Total Knee Arthroplasty in a Patient with Subcutaneous and Intra-Articular Tophaceous Gout
A Case Report

Xavier Aguilera, M.D., Jose Carlos Gonzalez, M.D., Fernando Celaya, M.D., Ph.D., Marcos Jordan, M.D., Cesar Diaz-Torne, M.D., and Joan Carles Monllau, M.D., Ph.D.

Abstract
Total knee arthroplasty is a common operation for all types of arthritis, including chronic gouty arthritis. Tophi deposits are a well-known cause of joint destruction, but simultaneous subcutaneous and articular tophaceous gout is exceptional. We report a patient who required bilateral total knee replacement for this rare condition.

Gout is a common disease caused by deposits of monosodium urate crystals accumulating in joints and surrounding tissues. After years of acute intermittent disease, about 10% of patients develop tophaceous gout. This chronic form of the disease affects skeletal structures, such as the skin, tendons, ligaments, and joints, severely limiting their range of motion.

Surgery may be a viable option in some cases, but it is associated with a high rate of complications, such as delayed wound healing, sepsis, and discharging sinus. Furthermore, as surgical outcome is worse in lower limbs than in upper limbs, knee replacement surgery should be reserved for selected cases only.

We report the first case of bilateral knee arthroplasty in a patient with both articular and subcutaneous tophaceous gout.

Case Report
An 80-year-old man was referred to our hospital with a long history of sudden onset pain, swelling, and limited flexion in both knees. The gout also affected the bilateral first metatarsophalangeal joints and all other joints on both hands, causing severe deformities.

Physical examination showed a varus deformity in both knees with multiple large subcutaneous masses in front of the patella, causing a smooth skin surface (Fig. 1). The range of motion was 20° to 100° for both knees, and the patient was unable to walk any distance without help.

Plain radiography showed decreased medial joint space and osteophytes affecting the patellofemoral joint. Dense soft tissue of several masses with abnormal calcification was seen in the anteropatellar subcutaneous tissue. CT scan revealed irregular and marginal calcification around the mass in the medial parapatellar joint space.

Due to the severe pain, the patient’s limited range of movement, and the radiographic findings, total knee arthroplasty (TKA) was considered. Possible surgical complications were explained to the patient well in advance of the intervention. During surgery of the right knee, great care was taken not to injure the soft tissue because most tophi were anterior, and loss of substance in this region could jeopardize the surgery and thus the outcome. All tophaceous deposits were dissected, taking special care not to damage the skin. The deposits were easy to remove from the extensor mechanism, but they were well attached to the skin (Fig. 2).

After surgery, the surgical wound healed correctly, and the patient achieved a range of movement from 120° to full extension. One year after right knee surgery, a TKA was inserted in the left knee. The surgery and postoperative period again was uneventful, and results were similar to those for the right knee.

Discussion
The incidence and prevalence of gout has increased over the last few decades. This increase can be explained by factors, such as greater alcohol use, changes in dietary habits,
modern life style, obesity, metabolic syndrome, and wider use of drugs causing hyperuricemia.\textsuperscript{3}

Tophaceous deposits in knee joints and other areas have occasionally been reported, but detailed clinical information is lacking.\textsuperscript{4,5} Eighty percent of non-treated gout patients develop tophi or present radiological manifestations within 20 years.\textsuperscript{6} Furthermore, the prevalence of tophi appears to be increasing.\textsuperscript{7} As this condition limits a joint’s range of movement and can severely affect walking ability, joint replacements for gout osteoarthritis will likely become a more frequent surgical procedure in future.\textsuperscript{8}

Currently, TKA is a common operation for all types of arthritis. However, tophaceous gout causing arthritis of the knee and requiring TKA is rare,\textsuperscript{9} and simultaneous subcutaneous and articular tophaceous gout arthritis is exceptionally rare. The present case is the first report of TKA with this form of gout arthritis.

The reason why surgeons avoid surgical intervention in these patients is the associated high rate of complications, including delayed wound healing and sepsis with discharging sinus,\textsuperscript{2} both extremely serious situations in arthroplasty surgery. The literature has described the need for revision knee surgery due to gouty arthropathy, presenting with signs and symptoms of a septic arthroplasty. This stresses the importance of prompt diagnosis, by recognizing crystals in the joint as a source of a painful knee arthroplasty.\textsuperscript{10}

Although it is uncommon, surgery of tophaceous knee may be a valid therapeutic option in patients with severe pain, limited knee motion, deformity, and walking difficulties, particularly when both knees are affected. Furthermore,

**Figure 1** Preoperative right knee with subcutaneous multiple tophi masses erupting through the skin.

**Figure 2** Intraoperative photograph of right knee when the chalky lumps were surgically removed.

**Figure 3** Intraoperative photograph of right knee shows severe articular surfaces destruction covered with chalky deposit of sodium urate.

**Figure 4** The photograph shows the bilateral knee replaced and severe inflammatory tophi affecting all fingers on the proximal and distal interphalangeal joints.
the option of waiting for the tophi to disappear is not a viable alternative as this is unlikely, even after years of hypouricemic therapy.\textsuperscript{11}

Since his knee surgery, the patient has needed surgery for ulcerations caused by the tophi in interphalangical joints of both hands. However, he has had no recurrence of tophi in either replaced knee (Figs. 3 and 4).

In conclusion, this case report shows that total knee arthroplasty in patients with simultaneous subcutaneous and articular tophaceous knee may be a valid option with no significant complications. Notwithstanding, possible serious complications must be clearly explained to the patient well before surgery.

\textit{Disclosure Statement}
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\textbf{References}