

Utilization and Outcomes of Local Anesthesia and Peripheral Nerve Block for Hybrid Lower Extremity Revascularization

Arash Fereydooni et al. *J Endovasc Ther.* 2020;27(1).

Appendix 1. List of All Open Surgery and Endovascular Procedure CPT Codes Considered for Data Selection.

| Procedure | CPT Code |
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| Open Surgery | |
| <i>Thromboendarterectomy Aortoiliac</i> | |
| abdominal aorta | 35331 |
| iliac | 35351 |
| combined aortoiliac | 35361 |
| combined aortoiliofemoral | 35363 |
| <i>Thromboendarterectomy Femoral-popliteal</i> | |
| common femoral | 35371 |
| deep (profunda) femoral | 35372 |
| iliofemoral | 35355 |
| superficial femoral artery | 35302 |
| popliteal artery | 35303 |
| <i>Thromboendarterectomy Tibial</i> | |
| tibioperoneal trunk artery | 35304 |
| tibial or peroneal artery, initial vessel | 35305 |
| each additional tibial or peroneal procedure | (+) 35306 |
| <i>Bypass Graft Aortoiliac</i> | |
| Axillary-femoral | 35521 |
| Axillary-femoral (synthetic graft) | 35621 |
| Axillary-femoral-femoral | 35533 |
| Axillary-femoral-femoral (synthetic graft) | 35654 |
| Axillary-popliteal or -tibial | 35623 |
| Aortoiliac | 35537 |
| Aortoiliac (synthetic graft) | 35637 |
| Aortobi-iliac | 35538 |
| Aortobi-iliac (synthetic graft) | 35638 |
| Aortofemoral | 35539 |
| Aortofemoral (synthetic graft) | 35647 |
| Aortobifemoral | 35540 |
| Aortobifemoral (synthetic) | 35646 |
| Aortobifemoral prosthesis after unsuccessful endovascular repair) | 34832 |

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| Femoral-femoral | 35558 |
| Femoral-femoral (synthetic graft) | 35661 |
| Ilioiliac | 35563 |
| Ilioiliac (synthetic graft) | 35663 |
| Iliofemoral | 35565 |
| Iliofemoral(synthetic graft) | 35665 |
| Aortoiliofemoral, unilateral | 35548 |
| Aortoiliofemoral (synthetic graft) | 35549 |
| Aortofemoral-popliteal | 35551 |
| Aortofemoral-popliteal (synthetic graft) | 35651 |
| <i>Bypass Graft Femoral-popliteal</i> | |
| Femoral-popliteal | 35556 |
| Femoral-popliteal (vein conduit in-situ) | 35583 |
| Femoral-popliteal (synthetic graft) | 35656 |
| <i>Bypass Graft Femoral-popliteal-tibial</i> | |
| Femoral-anterior tibial, posterior tibial, peroneal artery or other distal vessels | 35566 |
| Femoral-anterior tibial, posterior tibial, peroneal artery (in-situ vein) | 35585 |
| Femoral-anterior tibial, posterior tibial, peroneal artery (synthetic graft) | 35666 |
| <i>Bypass Graft Tibial</i> | |
| Tibial-tibial, peroneal-tibial, or tibial/peroneal trunk-tibial | 35570 |
| popliteal-tibial, -peroneal artery or other distal vessels | 35571 |
| popliteal-tibial, -peroneal artery (in-situ vein) | 35587 |
| popliteal-tibial, -peroneal artery (synthetic graft) | 35671 |
| | |
| Endovascular Surgery | |
| <i>Endovascular Aortoiliac</i> | |
| iliac artery angioplasty | 37220 |
| iliac artery stent placement and angioplasty | 37221 |
| iliac and additional ipsilateral iliac vessel angioplasty | 37222 |
| iliac and additional ipsilateral iliac vessel stent placement and angioplasty | 37223 |
| Aortic angioplasty (open) | 35452 |
| Aortic angioplasty (percutaneous) | 35472 |
| Aortic atherectomy (open) | 35481 |
| Aortic atherectomy (percutaneous) | 35491 |
| iliac angioplasty (open) | 35454 |
| iliac atherectomy (open) | 35482 |
| iliac angioplasty (percutaneous) | 35473 |
| iliac atherectomy (percutaneous) | 35492 |

