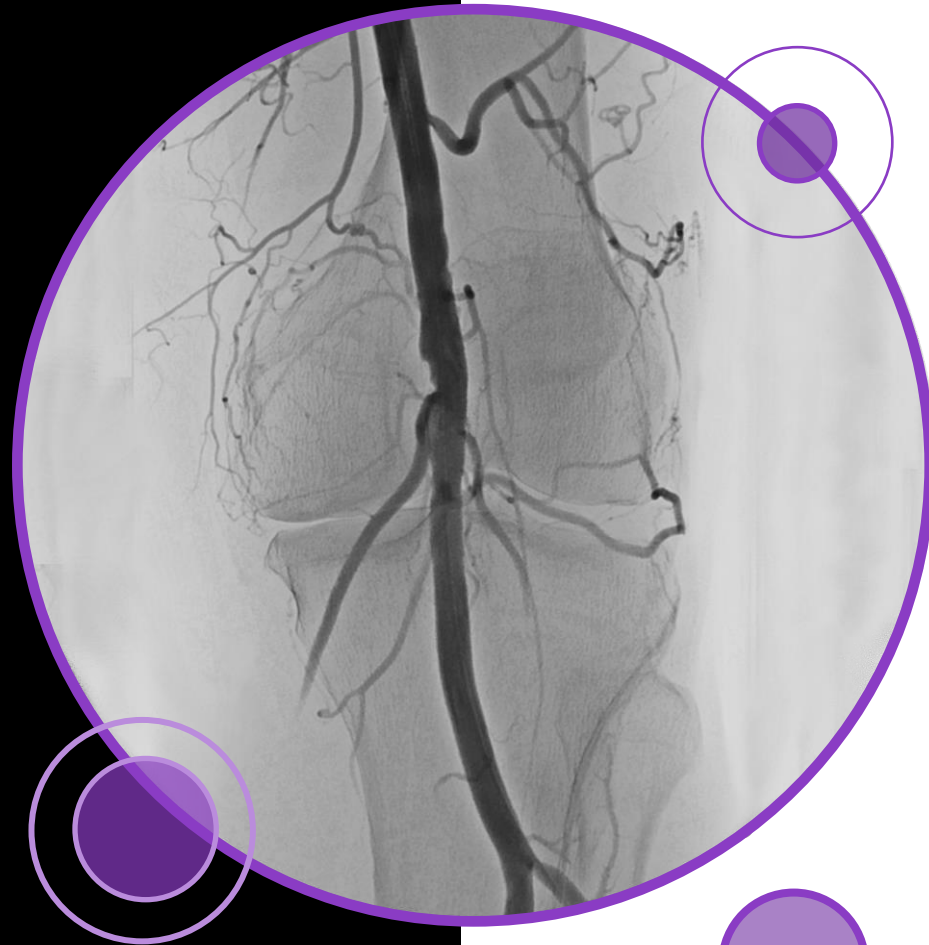


Genicular Artery Embolisation



**Health Professional
Information**

Genicular Artery Embolisation

A prominent treatment gap exists for patients with mild to moderate knee OA (KL grades 1-3), who are no longer responding to conservative management, but are not yet candidates for TKR. Genicular Artery Embolisation (GAE) is an emerging minimally invasive endovascular treatment option for these individuals.

An Interventional Radiologist performs GAE in an angiography suite or hybrid theatre. An endovascular catheter is extended to the genicular arteries, via an artery in the groin or foot. Inflammatory synovial neovascularity is selectively occluded with microscopic embolic beads (hydrogel), delivered by a microcatheter under image guidance. Very small aliquots of embolic beads are injected, followed by regular interval angiography, to ensure the abnormal angiogenesis is 'pruned' while preserving the native arteries. It is important to note that the abnormal hyperaemia feeding the synovitis does not supply the healthy tissues of the knee.

