

Objective: A 71-year-old male was consulted intraoperatively for a transected popliteal artery and vein after the cartilage and osteophytes of both proximal tibia and femur were removed for a total right knee arthroplasty.

Methods: Both popliteal artery and vein were ligated with 2/0 silk sutures, and the knee incision was closed temporarily. Incisions were made to expose both superficial femoral artery and popliteal artery, obtaining both proximal and distal controls. Intravenous heparin was given after the greater saphenous vein was harvested from the contralateral thigh. The vein was reversed, and the distal end of the vein was anastomosed end-to-side to the above-knee popliteal artery with 6/0 Prolene sutures. The vein was passed through a previously fashioned tunnel through the heads of the gastrocnemius muscles. An end-to-side anastomosis was performed to the below-knee popliteal artery with 6/0 Prolene sutures. The vein is slightly redundant to reduce tension after arthroplasty is completed; anastomoses were bled antegrade and retrograde prior to completion.

Results: The patient had a completed angiogram from the vein graft after the total knee arthroplasty was completed. The angiogram showed patent bypass with one-vessel runoff via the peroneal artery and distally reconstituted posterior tibial artery. No fasciotomy was carried out due to lack of concern for compartment syndrome.

Conclusion: Although the incidence of popliteal artery injury is rare during knee arthroplasty, the patients' outcomes vary depending on the time of diagnosis, ranging from prolonged hospital stay to amputation for delayed diagnosis. The risks for popliteal artery injury increase with hyperextension or hyperflexion of knee during operation, revision surgery, poor instrumentation intraoperatively, and vascular diseases. The popliteal artery locates laterally to the tibial plateau (site of typical resection during arthroplasty); therefore, placing posterior retractor medial to the to the midline of the tibial plateau and avoid hyperextension or hyperflexion during operation will reduce popliteal artery or vein injury. With late diagnosis and treatment, the mortality rate goes up to 7% and the amputation rate up to 42%. Therefore, timely diagnosis and treatment is critical for overall outcomes of patients.

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Symptomatic Popliteal Artery Aneurysms in Recently Sars-CoV2-Infected Patients



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Objective: Arterial and venous thrombosis are well-known complications in Sars-CoV2-infected patients. Furthermore, thrombotic effect of COVID-19 is often considered responsible for poor prognosis in affected patients, and it can compromise results in urgent limb revascularizations. The aim of the present study is to report on the incidence of symptoms development in patients affected by popliteal artery aneurysm (PAA) and to analyze the effect of ongoing or recent COVID-19 infection on outcomes.

Methods: Data on patients surgically treated for PAA from the massive widespread of the COVID-19 vaccine to present were prospectively collected. Factors considered for comparative analysis were symptoms, aneurysm diameter and length, time from symptom onset and hospital referral, and ongoing or recent COVID-19 infection. Outcomes measures were death, major or minor amputation, and sensory or motor deficit in the affected limb. A subgroup analysis was performed in symptomatic patients according to presence of ongoing or recently recovered COVID-19 infection.

Results: Thirty-five patients were surgically treated for PAA; among them, 15 were referred to our hospital for symptomatic PAA and were urgently treated. Urgent treatments comprised fibrinolytic intra-arterial administration, Fogarty embolectomy, surgical bypass implantation, endovascular recanalization, and covered stent implantation. Time from symptoms onset to hospital referral was >12 hours in nine symptomatic patients. Nine of 15 symptomatic patients had an ongoing or recently recovered COVID-19 infection (<2 months). Among asymptomatic patients, one patient reported a recent (<2 months) COVID-19 infection. Complications were recorded in nine symptomatic patients that were urgently treated. At statistical analysis, factors associated to postoperative complications were presence of symptoms (odds ratio [OR], 21.7; 95% confidence interval [CI], 2.28-206.49; $P = .001$), ongoing or recently-recovered Sars-CoV2 infection (OR, 200; 95% CI, 11.18-

3576.89; $P < .0001$). COVID-19 infection was strongly associated to symptoms development in patients affected by PAA (OR, 28.5; 95% CI, 2.97-273.31; $P < .001$) and to surgical failure in those patients (OR, 40; 95% CI, 2.01-794.31; $P = .005$).

Conclusion: In our series, presence of ongoing or recently recovered COVID-19 infection was strongly associated to ischemic symptoms onset and to complications after urgent treatment in symptomatic patients. Identification of ongoing or recent COVID-19 infections is of the utmost importance in surgical vascular patients.