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| <i>Endovascular Femoral-popliteal</i> | |
| femoral, popliteal angioplasty | 37224 |
| femoral, popliteal atherectomy and angioplasty | 37225 |
| femoral, popliteal stent placement and angioplasty | 37226 |
| femoral, popliteal stent placement and atherectomy and angioplasty | 37227 |
| femoral-popliteal angioplasty (open) | 35456 |
| femoral-popliteal atherectomy (open) | 35483 |
| femoral-popliteal angioplasty (percutaneous) | 35474 |
| femoral-popliteal atherectomy (percutaneous) | 35493 |
| <i>Endovascular Tibial</i> | |
| tibial, peroneal, unilateral angioplasty | 37228 |
| tibial, peroneal atherectomy and angioplasty | 37229 |
| tibial, peroneal stent placement and angioplasty | 37230 |
| tibial, peroneal stent placement, atherectomy, and angioplasty | 37231 |
| tibial, peroneal and additional vessel angioplasty | (+) 37232 |
| tibial, peroneal and additional vessel atherectomy and angioplasty | (+) 37233 |
| tibial, peroneal and additional vessel angioplasty and stent placement | (+) 37234 |
| tibial, peroneal and additional vessel angioplasty, stent placement and atherectomy | (+) 37235 |
| tibioperoneal trunk and branches angioplasty (open) | 35459 |
| tibioperoneal trunk and branches angioplasty (percutaneous) | 35470 |
| tibioperoneal trunk and branches atherectomy (open) | 35485 |
| tibioperoneal trunk and branches atherectomy (percutaneous) | 35495 |

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Appendix 2. ICD-9 Code Categorization Into 3 Peripheral Artery Disease (PAD) Groups.

| ICD-9 Codes Categorized as CLTI: | |
|----------------------------------|---|
| 440.22 | Atherosclerosis of native arteries of the extremities with rest pain |
| 440.23 | Atherosclerosis of native arteries of the extremities with ulceration |
| 440.24 | Atherosclerosis of native arteries of the extremities with gangrene |
| 681.1 | Unspecified cellulitis and abscess of toe |
| 682.2 | Cellulitis and abscess of trunk |
| 682.6 | Cellulitis and abscess of leg except foot |
| 682.7 | Cellulitis and abscess of foot except toes |
| 682.9 | Cellulitis and abscess of unspecified sites |
| 686.9 | Unspecified local infection of skin and subcutaneous tissue |
| 707 | Chronic ulcer of skin |
| 707.07 | Decubitus ulcer heel |
| 707.1 | Ulcer of lower limb except decubitus |
| 707.1 | Unspecified ulcer of lower limb |
| 707.11 | Ulcer of thigh |
| 707.12 | Ulcer of calf |
| 707.13 | Ulcer of ankle |
| 707.14 | Ulcer of heel and midfoot |
| 707.15 | Ulcer of other part of foot |
| 707.19 | Ulcer of other part of lower limb |
| 707.8 | Chronic ulcer of other specified sites |
| 707.9 | Chronic ulcer of unspecified site |
| 730.05 | Acute osteomyelitis involving pelvic region and thigh |
| 730.06 | Acute osteomyelitis involving lower leg |
| 730.07 | Acute osteomyelitis involving ankle and foot |
| 730.08 | Acute osteomyelitis involving other specified sites |
| 730.16 | Chronic osteomyelitis involving lower leg |
| 730.17 | Chronic osteomyelitis involving ankle and foot |
| 730.18 | Chronic osteomyelitis involving other specified sites |
| 730.2 | Unspecified osteomyelitis site unspecified |
| 730.25 | Unspecified osteomyelitis involving pelvic region and thigh |
| 730.26 | Unspecified osteomyelitis involving lower leg |
| 730.27 | Unspecified osteomyelitis involving ankle and foot |

