

Arthroplasty after previous surgery: previous vascular problems



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Introduction

- Chronic lower extremity arterial insufficiency may exist in 2% of patients undergoing TKA
- Acute peripheral arterial occlusion after TKA has been reported in only 0.03% to 0.17%
- The risk of vascular problems is higher in patients with preexistent vascular insufficiency as exhibited by leg claudication, atherosclerosis, prior coronary bypass surgery, and decreased distal pulses.



Calligaro KD, et al. *J Vasc Surg* 2003
Nachbur B, et al. *Clin Orthop Relat Res* 1979
Rand JA et al. *J Arthroplasty* 1987
Barrack RL et al. *Instr Course Lect* 2003
Barrack RL et al. *J Arthroplasty* 2004
Smith DE, et al. *J Am Acad Orthop Surg* 2001

Vessel injury during TKA

- Indirect vessel injury is the most common mechanism for vascular injury during TKA:
 - mechanical stretching
 - compression
 - thermal injury from cement
- Direct vessel injury is caused by a penetrating instrument and results in a popliteal artery laceration and eventual thrombosis

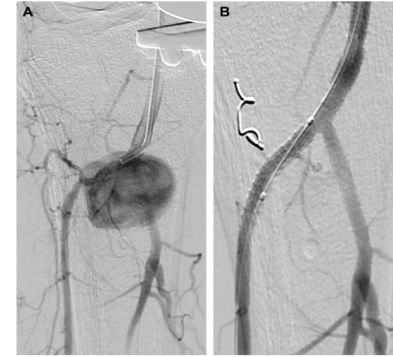
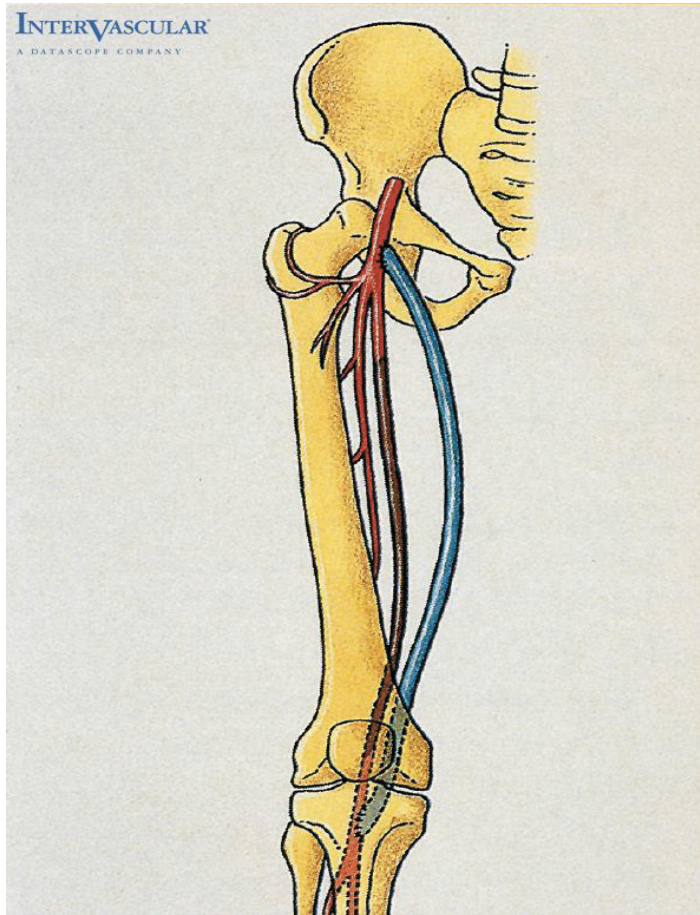