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The Effect of Endovascular Therapy on Surgical Bypass in a Limb Preservation Practice



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Objective: The options for management of infrainguinal peripheral arterial disease and limb revascularization have drastically changed in the past several decades. This has had a dramatic effect on the type of surgical bypass performed in the setting of a limb preservation program. The complexity of surgical bypass has increased due to bypass after endovascular failure, lack of venous conduit, and poor distal arterial targets. We report the impact on bypass characteristics performed at a tertiary care center with an active limb preservation program.

Methods: Patients undergoing infrainguinal surgical bypass from 2016 to 2022 performed by a surgeon associated with a limb preservation program were analyzed. The procedures were categorized based on bypass anatomy with regard to the outflow target artery (popliteal, anterior tibial/dorsalis pedis, posterior tibial/plantar pedis, or peroneal). Bypasses were further analyzed based on conduit and anastomotic configuration utilized (no adjunct, distal vein patch, anastomotic fistula, deep vein arterIALIZATION).

Results: A total of 103 surgical bypasses were performed, representing 28% of lower-extremity revascularization procedures during the 6-year period. All bypasses were performed for symptoms of critical limb ischemia. Vein bypass was performed in 22 patients (21.4%) with 20 tibial and two plantaris pedis bypasses. A prosthetic conduit (heparin-bonded expanded polytetrafluoroethylene) was used due to a lack of adequate vein, or to reach the appropriate distal target. Expanded polytetrafluoroethylene for tibial bypass was used in 59 patients (57%) with the following anastomotic configurations: 34 distal vein patch (33%), seven distal arteriovenous fistula (6.8%), seven prosthetic alone (6.8%), 11 deep vein arterIALIZATION (10.7%). In 22 patients (21.4%), prosthetic graft was used to bypass to the below-the-knee popliteal level.

Conclusion: This bypass experience reflects a dramatic change in the type of bypass performed in a limb preservation program due to the continued development of endovascular procedures especially below the knee. Tibial bypass is far more common than femoral-popliteal bypass with a concomitant shift towards the use of prosthetic conduit. This shift toward prosthetic graft utilization with anastomotic adjuncts now comprise the majority of bypasses performed for limb preservation. Mastery of these techniques will be important to continue to offer bypass to patients for healing and amputation prevention.

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Atherectomy with Drug-eluting Balloon for Common Femoral Artery Occlusive Disease: 1-Year Experience



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Objective: Gold-standard treatment for occlusive lesions of the common femoral artery used to be endarterectomy. In recent years, interest for endovascular treatment of the common femoral artery has been increasing. Vessel preparation with rotational atherectomy, followed by drug-eluting balloon usage, could be a good option.

Methods: Between June 2021 and October 2022, 36 patients with 40 lesions of the common femoral artery had been treated with rotational atherectomy followed by drug-coated balloon. They were reviewed prospectively.

Results: There were 23 men and 13 women. Mean age was 74 years old. Twenty-nine legs had had preoperative Rutherford stage 3 peripheral arterial disease. The mean lesion length was 4 cm, with four chronic total occlusions. All lesions were heavily calcified. Technical success rate was 100%. No bail-out stenting was required. One case of asymptomatic embolization had occurred in a deep femoral side branch. One of the patients had died after 1 day following myocardial infarction, another one after 5 days following acute mesenteric ischemia, and a final patient after 1 month following cardiac decompensation. Two patients had experienced a non-ST-elevation myocardial infarction, one on the first postoperative day, and one on the thirtieth. Two patients had developed a false aneurysm, and another two a thrombosis at the puncture site. All others had no complications. Mean follow-up was 7 months. Primary patency rate was 95%. Two patients had needed surgical endarterectomy. One patient with Rutherford stage 6 had had major amputation and one with stage 4 minor amputation. All other patients had decreased Rutherford stage.

Conclusion: These results have shown that rotational atherectomy with drug-coated balloon angioplasty for common femoral artery calcified occlusive disease is feasible and safe. It has the advantages of avoiding the potential complications of surgical treatment and of not leaving a stent.

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Complex Multilevel and Multivessel Endovascular Revascularization in a Patient With Chronic Limb-threatening Ischemia



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Objective: Between 2% and 3% of patients with peripheral artery disease present with a severe case of chronic limb-threatening ischemia, a condition which is correlated with extensive arterial disease. We report a case of complex multilevel and multivessel endovascular revascularization that required a combination of different techniques in the same patient.