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| 730.28 | Unspecified osteomyelitis involving other specified sites |
| 730.29 | Unspecified osteomyelitis involving multiple sites |
| 730.8 | Other infections involving bone in diseases classified elsewhere |
| 785.4 | Gangrene |
| 785.5 | Shock without mention of trauma |
| 879.9 | Open wound(s) (multiple) of unspecified site(s) complicated |
| 890 | Open wound of hip and thigh without complication |
| 890.1 | Open wound of hip and thigh complicated |
| 891 | Open wound of knee leg (except thigh) and ankle without complication |
| 891.1 | Open wound of knee leg (except thigh) and ankle complicated |
| 892 | Open wound of foot except toe(s) alone without complication |
| 892.1 | Open wound of foot except toe(s) alone complicated |
| 892.2 | Open wound of foot except toe(s) alone with tendon involvement |
| 894 | Multiple and unspecified open wound of lower limb without complication |
| 894.1 | Multiple and unspecified open wound of lower limb complicated |
| 998.83 | Non-healing surgical wound |
| ICD-9 code for Intermittent Claudication | |
| 440.21 | Atherosclerosis of native arteries of the extremities with intermittent claudication |
| ICD-9 Codes Categorized as PAD Not Otherwise Specified | |
| 249.7 | Secondary diabetes mellitus with peripheral circulatory manifestation not stated as uncontrolled or unspecified |
| 249.71 | Secondary diabetes mellitus with peripheral circulatory manifestation uncontrolled |
| 250.7 | Diabetes with peripheral circulatory disorders type II or unspecified type not stated as uncontrolled |
| 250.71 | Diabetes with peripheral circulatory disorders type I (juvenile type) not stated as uncontrolled |
| 250.72 | Diabetes with peripheral circulatory disorders type II or unspecified type uncontrolled |
| 250.73 | Diabetes with peripheral circulatory disorders type I (juvenile type) uncontrolled |
| 440 | Atherosclerosis |
| 440.2 | Atherosclerosis of native arteries of the extremities |
| 440.29 | Other atherosclerosis of native arteries of the extremities |
| 440.3 | Atherosclerosis of unspecified bypass graft of the extremities |
| 440.31 | Atherosclerosis of autologous vein bypass graft of the extremities |
| 440.32 | Atherosclerosis of nonautologous biological bypass graft of the extremities |
| 440.4 | Chronic total occlusion of artery of the extremities |
| 440.8 | Atherosclerosis of other specified arteries |

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| 440.9 | Generalized and unspecified atherosclerosis |
| 443 | Other peripheral vascular disease |
| 443.8 | Other specified peripheral vascular diseases |
| 443.81 | Peripheral angiopathy in diseases classified elsewhere |
| 443.89 | Other peripheral vascular disease |
| 443.9 | Peripheral vascular disease unspecified |
| 444 | Arterial embolism and thrombosis |
| 444 | Arterial embolism and thrombosis of abdominal aorta |
| 444.01 | Saddle embolus of abdominal aorta |
| 444.09 | Other arterial embolism and thrombosis of abdominal aorta |
| 444.1 | Embolism and thrombosis of thoracic aorta |
| 444.2 | Embolism and thrombosis of arteries of the extremities |
| 444.21 | Arterial embolism and thrombosis of upper extremity |
| 444.22 | Arterial embolism and thrombosis of lower extremity |
| 444.8 | Embolism and thrombosis of other specified artery |
| 444.81 | Embolism and thrombosis of iliac artery |
| 444.89 | Embolism and thrombosis of other artery |
| 444.9 | Embolism and thrombosis of unspecified artery |
| 445 | Atheroembolism of extremities |
| 445.02 | Atheroembolism of lower extremity |
| 445.89 | Atheroembolism of other site |
| 447.1 | Stricture of artery |
| 459 | Other disorders of circulatory system |
| 459.8 | Other specified disorders of circulatory system |
| 459.89 | Other specified circulatory system disorders |
| 459.9 | Unspecified circulatory system disorder |
| 707.23 | Pressure ulcer stage III |
| 707.25 | Pressure ulcer unstageable |
| 729.5 | Pain in limb |
| 729.82 | Cramp of limb |
| 729.89 | Other musculoskeletal symptoms referable to limbs |
| 997.7 | Vascular complications of other vessels |
| 997.79 | Vascular complications of other vessels |
| 998.3 | Disruption of wound unspecified |

