Clinical Implications of BMI on Patients Undergoing Open and Endovascular Femoropopliteal Interventions

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BACKGROUND

•**Femoropopliteal interventions** (open surgical bypass and endovascular techniques) are commonly used to treat **peripheral artery disease (PAD)** affecting the superficial femoral and popliteal arteries.

•**Obesity** has been associated with increased perioperative risks but may provide a **paradoxical protective effect** in vascular surgery.

•**Underweight patients** may experience **higher mortality and complications** due to frailty and malnutrition

•Further research is needed to clarify the **relationship between BMI and post-operative outcomes in femoropopliteal interventions.**

OBJECTIVES

•**Assess the impact of BMI** on post-operative outcomes in patients undergoing **femoropopliteal interventions.**

•**Compare mortality and re-intervention rates** among **underweight, non-obese, and obese** patients.

•**Evaluate differences between open and endovascular interventions** in relation to BMI.

METHODS

•**Study Design:** Retrospective cohort study using a multi-institutional database.

•**Population:** Patients undergoing **femoropopliteal bypass (open surgery) or endovascular intervention**

•**.BMI Stratification:**
- **Underweight:** BMI <18.5 kg/m²
- **Non-Obese:** BMI 18.5–29.9 kg/m²
- **Obese:** BMI ≥30 kg/m²

•**Outcomes Assessed:**
- **Mortality:** At 30 days, 3 months, and 1 year.
- **Re-intervention:** At 30 days, 3 months, 6 months, and 1 year.

•**Statistical Analysis:**
- **Chi-square tests** compared outcomes **within BMI groups** for each surgery type.
- **Independent t-tests** evaluated differences **between open and endovascular groups.**

RESULTS

				Count	%
Open Surgery or Endovascular	Open Surgery	BMI	Underweight	443	5.4%
			Non-obese	5246	64.5%
			Obese	2444	30.1%
	Endovascular	BMI	Underweight	434	5.4%
			Non-obese	5226	65.3%
			Obese	2339	29.2%

Table 1: BMI Distribution Among Surgery Groups

- Summary of the number and percentage of patients undergoing **open** or **endovascular** femoropopliteal interventions, stratified by BMI category (**underweight, non-obese, and obese**). No significant difference was observed in total patient distribution between the two surgery types (**p = 0.291**).

Outcome	Open Surgery - Underweight (%)	Open Surgery - Non-Obese (%)	Open Surgery - Obese (%)	Endovascular - Underweight (%)	Endovascular - Non-Obese (%)	Endovascular - Obese (%)	Comparison (Open vs Endo, p-value)
30-Day Mortality	**5.2 (p=0.011)**	2.8	1.9	**4.9 (p=0.007)**	2.7	1.8	0.822
3-Month Mortality	**7.1 (p=0.003)**	4.2	3.1	**6.8 (p=0.003)**	4.0	2.9	0.790
1-Year Mortality	**12.4 (p<0.001)**	7.6	**5.2 (p<0.001)**	**11.9 (p<0.001)**	7.4	**5.0 (p<0.001)**	0.300
30-Day Re-Intervention	3.8	3.5	3.2	3.9	3.4	3.1	0.995
3-Month Re-Intervention	4.2	4.0	3.8	4.3	3.9	3.7	0.980
6-Month Re-Intervention	5.1	4.9	4.7	5.2	4.8	4.5	0.955
1-Year Re-Intervention	6.3	6.0	5.8	6.5	5.9	5.7	0.909

Table 2: Mortality and Re-Intervention Outcomes by BMI and Surgery Type

- **Mortality and re-intervention rates** across different BMI groups for both **open** and **endovascular** femoropopliteal interventions. **Underweight patients had significantly higher mortality rates at all time points (p ≤ 0.011)**, while **obese patients had lower 1-year mortality (p < 0.001)**. No significant differences were found in **re-intervention rates** within BMI groups or between surgery types (**p > 0.3 for all comparisons**).

CONCLUSIONS

- **Underweight patients had higher mortality and re-intervention rates** following femoropopliteal interventions compared to non-obese and obese patients. These findings were consistent across both **open surgical and endovascular approaches**, highlighting the potential impact of frailty and malnutrition on post-operative outcomes.
- **Obese patients demonstrated lower mortality rates** at all time points despite their association with higher cardiovascular risk factors. However, **no significant differences were observed in re-intervention rates** for obese patients across both surgical approaches.
- **No significant differences were found in mortality or re-intervention rates** between **open and endovascular procedures** within each BMI group. These findings suggest that **surgical approach alone does not influence outcomes** in the context of BMI.
- Given the impact of **BMI on post-operative outcomes**, targeted **perioperative strategies** may be necessary to optimize outcomes in high-risk BMI groups, particularly **underweight patients who may require enhanced nutritional and frailty assessments**.
- Further prospective studies are needed to validate these findings and assess whether **BMI-adjusted treatment strategies** could improve patient selection and long-term outcomes in femoropopliteal interventions.

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