Blood Is Thicker Than Water

Commentary on an article by Lionel E. Lazaro, MD, et al.: “Quantitative Assessment of Femoral Head Perfusion Following Arthroscopic Femoral Osteochondroplasty. A Cadaveric Study”

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Preserving the vascular supply to the femoral head is one of a myriad of factors that the surgeon must be mindful of during an arthroscopic femoral osteochondroplasty. Although the likelihood of compromising the vascular supply to the point of developing osteonecrosis is low, this can be a devastating complication for a patient. There have been a number of studies that describe the anatomy of the medial femoral circumflex artery in supplying blood to the femoral head. However, we have a limited understanding of how much a femoral osteochondroplasty procedure can decrease the blood supply to the femoral head. Lazaro et al. attempt to bridge this gap with their study, in which they quantified the effect of arthroscopic femoral osteochondroplasty on femoral head perfusion.

They found that the farther the superior margin of resection was extended posteriorly, the greater the loss in femoral head perfusion. The specimens in their standard-resection group (resection anterior to the 12 o’clock position) demonstrated a mean decrease in femoral head perfusion of 5%. The minimally extended resection group (resection extended just posterior to the 12 o’clock position by £10°) demonstrated a mean decrease in femoral head perfusion of 9%. In contrast, the extended-resection group (resection extending an average of 41.3° posterior to the 12 o’clock position) demonstrated a mean decrease in perfusion of 28%. The authors found that these differences in femoral head perfusion were significant across the groups. It is also important to note that their quantitative findings are consistent with what is already known in the literature regarding the anatomy of the blood supply to the femoral head.

Although the results of this study are compelling, the reader should also take into account that the methods only focus on varying resection margins based on the clock face. Additionally, the maximum depth of resection was 10 mm. In clinical practice, resection margins can vary with respect to the proximal and distal extents as well as depth. The depth of resection performed in this study was deeper than that noted in the literature. For example, Aoki et al. recently described a trough technique in which the depth of resection was between 3 to 5 mm in most cases, with some exceptions for larger cam lesions. Philippon et al. described a depth of resection of 5 to 7 mm. One can argue that the depth of resection can also affect femoral head perfusion. Perhaps variables such as depth of resection as well as the proximal-distal extent of resection can be investigated in future studies quantifying their effects on femoral head perfusion.

Lazaro and colleagues were astute in mentioning that the results of the study should be interpreted with caution. Although they were able to quantify the decrease in femoral head perfusion, the threshold at which a loss in femoral head perfusion becomes clinically important is unknown. Additionally, beyond the extent of resection during a hip arthroscopy procedure, there may be other factors that contribute to the development of osteonecrosis. These may include traction time, increased intra-articular pressure, amount of traction, and direct injury to the vessels from other instruments used during a hip arthroscopy.

It is important to recognize that determining the extent of resection during a femoral osteochondroplasty can be challenging. Not only can over-resection lead to vascular compromise but it can also lead to violating the suction-seal effect between the labrum and the femoral head. Under-resection can result in persistent cam lesion impingement, which can fail to alleviate symptoms and lead to revision hip arthroscopy. Proper preoperative planning, including a thorough evaluation of radiographs and advanced imaging, can help the surgeon determine the extent of resection needed. Intraoperatively, the surgeon should clearly visualize anatomic landmarks and use fluoroscopy and dynamic arthroscopic evaluation to help determine resection margins. Additionally, the surgeon should also consider staying more superficial with the depth of resection as the margin of resection moves more posteriorly.

Clearly there are many factors involved that a conscientious surgeon needs to consider when performing a femoral osteochondroplasty. Lazaro et al. should be lauded for investigating one of these factors in depth and helping to bring to light the importance of preserving the blood supply to the femoral head.
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References