***CORR* Insights®: Distribution of Locally Delivered Antimicrobials is Limited by Cortical Bone: A Pilot Study**

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Where Are We Now?

McLemore and colleagues use their extensive knowledge about antimicrobial elution from bone cements to that of another porous surface, cortical bone. Their work discusses cortical anatomy and its contribution to transcortical transport of antimicrobials, and may explain how local and systemic antibiotics interact at the surgical site. The current study may shed light on the importance of augmenting medullary antibiotic delivery with antibiotic laden bone cement (ALBC) when there is an adequate extramedullary vascularized soft tissue envelope.

Some centers in Europe have reported success using single stage revision for an infected THA. Stabilizing the

stem within the femur may provide local antibiotic delivery, whereas the temporary ALBC femoral spacer for two-stage revision surgery (the preferred method in the United States) primarily obtains its intramedullary vascular antibiotic supply from the local medullary blood flow. The study by Odgers and colleagues shows that there is little antibiotic penetration through the thick cortices of the femoral diaphysis. Such a conclusion can be made assuming that flow across the cortex is the same in both directions.

Where Do We Need to Go?

What this paper does not show is the contribution of blood flow through vessels in the cortical vascular foramina, as this is a cadaveric study. For cemented stems, this may not be very important, as the blood flow through the cortical channels may be negligible when the implant is cemented, as the cement mantle essentially blocks transcortical blood flow. By contrast, in an ALBC femoral spacer for a two-stage revision procedure for an infected THA, there may be some limited transcortical blood flow along with some intramedullary blood flow from the remaining medullary bone, which is in communication with the spacer. Since there is limited or negligible medullary and transcortical blood flow to augment the local antibiotic delivery from the spacer, the adequacy of surgical débridement of infected tissue and biofilm is important in maximizing the effectiveness of local antibiotics from the cement and vascular supply. Ascertaining the extent of how cortical and medullary bone influences and contributes to the distribution of local antibiotic delivery by devices such as antibiotic-containing cement spacers in vivo remains an important open question.

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How Do We Get There?

The lesson for clinicians is that success of treating infection in diaphyseal bone with thick cortices will depend on a well vascularized soft tissue envelope with an intramedullary local antibiotic delivery device. Whether the antibiotic delivery is best included as part of a single stage revision technique, or

whether it should be part of a two-stage surgical approach, will need to be delineated with further research, optimally in the setting of multicenter, prospective studies. Different types of local antibiotic delivery devices with appropriate elution characteristics will provide opportunities to explore and to add useful tools to the orthopaedic surgeon's toolbox; these should be developed and further studied.