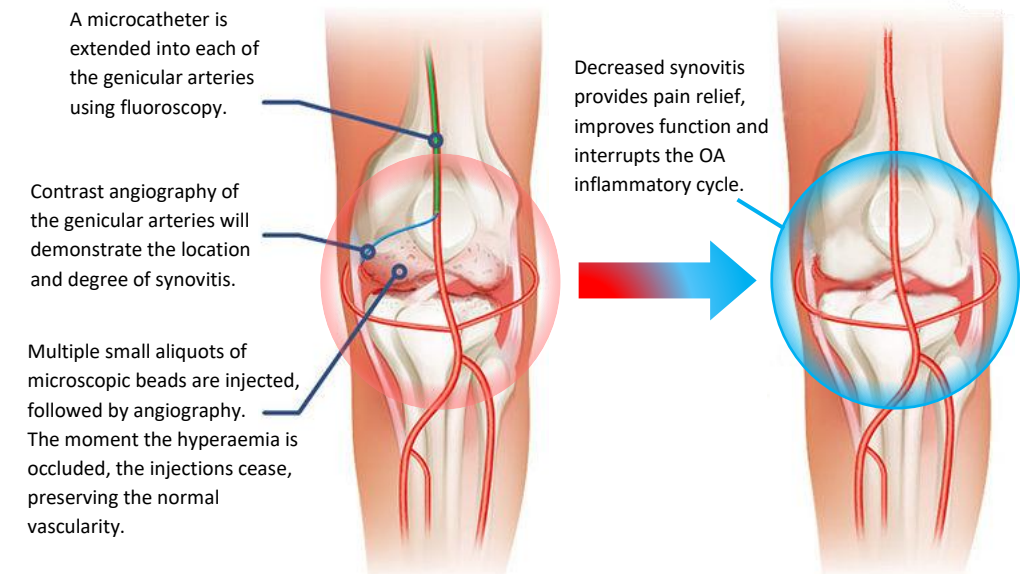
The resulting reduction in hyperaemia decreases synovitis, reduces the density of accompanying unmyelinated sensory nerves and interrupts the inflammatory cycle currently theorised to progress the OA disease process.

A preoperative genicular nerve block provides effective post-procedural pain relief, however an overnight stay is recommended for monitoring and management of breakthrough pain. Same-day discharge with analgesia can be considered in specific circumstances. Several clinic reviews are scheduled during the first year following the procedure.

Synovitis and OA Pathophysiology

Although regarded as multifactorial, OA has long been considered a disease of wear-and-tear. Research into the pathophysiology of OA has subsequently identified synovitis as a primary contributor to the development, progression and pain associated with OA.

Joint inflammation following cartilage damage activates macrophages, which release neoangiogenic growth factors that drive angiogenesis within the synovium. The resulting hyperaemia prolongs synovial inflammation, while collagenases and aggrecanases disrupt the integrity of the articular cartilage, predisposing it to further injury. In addition, unmyelinated sensory nerves develop alongside the neovascularity, exacerbating OA discomfort.

