4, 6]. However, another study [1] found local wound complications to be more common when barbed sutures were added to a standard closure. Additionally, barbed sutures are more expensive, and the purported time saved in the operating room often does not translate into real healthcare dollars, despite the fact the current study [5] has shown a minute-to-dollars savings. The correlation between operative time reduction and cost is debatable. A single minute of time in the operating room often does not directly cost or save money. Many institutions and anesthesia teams bill on an hourly rate. Therefore, if the additive time saved per case does not exceed an hour, or allow an additional procedure to be performed in that

room, then there likely is no true savings being realized by the hospital or healthcare system. The studies that have shown decreased closure times have previously reported that this operating room time reduction (translated as minutes-to-dollars saved based on calculated costs at their institutions) appears to offset the material costs [2–4, 6]. Although improved cosmesis and faster wound closures are appealing potential characteristics of barbed sutures, this must come with the same safety profiles and comparable complication rates to standard suture materials. Currently, barbed sutures are available in unidirectional and bidirectional patterns, which may have implications in speed of closure and local wound complications. Each of these offerings calls for detailed studies to determine safety and efficacy profiles.

The current study adds to those that support the use of bidirectional barbed sutures for wound closure in TKA. This prospective, randomized clinical trial compared wound closure in the

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same patient undergoing simultaneous bilateral TKAs. Fifty patients were enrolled with all completing a final 1-year evaluation. In this well-controlled study, mean closure times were reduced by 4.7 minutes (16.1 minutes versus 11.4 minutes) when barbed sutures were utilized during the closure. Patient characteristics, Knee Society scores, ROM, and overall outcomes were not different between the two groups. After a financial analysis, it was determined that the barbed sutures were responsible for a mean savings of USD 175 per case. Overall, this supports the efficacy of bidirectional barbed sutures in wound closure during TKA.

Where Do We Need To Go?

The current study speaks to many of our concerns and controversies about the use of bidirectional sutures, which may not be generalizable to unidirectional materials. The only important controversy that remains pertains to the question of true cost savings, as each hospital may calculate cost-per-minute in the operating room differently. This may lead to a varying level of savings for each institution. Still, it appears to me that regardless of the calculation, the operating room time saved will offset the cost of the barbed suture material.

How Do We Get There?

In order to determine the true cost-effective nature of barbed sutures, further randomized clinical trials are needed comparing these sutures to the various options for routine closure materials, which would include an accurate analysis of the direct savings to the hospital or healthcare system. Standardized protocols throughout all levels of training (physicians, residents, students, physician assistants) need to evaluate the speed of closure, number of sutures utilized, glove perforations, and treated wound complication rates in regards to the overall cost to the healthcare system. Specific procedures, patient comorbidities, and layers of closure could be more sensitive to barbed sutures and the safety and outcomes for such variables need to be thoroughly assessed. Additionally, the added cost of such suture material must be fully weighed against the true savings provided by the decreased time for wound closure.

Another factor that warrants greater evaluation is glove perforations with barbed sutures versus standard sutures that require knots to be tied. This may be a difficult study to perform as it could be considered quite tedious. To measure glove perforations, all gloves of those that sewed would need to be saved then filled with water and

examined for holes. Additionally, to avoid getting perforations prior to wound closure, an additional glove change would have to occur just prior to closure. Still, a study of this nature could add to the safety profile of barbed sutures as the needle is rarely handled with one's fingers during the entire closure. Lastly, the various forms of barbed sutures will need to be tested equally to assure that outcomes are generalizable to this entire class of suture and not just one manufacturer or bidirectional versus unidirectional options.

With bundled payments looming on the horizon, cost containment and efficiency are topics of great interest, and the role barbed sutures play in this paradigm has not yet been fully elucidated.

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