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Appendix 3. ICD-10 Code Categorization Into 3 Peripheral Artery Disease (PAD) Groups.

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|----------------------------------|---|
| I70.212 | Athscl native art of extrm w intrmt claud l leg |
| I70.213 | Athscl native art extrm w intrmt claud bi legs |
| I70.312 | Athscl unsp tp byp of extrm w intrmt claud l leg |
| I70.211 | Athscl native art of extrm w intrmt claud r leg |
| I70.313 | Athscl usp tp byp extrm w intrmt claud bi legs |
| I70.411 | Athscl autol vein byp extrm w intrmt claud r leg |
| I70.218 | Athscl native art extrm w intrmt claud ot extrm |
| I70.713 | Athscl tp of byp of extrm w intrmt claud bi legs |
| I70.412 | Athscl autol vein byp extrm w intrmt claud l leg |
| I70.219 | Athscl native art extrm w intrmt claud usp extrm |
| I70.311 | Athscl unsp tp byp of extrm w intrmt claud r leg |
| I70.612 | Athscl nonbiol byp of extrm w intrmt claud l leg |
| I70.712 | Athscl type of byp of extrm w intrmt claud l leg |
| I70.21 | Athscl native art of extrem w intermittent claud |
| I70.511 | Athscl nonaut bio bypass of extrm w intrmt claud, right leg |
| ICD-10 Codes Categorized as CLTI | |
| I70.222 | Athscl native art of extrem w rest pain left leg |
| I70.221 | Athscl native art of extrm w rest pain right leg |
| I70.223 | Athscl native art of extrm w rest pain bi legs |
| I70.245 | Athscl native art of left leg w ulc oth prt foot |
| I70.243 | Athscl native art of left leg w ulcer of ankle |
| I70.262 | Athscl native art of extrem w gangrene left leg |
| I70.263 | Athscl native art of extrm w gangrene bi legs |
| I70.238 | Athscl natv art of r leg w ulc oth prt low r leg |
| I70.235 | Athscl native art of r leg w ulcer oth prt foot |
| I70.232 | Athscl native art of right leg w ulcer of calf |
| I70.22 | Athscl native arteries of extrem w rest pain |
| E11.52 | Type 2 dbt w diab periph angiopath w gangrene |
| I70.269 | Athscl native art of extrm w gangr unsp extrem |
| I70.261 | Athscl native art of extrem w gangrene right leg |
| I70.244 | Athscl native art of l leg w ulc of heel & midft |