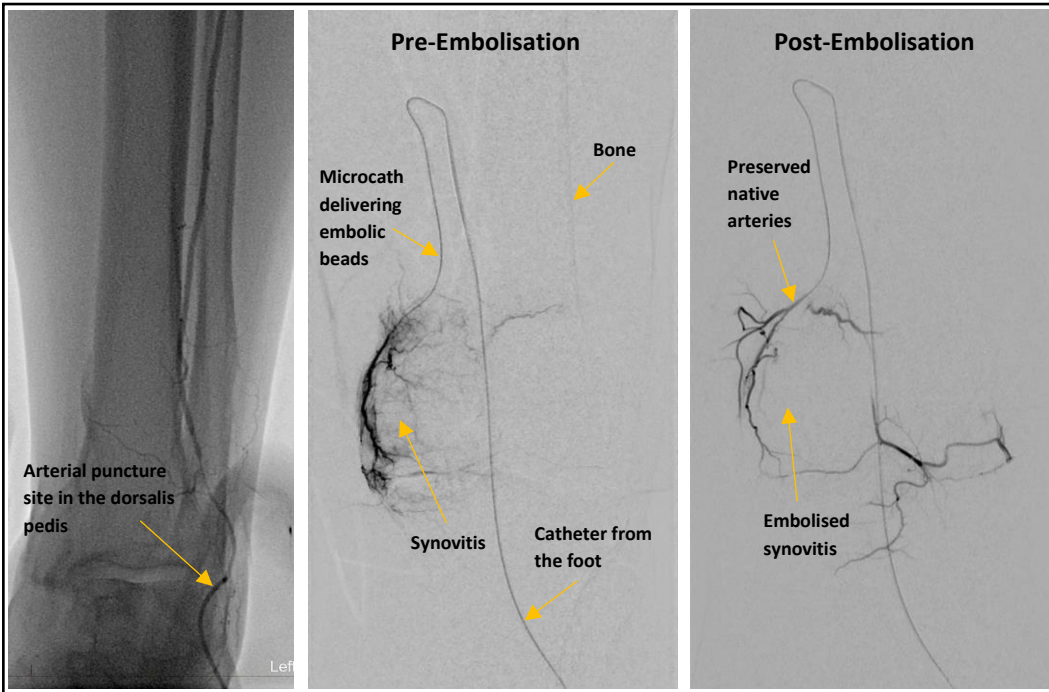


GAE Efficacy

GAE efficacy is determined by the degree of synovitis available to be embolised, which is commonly present in mild to moderate OA. Literature suggests that GAE can also slow disease progression by disrupting the inflammatory cycle described above. The longest-running study has demonstrated analgesia for up to 4 years; however, since OA is a multifactorial disease, the degree and duration of the effect will be determined by the ratio of contributing factors. The minimally invasive nature of GAE enables repeat treatment for residual or recurrent synovitis.

Since synovitis is necessary for GAE to be effective, not all cases of OA will be suitable for this treatment. Embolisation will not alleviate fibrotic stiffness, meniscal/ligamentous tears or central neuropathic pain. A KL grade-4 non-surgical candidate with synovitis may still benefit from GAE, however the outcomes will vary.

A preprocedural MRI can quantify synovitis and predict the likelihood of a favorable outcome. MRI can also identify known indicators of decreased treatment response, such as full-thickness articular cartilage loss. A preprocedural MRI is therefore beneficial for both patient selection and expectation management.



GAE: Other Uses

Although GAE is an emerging treatment option for OA, the technique has been used for many years in the management of recurrent post-TKR haemarthrosis. In addition to resolving the intra-articular bleeding, GAE decreased the accompanying synovial hypertrophy and inflammation, reducing impingement and relieving pain. More recently GAE has been used in the absence of haemarthrosis, alleviating pain in post-TKR patients with residual synovitis. As with OA, GAE in this setting has been found to be both safe and effective.

GAE Risks

GAE is minimally invasive and can be performed under conscious sedation. These characteristics considerably lower the risk profile of GAE, with no severe complications identified in the current evidence base.

A small amount of non-target embolisation is inevitable, however robust native arterial supply and rapid development of collateral circulation is protective of the healthy tissue. Only two cases of asymptomatic lowgrade osteonecrosis have been reported in the literature. Transient skin mottling around the treated knee is common, which typically resolves within a week. Uncommon self-limiting complications include puncture site haematomas, cutaneous paraesthesia and fever.

Several studies have addressed the concept of TKR post-GAE, with no wound healing issues noted in subsequent arthroplasties.

Research and PRAETORIAN GAE Registry

Multicenter collaboration among Queensland Interventional Radiologists has resulted in the establishment of the PRAETORIAN GAE registry. The PRAETORIAN registry is modelled on the AOA National Joint Replacement Registry and, like the AOANJRR, it aims to provide a multicenter database of standardised data for research and a repository from which to establish best practice.

Dr May has recently partnered with QUT, Ramsay Health and I-MED to perform a groundbreaking study, examining the effects GAE on the biochemical markers of osteoarthritis and the socioeconomic impact of GAE on its participants.

Individuals may be asked if they would be willing to participate in the registry and research.

Contact and Referrals

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Referrals can be submitted via Medical Objects.

Dr May offers 'Known-Gap' billing to patients with appropriate health cover. Known-Gap billing is set at \$500. No-Gap billing can be discussed in specific cases.