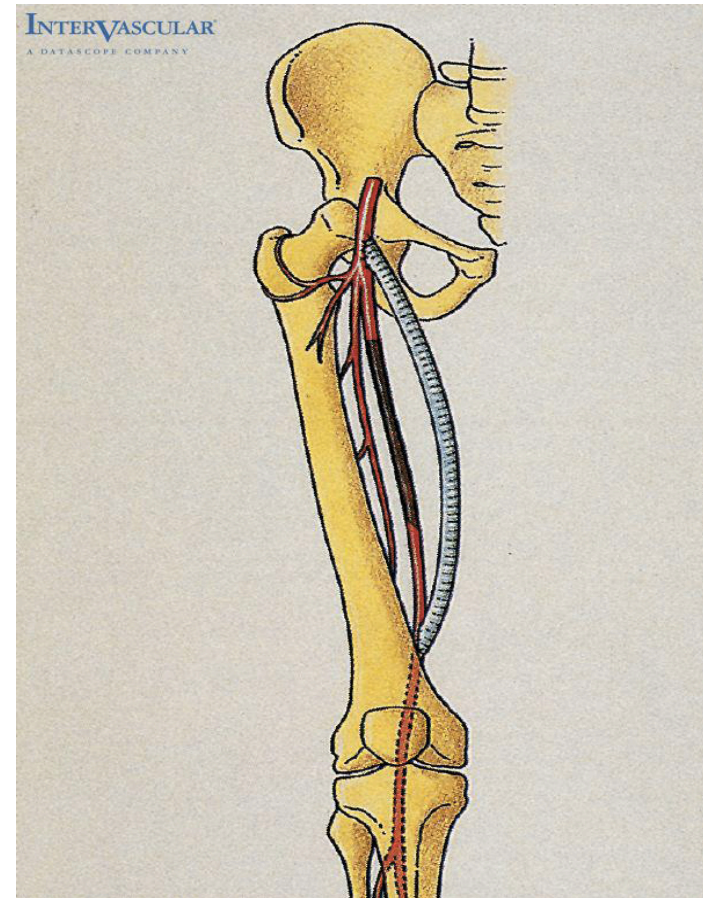
Fig. A, Pseudoaneurysm arising from anterior tibial artery after total knee arthroplasty (TKA). B, Result after coil embolization and stent graft placement.

Calligaro KD, et al. *J Vasc Surg* 2003
Hirsch SA, et al. *Arch Surg* 1976
Kumar SN, et al. *J Arthroplasty* 1998