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| T87.43 | Infection amputation stump right lower extremity |
| I70.234 | Athscl native art of r leg w ulc of heel & midft |
| I96 | Gangrene, not elsewhere classified |
| I70.239 | Athscl native art of r leg w ulcer of unsp site |
| I70.629 | Athscl nonbiol byp extrm w rest pain usp extrm |
| L03.115 | Cellulitis of right lower limb |
| M86.171 | Other acute osteomyelitis, right ankle and foot |
| I70.229 | Athscl native art of extrm w rest pain usp extrm |
| I70.321 | Athscl unsp type byp of extrm w rest pain r leg |
| E11.621 | Type 2 diabetes mellitus with foot ulcer |
| I70.248 | Athscl native art of l leg w ulc ot prt lo l leg |
| I70.25 | Athscl native arteries of extrem w ulceration |
| I70.421 | Athscl autol vein byp of extrm w rest pain r leg |
| L97.929 | Non-prs chr ulc usp prt of l lo leg w usp severt |
| I70.249 | Athscl native art of left leg w ulc of unsp site |
| I70.24 | Aths of native arteries of left leg w ulceration |
| I70.362 | Athscl unsp type byp of extrm w gangr left leg |
| A41.9 | Sepsis, unspecified organism |
| I70.228 | Athscl native art of extrm w rest pain oth extrm |
| I70.461 | Athscl autol vein byp of extrm w gangr right leg |
| I70.334 | Athscl unsp tp byp of r leg w ulc of heel&midft |
| I70.268 | Athscl native art of extrm w gangrene oth extrem |
| M86.9 | Osteomyelitis, unspecified |
| I70.242 | Athscl native art of left leg w ulcer of calf |
| E10.52 | Type 1 dbt w diab periph angiopath w gangrene |
| I70.233 | Athscl native art of right leg w ulcer of ankle |
| I70.322 | Athscl unsp type byp of extrm w rest pain l leg |
| I70.23 | Aths of native arteries of right leg w ulcer |
| E11.622 | Type 2 diabetes mellitus with other skin ulcer |
| I70.628 | Athscl nonbiol byp of extrm w rest pain ot extrm |
| L03.116 | Cellulitis of left lower limb |
| E13.51 | Oth dbt w diabetic periph angiopath w/o gangrene |
| I70.721 | Athscl type of byp of extrm w rest pain r leg |
| I70.335 | Athscl unsp type byp of r leg w ulc oth prt foot |
| E10.51 | Type 1 dbt w diab periph angiopath w/o gangrene |
| S91.109A | Unsp open wnd of unsp toe w/o damag to nail init |
| M79.671 | Pain in right foot |
| L97.529 | Non-pressure chronic ulcer oth prt left foot w unsp severity |
| L97.423 | Non-prs chr ulcer of left heel and midfoot w necros muscle |

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| I70.462 | Athscl autol vein bypass of the extrm w gangrene, left leg |
| L97.514 | Non-prs chronic ulcer oth prt right foot w necrosis of bone |
| I70.361 | Athscl unsp type bypass of the extrm w gangrene, right leg |
| A41.50 | Gram-negative sepsis, unspecified |
| L97.509 | Non-pressure chronic ulcer oth prt unsp foot w unsp severity |
| T87.44 | Infection of amputation stump, left lower extremity |
| L98.499 | Non-pressure chronic ulcer of skin of sites w unsp severity |
| A41.52 | Sepsis due to Pseudomonas |
| I70.639 | Athscl nonbiol bypass of the right leg w ulcer of unsp site |
| I70.323 | Athscl unsp type bypass of the extrm w rest pain, bi legs |
| L97.919 | Non-prs chronic ulc unsp prt of r low leg w unsp severity |
| L97.329 | Non-pressure chronic ulcer of left ankle with unsp severity |
| L97.909 | Non-prs chronic ulc unsp prt of unsp low leg w unsp severity |
| I70.645 | Athscl nonbiol bypass of the left leg w ulcer oth prt foot |
| I70.363 | Athscl unsp type bypass of the extrm w gangrene, bi legs |
| I70.621 | Athscl nonbiol bypass of the extrm w rest pain, right leg |
| I70.231 | Athscl native arteries of right leg w ulceration of thigh |
| I70.522 | Athscl nonaut bio bypass of the extrm w rest pain, left leg |
| I70.444 | Athscl autol vein bypass of left leg w ulc of heel and midft |
| ICD-10 Codes Categorized as PAD Not Otherwise Specified | |
| E11.69 | Type 2 diab mel with other specified compl |
| I73.9 | Peripheral vascular disease, unspecified |
| I70.92 | Chronic total occlusion of artery of the extrem |
| T82.868A | Thrombosis of vascular prosth dev/grft, init |
| I74.5 | Embolism and thrombosis of iliac artery |
| I70.203 | Unsp athscl native arteries of extrem bi legs |
| I74.9 | Embolism and thrombosis of unspecified artery |
| I99.8 | Other disorder of circulatory system |
| I74.3 | Mblsm and thrombosis of art of the lower extrem |
| I70.8 | Atherosclerosis of other arteries |
| T82.858A | Stenosis of vascular prosth dev/grft, init |
| I70.202 | Unsp athscl native arteries of extrem left leg |
| I74.09 | Other arterial mblsm and thrombosis of abd aorta |
| I73.89 | Other specified peripheral vascular diseases |
| I75.022 | Atheroembolism of left lower extremity |
| I70.201 | Unsp athscl native arteries of extrem right leg |
| E11.51 | Type 2 dbt w diab periph angiopath w/o gangrene |
| I77.1 | Stricture of artery |
| R09.89 | Oth symp&signs involving the circ&resp systems |

