Geniculate artery embolization (GAE) may offer another treatment option for patients with knee pain due to osteoarthritis. The novel, minimally invasive procedure is image guided and works to decrease inflammation and pain by blocking abnormal blood vessels in the knee. Results of the first United States clinical trial have been promising, with no major adverse events and the majority of patients experiencing significant pain reduction and better range of motion. Rachel Piechowiak, DO, an investigator with the study, joined us to further discuss the results and their implications.

**VDM:** Why did you decide to study geniculate artery embolization (GAE)?

**Dr Piechowiak:** Osteoarthritis affects nearly 30 million people in this country, and the knee is the most common site. However, there is a large population of patients who are not quite ready for knee replacement and depend on daily NSAIDs, narcotics, or knee injections for pain control with variable success. NSAIDs are the mainstay for medical management for osteoarthritis, but over 100,000 people are hospitalized annually for NSAID-related gastrointestinal bleeding, and there are over 16,000 annual NSAID-related deaths in arthritis patients alone. This is significant morbidity for people trying to achieve pain relief. There is a need for better treatment options for this “in between” population, who are not ready for surgery but are not adequately managed with medication or injections. We know from Dr Okuno’s work in Japan that GAE is successful in providing relief for pain related to knee osteoarthritis. We’re very excited about the potential to really help these patients.

**VDM:** What are some of the steps of the procedure?

**Dr Piechowiak:** GAE is done under moderate sedation. We catheterize the patient from the groin and perform an angiogram to highlight the arterial anatomy of the affected knee. We target the area of hypervascularity that corresponds to the area of palpable pain, and insert a catheter into the artery that supplies the abnormal area. Then we inject tiny particles that shut down the abnormal hypervascularity, decrease the inflammation, and stop the cycle of pain.

**VDM:** What were your results?

**Dr Piechowiak:** One of our patients was lost to follow-up, but we were technically successful in 100% of patients. We used well-known pain scales in the medical community to measure overall clinical success and found that patients had an 80% improvement in pain and function compared with their condition prior to the GAE procedure. Some patients had immediate pain relief, while others took a few days before experiencing relief. Many patients have expressed their gratitude in their improvement after the procedure. One patient shared pictures of himself hiking weeks after the procedure! People tell us that they have their lives back and can participate in activities with their families that were impossible before the procedure. It’s really exciting to be able to do something for these patients that’s this effective.
VDM: Are there any clinical takeaways currently?

Dr Piechowiak: Many patients are asking us when we can treat their other knee, as they experienced significant improvement in the treated knee but usually have arthritis in both knees. Unfortunately, it will likely be some time before GAE for osteoarthritis becomes a mainstream procedure and is covered by insurance. Treatment as of now is primarily possible in a clinical study or as an out-of-pocket patient expense. We are hoping to change that with our results and our upcoming GAE study.

VDM: Were there any challenges encountered while doing this study?

Dr Piechowiak: As interventional radiologists, we're very well versed in embolization in other body parts, such as uterine fibroids, enlarged prostates, liver tumors, and tumors in other areas of the body, but GAE is new. It’s similar to knowing how to drive, but driving in a different neighborhood. We’re applying the same techniques we’ve applied to other areas of the body to hypervascular synovium in the knee. Much of what we’re doing is second nature, but there are nuances, such as how much embolic to use and what size particles are appropriate.

VDM: Were there any unexpected results?

Dr Piechowiak: Not really. We participated in a pilot study in Buenos Aires a couple years ago, and we found very similar results. Our results also echoed that of Dr Okuno and his team in Japan. Our results have further supported how exciting and useful we think this procedure is and will be down the road.

VDM: What are your plans for future studies?

Dr Piechowiak: The next step for us is conducting a sham study in which we’ll determine whether the placebo effect is influencing pain relief. We’ll be randomizing and blinding patients to either the procedure or a sham procedure. Patients in the placebo group will still have the angiogram, but we won’t be injecting particles. If in a month the sham patients are not better, then we’ll unblind them and offer them the procedure. We’re hoping that our research will be successful and that we will eventually be able to offer it to many patients.

REFERENCE