Impact of BMI on venous thromboembolism and hematoma rates during hospitalization in patients undergoing free flap reconstruction of the head and neck region

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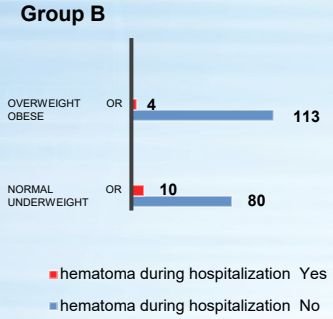
Background: Venous thromboembolism (VTE) is a complication seen in hospitalized patients after free tissue transfer to the head and neck (H&N). A fixed dose of enoxaparin is recommended for thromboprophylaxis, however, differences in enoxaparin metabolism based on patient weight can affect the adequacy and the side effects of prophylactic anticoagulation. In this study, we aimed to assess the impact of body-mass-index (BMI) on postoperative VTE and hematoma rates during hospitalization.

Methods: This is a retrospective cohort study of a prospectively maintained database. The population included patients who underwent H&N reconstruction with free tissue transfer and received standard enoxaparin prophylaxis at 30 mg twice daily while inpatient. Deep vein thrombosis and pulmonary embolism rates were prospectively recorded to calculate VTE rates in this population. In addition, hematoma rates were prospectively calculated for the duration of hospitalization. Patients with a known bleeding disorder and those that received intra- or perioperative heparin drips were excluded. The cohort was divided into two groups based on the presence of pre-operative outpatient anticoagulation use. Each of these two groups were further stratified into two subgroups based on the BMI (BMI≤24.9 as normal-underweight and BMI>24.9 as overweight-obese). Statistical analysis was performed using chi-square and T-tests.

Results: 259 patients were included. The mean BMI of the patients was 26.68±6.01 (range 14.24-49.59). VTE and hematoma rates among all patients were 3.9% and 7.7%, respectively. The mean BMI of patients that developed hematoma was significantly lower than the BMI of the patients that did not develop hematoma (24.13±4.93 vs 26.89±6.05, p=0.048). VTE and hematoma rates in patients with outpatient-anticoagulation (n=52) were 1.9% and 11.5%, respectively. There was no statistically significant difference on VTE and hematoma rates, after stratification based on BMI in this group. VTE and hematoma rates in patients without outpatient-anticoagulation (n=207) were 4.3% and 6.8%, respectively. There was no statistically significant difference in the VTE rate after stratification based on BMI, however, the hematoma rate in normal-underweight patients was significantly higher than overweight-obese patients (11.1% vs 3.4%, p=0.029).

			Hematoma during hospitalization		Total
			No	Yes	
Group B: No preoperative outpatient anticoagulation use	normal or underweight	Count	80	10	90
		Expected Count	83.9	6.1	90.0
		% within Group B	88.9%	11.1%	100.0%
	overweight or obese	Count	113	4	117
		Expected Count	109.1	7.9	117.0
		% within Group B	96.6%	3.4%	100.0%
Total		Count	193	14	207
		Expected Count	193.0	14.0	207.0
			93.2%	6.8%	100.0%



Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.773[a]	1	0.029		

Hematoma during hospitalization	N		Mean		Std. Deviation	
BMI	Yes	20	24.13100		4.928014	
	No	239	26.89464		6.050895	
t-test for Equality of Means						
	t	df	Significance		95% Confidence	
			One-Sided p	Two-Sided p	Lower	Upper
BMI	-1.987	257	0.024	0.048	-5.502567	-0.024721

Conclusion: The enoxaparin dosing at 30 mg twice daily provides adequate thromboprophylaxis to maintain VTE rates under 4% for patients undergoing free flap reconstruction of the H&N. Patients that are normal- or underweight can be susceptible to increased hematoma rates. Monitoring of anti-factor Xa levels could be utilized to prevent over-anticoagulation. Weight-based dosing could potentially provide adequate thromboprophylaxis while avoiding hematoma in normal- or underweight patients.