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| I70.209 | Unsp athscl native art of extrem unsp extrem |
| I70.0 | Atherosclerosis of aorta |
| I70.90 | Unspecified atherosclerosis |
| I74 | Arterial embolism and thrombosis |
| I70.701 | Unsp athscl type of byp of the extrem right leg |
| I70.293 | Oth athscl native arteries of extrem bi legs |
| I77.9 | Disorder of arteries and arterioles, unspecified |
| I75.02 | Atheroembolism of lower extremity |
| I70.299 | Oth athscl native arteries of extrem unsp extrem |
| I70.292 | Oth athscl native arteries of extrem left leg |
| I70.402 | Unsp athscl autol vein byp of the extrm left leg |
| I73 | Other peripheral vascular diseases |
| I74.8 | Embolism and thrombosis of other arteries |
| T82.818A | Embolism of vascular prosth dev/grft, init |
| E11.5 | Type 2 diab mel with circulatory complications |
| I79.8 | Oth disord of art,arterioles&capilare in dis c/e |
| I70.301 | Unsp athscl unsp type byp of the extrm right leg |
| I70.291 | Oth athscl native arteries of extrem right leg |
| I70.9 | Other and unspecified atherosclerosis |
| I70.2 | Aths of native arteries of the extremities |
| T82.8 | Oth comp of cardiac and vascular prosth dev/grft |
| I73.8 | Other specified peripheral vascular diseases |
| I70.20 | Unsp aths of native arteries of extremities |
| I74.10 | Embolism and thrombosis of usp parts of aorta |
| T82.868 | Thrombosis due to vascular prosth dev/grft |
| I77.89 | Other specified disorders of arteries and arterioles |
| I70.502 | Unsp athscl nonaut bio bypass of the extremities, left leg |
| I74.0 | Embolism and thrombosis of abdominal aorta |
| I70.208 | Unsp athscl native arteries of extremities, oth extremity |
| I99.9 | Unspecified disorder of circulatory system |
| T82.856A | Stenosis of peripheral vascular stent, initial encounter |
| I74.4 | Embolism and thrombosis of arteries of extremities, unsp |
| I75.021 | Atheroembolism of right lower extremity |
| I70 | Atherosclerosis |
| I70.491 | Oth athscl autologous vein bypass of the extrm, right leg |
| I13.2 | Hyp hrt & chr kdny dis w hrt fail and w stg 5 chr kdny/ESRD |
| I74.01 | Saddle embolus of abdominal aorta |
| I13.0 | Hyp hrt & chr kdny dis w hrt fail and stg 1-4/unsp chr kdny |