Anatomic and Procedural Considerations for Geniculate Artery Embolization

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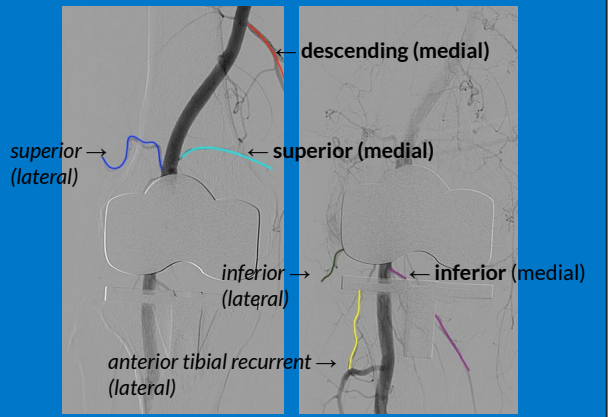
→ Geniculate artery embolization (GAE) is a minimally invasive intra-arterial intervention that selectively targets geniculate artery branches corresponding to an area of pain. The goal is to target 2-3 hypervascular vessels to preserve some blood supply to joint capsule but curtail supply of proinflammatory mediators to the knee (contributes to synovitis and joint vascularity.)

Conventional geniculate artery anatomy

3 compartments: medial, lateral, and patellofemoral

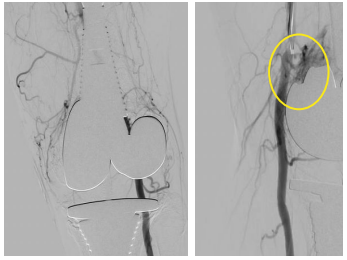


Patellofemoral Compartment → supplied from all six

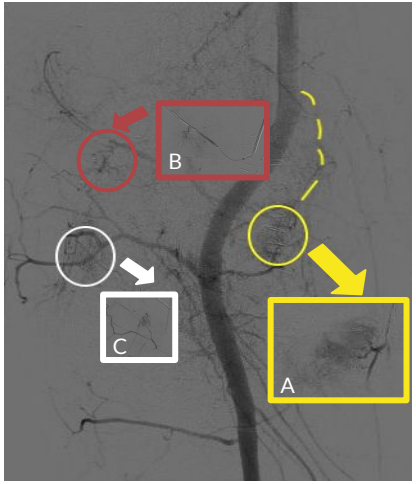
→ While most complications are rare and minor, one of the biggest risks from the procedure is superficial skin discoloration/erythema, attributable to nontarget embolization.

Tips to prevent non-targeted embolization during GAE

1. Obtain superselective embolization with lower profile catheters (2F or smaller) +/- serial oblique projections
2. Using larger embolics (11% versus 57-65% complication rate when using large vs smaller embolics[2])
3. Applying an ice pack intraprocedurally to physically limit embolics that might migrate to the skin



↑Power of serial oblique projections, necessary for patients with prior arthoplasties, which often obscures midline vasculature. The source of this patient's hemarthrosis via the superior medial geniculate artery (circle) was not apparent until the optimal projection was found. No posprocedural complications.



← 68 year old male with pathologic right distal femur fracture requiring embolization before fixation. Knowledge of the geniculate artery is important to eliminate risk of non-target embolization. Here, superselection of the descending (a), lateral superior (b), and lateral inferior (c) geniculate arteries optimized the areas of tumor blush (circles), allowing the operator to confidently embolize and minimize any complications for the patient's subsequent surgery.

References: 1. Heller DB et al. (2022). *Radiographics*; **42** (1): 289-301. ; 2. Little MW et al. (2021). *Cardiovasc Intervent Radiol*; **44** (6): 931-940.