Arterial bypass graft

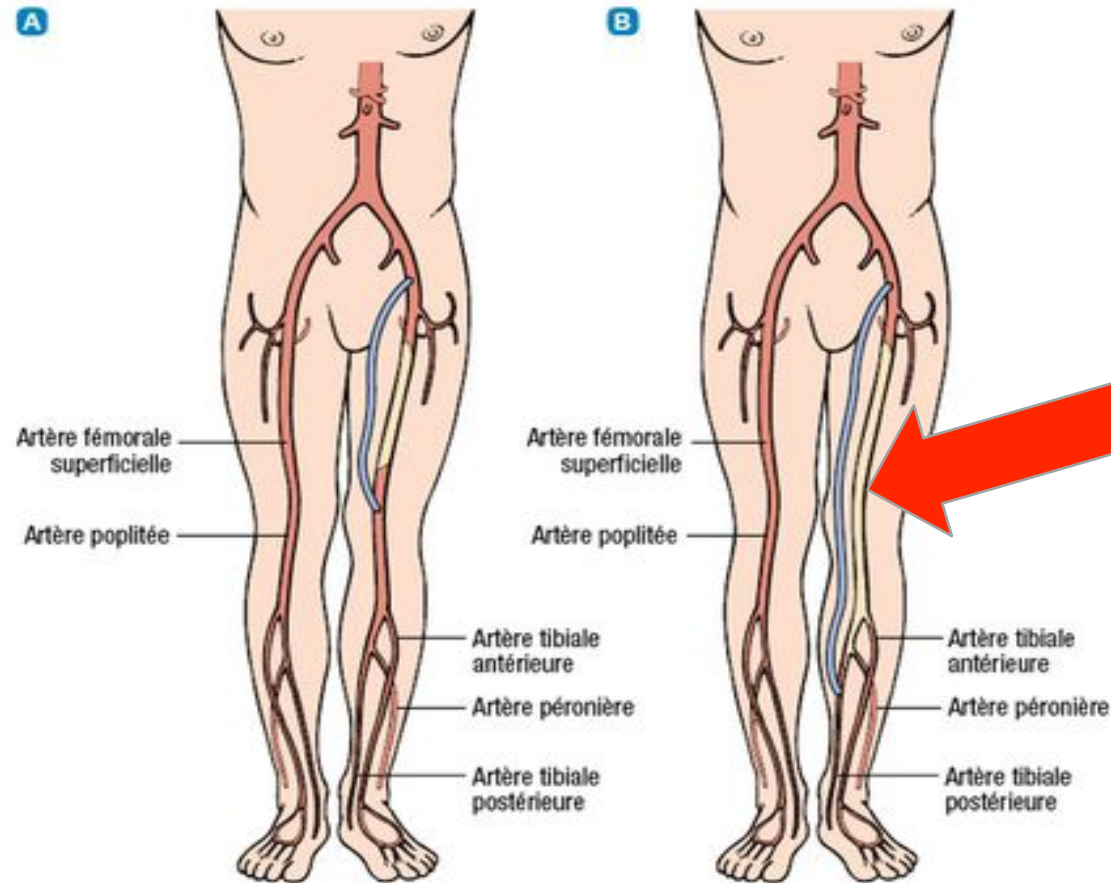


Venous graft



Synthetic graft

Arterial bypass graft



Femoro-popliteal
arterial bypass

Femoro-tibialis posterior
arterial bypass

TKA after arterial bypass graft

- Rand et al. published 1 case of acute occlusion of an external iliac-to-anterior tibial bypass graft after an ipsilateral TKA. That patient failed to improve after a thrombectomy, then had a below-knee amputation.

Rand J.A et al. J Arthrop 1987

- DeLaurentis et al. reported 1 case of acute occlusion of a previously patent femoral-popliteal bypass graft after ipsilateral TKA

DeLaurentis D.A. et al. Am J Surg 1992

TKA after arterial bypass graft

Aller à la page suivante **Total Knee Arthroplasty After Ipsilateral
Peripheral Arterial Bypass Graft**

Acute Arterial Occlusion Is a Risk With or Without
Tourniquet Use

Norman S. Turner, III, MD, Mark W. Pagnano, MD, and Franklin H. Sim, MD

The Journal of Arthroplasty Vol. 16 No. 3 2001

Retrospective review of the total joint registry at the Mayo Clinic

- 19,808 consecutive TKAs between 1970 to 1997
- 9 patients had a TKA after an ipsilateral peripheral arterial reconstruction
- 1 patient had bilateral peripheral arterial reconstruction followed by bilateral TKA

TKA after arterial bypass graft

Analyse of

- the type of peripheral bypass surgery performed
- the bypass graft source
- the timing of the bypass surgery relative to TKA
- the use of a tourniquet at the time of TKA
- the occurrence of complications after TKA

Table 1. Data on Total Knee Arthroplasty in Patients With Prior Ipsilateral Arterial Bypass Surgery

Patient No.	Age/ Sex	Diagnosis	Bypass Type	Graft Type	Bypass Time Prior TKA (y)	Tourniquet	Tourniquet Time (min)	Follow-Up Time (y)	Complication	Operative Time (min)	Initial Anticoagulation
1	69/M	OA	Right femoral-popliteal bypass	Weave knit graft	1.0	No	0	1.0	None	135	Aspirin
2	64/F	OA	Left external iliac-to-left anterior tibial bypass	Gore-Tex	1.17	No	0	4.92	Thrombosis, BKA	120	Warfarin
3	75/M	OA— bilateral	Right suprapopliteal-to-infrapopliteal bypass Left femoral-popliteal bypass	Reverse saphenous	10.17	Right, yes Left, yes	28 25	2.0	None	313	Warfarin
4	70/M	OA	Right femoral-popliteal bypass	<i>In situ</i> saphenous	0.17	Yes	94	2.17	None	130	Warfarin
5	58/M	Painful loose TKA	Right femoral-to-left popliteal bypass	Gore-Tex	2.75	No	0	0.92	None	147	Warfarin
6	77/M	Painful loose TKA	Left femoral-to-popliteal bypass	<i>In situ</i> saphenous	1.58	Yes	156	0.25	None	224	Aspirin
7	78/M	OA	Right femoral-to-popliteal bypass	Gore-Tex	0.25	No	0	2.08	None	143	Warfarin
8	83/M	OA	Left femoral-to-popliteal bypass	Dacron	1.17	Yes	18	1.0	Thrombosis	148	Heparin in recovery room Warfarin
9	79/M	OA	Right femoral-to-popliteal bypass	Dacron	21.83	Yes	96	3.17	None	115	Warfarin

