External Iliac Artery as Inflow Source Offers Excellent Patency with Less Pulmonary Complications for Inflow Reconstructions

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Introduction:

Iliac artery to femoral artery bypass has been shown to have superior patency when compared to using a femoral or axillary artery as inflow. Higher flow volumes in the common iliac artery (CIA) versus an external iliac artery (EIA) may provide improved patency secondary to larger size and more direct flow from the aorta, however, there may be postoperative complications related to the more extensive operative exposure. The purpose of this study is to compare outcomes of CIA- and EIA-based inflow bypasses to those from the femoral artery.

Methods:

A single hospital-based vascular surgery division surgical management system was queried for iliac to femoral artery bypasses from 2017-2021. The CIA and EIA groups' demographics, indications, operative details, and outcomes were tabulated and compared using standard statistics.

Results:

Figure 1

demographics

	CIA inflow		EIA inflow		TOTAL		p val
	#	%	#	%	#	%	
Total proce	40		191		231		
male	25	62.50%	131	68.59%	156	67.53%	0.45
female	15	37.50%	60	31.41%	75	32.47%	0.45
diabetic	13	32.50%	62	32.46%	75	32.47%	1.00
HTN	31	77.50%	132	69.11%	163	70.56%	0.29
CAD	13	32.50%	73	38.22%	86	37.23%	0.50
Smoker	18	45.00%	62	32.46%	80	34.63%	0.38
Ex-smoker	11	27.50%	55	28.80%	66	28.57%	0.87
COPD	5	12.50%	43	22.51%	48	20.78%	0.16
chol	31	77.50%	109	57.07%	140	60.61%	0.02
renal	1	2.50%	7	3.66%	8	3.46%	0.71

231 bypasses were identified (40, 17.3% CIA and 191, 82.2% EIA), of which 25/40 (67.5%) CIA bypasses and 131/191 (62.5%) EIA bypasses were performed on males with a mean age 61 years (range 21-93). Demographics including diabetes, hypertension, coronary artery disease, smoking status, COPD, and chronic kidney disease were similar between groups, except for more hyperlipidemia in CIA group (33, 77.5% vs 109, 57.1% p = 0.01).

Figure 2

indications

Indication	CIA		EIA		Total		
asymptomatic aneurysm	3	7.50%	15	7.85%	18	7.79%	0.94
PSA	1	2.50%	7	3.66%	8	3.46%	0.71
infected aneurysm		0.00%	1	0.52%	1	0.43%	0.65
ruptured aneurysm		0.00%	2	1.05%	2	0.87%	0.52
symptomatic aneurysm		0.00%	6	3.14%	6	2.60%	0.26
thrombosed aneurysm	2	5.00%	2	1.05%	4	1.73%	0.08
bleeding		0.00%	2	1.05%	2	0.87%	0.21
claudication	13	32.50%	22	11.52%	35	15.15%	0.00
dissection	1	2.50%	2	1.05%	3	1.30%	0.46
embolus/thrombus		0.00%	8	4.19%	8	3.46%	0.19
endoleak		0.00%	1	0.52%	1	0.43%	0.65
gangrene	3	7.50%	20	10.47%	23	9.96%	0.57
infected graft	2	5.00%	11	5.76%	13	5.63%	0.85
infection wound	1	2.50%		0.00%	1	0.43%	0.03
NHU	4	10.00%	18	9.42%	22	9.52%	0.91
rest pain	9	22.50%	62	32.46%	71	30.74%	0.21
trauma - blunt		0.00%	1	0.52%	1	0.43%	0.65
trauma - operative		0.00%	5	2.62%	5	2.16%	0.30
trauma - penetrating	1	2.50%	6	3.14%	7	3.03%	0.83

Indications demonstrated more claudicants in CIA group (13, 32.5% vs 22, 11.5% P=.0007). Conduit was mostly PTFE (35, 87.5% CIA vs 170, 89.01% EIA p=.89).

Figure 3

complications

Operative mortality	2	5.00%	6	3.14%	8	3.46%	0.56
Non-fatal complications	**CIA**		**EIA**		**Total**		
compartment syndrome		0.00%	1	0.52%	1	0.43%	0.65
hematoma		0.00%	4	2.09%	4	1.73%	0.36
wound infection	3	7.50%	5	2.62%	8	3.46%	0.12
limb loss - AK		0.00%	2	1.05%	2	0.87%	0.52
lymph leak	1	2.50%	4	2.09%	5	2.16%	0.87
immediate occlusion	1	2.50%	6	3.14%	7	3.03%	0.83
other		0.00%	5	2.62%	5	2.16%	0.30
seroma/lymphocele	1	2.50%	5	2.62%	6	2.60%	0.97
wound dehiscence	1	2.50%	6	3.14%	7	3.03%	0.83
cardiac	2	5.00%	2	1.05%	4	1.73%	0.08
cerebrovascular		0.00%	2	1.05%	2	0.87%	0.52
pulmonary	2	5.00%	1	0.52%	3	1.30%	0.02
readmission w/in 30 days	6	15.00%	23	12.04%	29	12.55%	0.61
renal		0.00%	2	1.05%	2	0.87%	0.52
late occlusion	1	2.50%	10	5.24%	11	4.76%	0.46
stenosis distal outflow		0.00%	1	0.52%	1	0.43%	0.65
stenosis distal vein	1	2.50%	1	0.52%	2	0.87%	0.22
stenosis proximal inflow		0.00%	3	1.57%	3	1.30%	0.42
stenosis proximal vein	1	2.50%	2	1.05%	3	1.30%	0.46
graft infection		0.00%	2	1.05%	2	0.87%	0.52

Subsequent OR	CIA		EIA		Total		
OR for major amp	7	17.50%	13	6.81%	20	8.66%	0.03
OR for minor amp		0.00%	3	1.57%	3	1.30%	0.42
OR for bypass revision	2	5.00%	13	6.81%	15	6.49%	0.67
OR for wound/groin comp	8	20.00%	21	10.99%	29	12.55%	0.12
OR for distal revasc	2	5.00%	18	9.42%	20	8.66%	0.37
OR for direct repair	1	2.50%	2	1.05%	3	1.30%	0.46
REDO/new	4	10.00%	26	13.61%	30	12.99%	0.54
OR for AX unifem	4	10.00%	2	1.05%	6	2.60%	0.00
OR for AX bifem	1	2.50%	2	1.05%	3	1.30%	0.46
OR for aorta unifem	0	0.00%	2	1.05%	2	0.87%	0.52
OR for aorta bifem	1	2.50%	8	4.19%	9	3.90%	0.62
OR for aorta iliac	0	0.00%	1	0.52%	1	0.43%	0.65
EVAR	0	0.00%	3	1.57%	3	1.30%	0.42

Readmission rates (6, 15% vs 23, 12.0% p=0.61) and wound infection rates (3, 7.5% vs 5, 2.6% p=0.12) were similar for CIA and EIA respectively. Perioperative mortality rates were similar for CIA and EIA (2, 5% vs 6, 3.1% P =0.55). Major amputation rates were higher in the CIA group (7, 17.5% vs 13, 6.8% p= .03). Late bypass occlusion rates trended higher in EIA (1, 2.5% vs 10, 5.24% p=.46).

Conclusion:

Iliac artery inflow-based bypasses overall offer excellent results, however there may be an outcome difference between common and external arteries. The common iliac bypasses may require more exposure and may also be indicative of more widespread atherosclerosis. This series suggests that inflow bypass from the external iliac artery is associated with equivalent patency but lower postoperative complication rates.