Methods: The patient was a male with rest pain and digital ulcer in the right limb, history of heart and chronic pulmonary disease, and a femorofemoral bypass left to right due to a previous acute ischemia. Computed tomography scan revealed a severely diseased femoropopliteal and distal sector, combining high-grade stenosis and occlusions at multiple levels. Due to the extensive illness and the absence of an adequate autologous conduit, we decided to avoid open surgery. Under regional anesthesia, we punctured the previous bypass and tried to recanalize the popliteal occlusion, but we failed. So we punctured the pedal artery, recanalizing the occlusion of the anterior tibial artery and reaching the popliteal sector. However, the 'through and through' was gained from antegrade access, entering the false lumen with a Tempo Aqua catheter (Cordis, Miami Lakes, FL), achieving the rendezvous with the retrograde wire. Angioplasty was performed on the anterior tibial artery with a 2.5 × 210 mm balloon, deploying a balloon expandable stent of 3.5 × 20 mm in its origin due to a dissection. Despite using non-compliant balloons in the femoro-popliteal sector, the results were suboptimal, thus forcing us to employ a covered self-expanding stent of 6 × 250 mm from below the knee, and a self-expanding stent of 5.5 × 180 mm in the proximal segment.

Results: The patient recovered pedal pulse with disappearance of the ischemia and was discharged from hospital after 2 days.

Conclusion: Combination of different endovascular techniques to approach complex anatomies facilitates good outcomes and reduces a patient's morbidity and mortality.

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Minimizing Lymphoceles After Femoral Artery Exposure Using LigaSure



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Objective: Lymphoceles occur in up to 15% of patients after open surgical femoral artery interventions and are a common cause of postoperative morbidity. Previous authors have shown mechanical bipolar electrocautery (LigaSure; Medtronic, Dublin, Ireland) to be effective in limiting lymphatic complications after axillary dissection and renal transplantation. We hypothesize that femoral artery exposure using LigaSure would lower postoperative complications after open femoral artery vascular surgery.

Methods: This was a retrospective analysis of 284 consecutive patients having femoral endarterectomy (FE) or femoral distal bypass (FB). A total of 154 patients had surgery between May 1, 2019, and May 1, 2020, using traditional techniques and 130 patients had surgery between May 1, 2020, and May 1, 2021, using LigaSure to aid in femoral artery exposure. Outcomes, including return to the operating room for infection and/or drainage of lymphocele, were compared between the two groups.

Results: There were no differences in cardiovascular risk factors, age, or body mass index between the two groups. The LigaSure group had a significantly lower incidence of return for infection or drainage of lymphocele (4.6% [6/130] vs 12.3% [19/154]; $P < .5$). There were no significant differences in operative time (FE, 140 minutes with LigaSure vs 142 minutes; $P =$ non-significant [NS]; FB, 175 minutes with LigaSure vs 185 minutes; $P =$ NS), nerve injury (5% vs 4.8%; $P =$ NS), or postoperative bleeding (2% vs 1.5%; $P =$ NS) between groups.

Conclusion: The use of LigaSure during femoral artery exposure lowers the incidence of postoperative lymphocele and the reoperation for infection and drainage following open vascular surgery.

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New Therapeutic Horizons with a Novel Sirolimus Eluting Balloon Technology in Endovascular Treatment of Critical Limb Ischemia



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Objective: SELUTION SLR (MedAlliance MA, Nyon, Switzerland) is a novel CE-marked, drug-eluting balloon encapsulating non-crystalline sirolimus embedded in biodegradable polymer micro-reservoirs to achieve a sustained sirolimus release out to 90 days and allow for a low drug dose concentration on the balloon surface (1 $\mu\text{g}/\text{mm}^2$).

Methods: PRESTIGE was a pilot, prospective, non-randomized, single-arm, multi-investigator, single-center clinical study enrolling 25 patients with critical limb ischemia (CLI), treating TASC II C & D tibial occlusive lesions. SUCCESS PTA is a real-world, prospective, multi-center, single-arm, post-market surveillance study for the treatment of de novo/restenotic lesions in the superficial femoral artery, popliteal, tibial, and/or pedal arteries that will enroll over 700 patients. The primary endpoint of the study is freedom from clinically driven target lesion revascularization at 1 year. Currently, around 200 patients have been enrolled. SELUTION4BTK is a prospective randomized clinical trial to assess SELUTION SLR vs plain (uncoated) balloons treating below-the-knee (BTK) lesions in patients with CLI.

Results: In the PRESTIGE trial, baseline demographics included 68.0% males, and a mean age of 63.7 ± 9.7 years. TASC II D lesions numbered 15 (45.5%), and mean lesion length treated was 19 ± 11 cm. At the 24-month time point, amputation-free survival was 19 of 24 (79.2%); four deaths and one major lower extremity amputation) and freedom from clinically driven target lesion revascularization was 22 of 25 (88.0%). Mean Rutherford score improved from 5.00 at baseline to 1.42 ± 2.1 ($P < .05$) at 18 months. Wound healing rate was 18 of 22 (81.8%). The SUCCESS registry continues to enroll, and first data is now expected. Enrollment in SELUTION4BTK began in 2022.