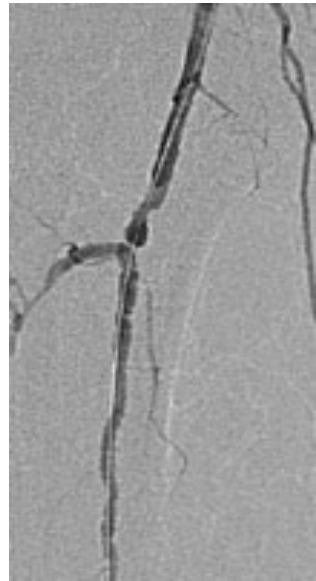
TKA, total knee arthroplasty; OA, osteoarthritis; BKA, below-knee amputation.

TKA after arterial bypass graft

- Incidence of TKA subsequent to ipsilateral bypass graft is 0.0005 (10/19,808)
- Of the 10 TKAs, 2 patients had acute arterial occlusion: one patient had a tourniquet, and the other patient did not
- No statistical correlation between graft type, tourniquet use, timing of surgery, postoperative anticoagulation, and occurrence of arterial occlusion.

TKA after arterial bypass graft

- Marked risk of acute thrombosis of an ipsilateral arterial bypass graft after TKA that cannot be eliminated by performing the TKA without a tourniquet.
- Careful monitoring of the vascular status of the limb is required in the early postoperative period to detect arterial compromise.
- If limb ischemia is suspected, an emergent vascular surgery consultation is required, and arterial flow to the lower extremity must be re-established.



How to manage patients?

- The management of the patient who is a candidate for TKA and lower extremity arterial bypass is controversial.
- DeLaurentis et al. recommended that if the ischemia is moderate, with an ankle-brachial index > 0.5
 - TKA should precede arterial reconstruction.
- When the degree of ischemia is severe ($ABI < 0.5$) or if femoropopliteal arterial calcification or popliteal aneurysm is present
 - Arterial reconstruction should precede TKA

DeLaurentis D.A. et al. *Am J Surg* 1992



How to manage patients?

Calligaro et al. suggested that in patients with severe ischemia, TKA be performed first, followed by operative angiogram and emergent revascularization if MI developed after TKA.

→ That protocol was employed in 2 patients, both of whom did require emergent revascularization after TKA.

■ This approach demands close cooperation with a vascular surgeon preoperatively and immediately postoperatively.

■ The effect of the emergent revascularization on post-operative rehabilitation and the functional results of those TKAs were not reported.

Mayo protocol

■ Pre-op:

- The graft first is evaluated with preoperative US to identify any occult stenosis that could predispose to thrombosis.
- If US shows occlusion or stenosis, an angiogram and vascular surgical consultation is obtained.

■ At surgery:

- A small dose of heparin (2,500 U) is injected intravenously before tourniquet inflation
- An additional 1,000 U of heparin is used if the tourniquet is inflated for >1h

■ Post-op:

- ✧ The patient is examined carefully for ischemia and is anticoagulated for 4 weeks using low-dose warfarin with a goal INR of 1.8 to 2.0 for 4 weeks.

Pulseless extremity after TKA

- Pulseless extremity may be due to:

- Vascular injury
- Reversible arterial spasm
- Tight dressing
- Absent pulse pre-op.



- In case of pulseless extremity:

- Release of the dressing and monitoring of the patient
- If pulse fails to return within minutes or cannot be picked up by Doppler, then emergent vascular consult is sought.

- A warm ischemia time interval of less than 6 hours is generally the accepted period within which arterial continuity must be restored to avoid permanent soft tissue damage

Conclusion

- Vascular status must be checked before TKA
- In case of arterial insufficiency, vascular surgeon consultation must be done before TKA to determine if TKA or if revascularization is first
- For TKA after arterial bypass, the "Mayo Clinic" protocol should be used and tourniquet avoided
- Careful clinical exam after TKA with a high degree of suspicion to detect vascular complications

Mark your calendar

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16th **ESSKA** Congress

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