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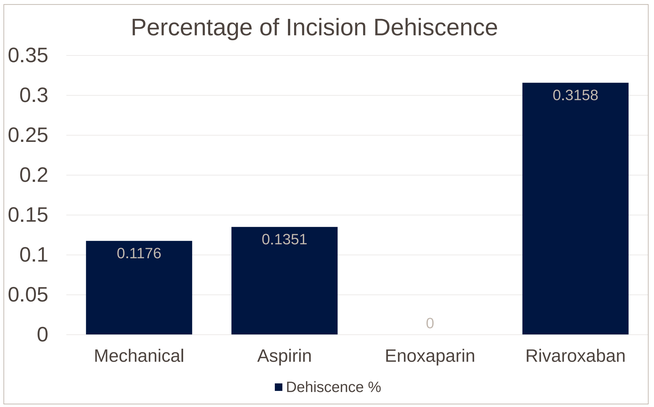
Introduction

Although the risk of a thrombotic event following foot and ankle surgery is lower than other orthopedic procedures, it remains a concern among physicians. The use of venous thromboembolic prophylaxis in foot and ankle surgery remains controversial due to a low prevalence of deep vein thrombosis (DVT) and pulmonary embolism (PE)[1-4]. When the risk for DVT or PE is high, prophylaxis should be considered [2-5]. The purpose of this study is to compare venous thromboembolic prophylactic therapies following a first metatarsocuneiform joint (1st TMTJ) arthrodesis procedure, and specifically look to determine rivaroxaban's affect on wound healing complications in the post-operative period.

Literature Review

There are multiple forms of prophylaxis that can be utilized including mechanical (sequential compression devices (SCDs) and compression stockings) and pharmaceutical prophylaxis, however use of prophylaxis does not come without risks. One potential risk in studies pertaining to hip and knee surgery includes the potential increase in wound healing complications with use of rivaroxaban. Some studies suggest that the use of rivaroxaban for DVT/PE prophylaxis following knee and hip surgery results in increased risk for wound healing complications. Jameson (2012) and Zou (2014) compared effect of Low-Molecular-Weight Heparin with rivaroxaban and both found a significantly higher wound complication rate for those who received rivaroxaban[6-7]. Colleoni (2018) compared use of aspirin with rivaroxaban following knee arthroplasty and found a trend in local wound complications with those taking rivaroxaban but this did not reach statistical significance[8]. However, this potential complication has not been studied in foot and ankle surgery.



Methods

- Retrospective review of consecutive patients who underwent a 1st TMTJ arthrodesis over 2 years.
- The 1st TMTJ arthrodesis procedure was chosen due to similar dissection, fixation techniques and post-operative course between all patients.
- Patients were separated in 4 groups based on venous thromboembolic prophylaxis: Group 1 – Mechanical prophylaxis, Group 2- aspirin, Group 3- enoxaparin, Group 4- rivaroxaban
- Refer to Charts 1 and 2 for data collected
- The main outcome variable was wound healing complications, including dehiscence and infections.
- Statistical Analysis:
  - Cochran-Mantel-Haenszel Chi-Square Analysis was performed to compare categorial variables (gender, smoking status, diabetes, dehiscence and DVT/PE).
  - One-Way Anova Test performed to compare continuous variables (age, BMI).
  - Odds ratio analysis performed to compare prophylactic treatments (groups 2-4) to the mechanical prophylaxis group.

Table 1: Cochran-Mantel-Haenszel Chi-Square Test

		Mechanical	Aspirin	Enoxaparin	Rivaroxaban	Total	Percentages	Chi Square Value
Gender	Male	16	32	7	18	73	87.95%	0.284
	Female	1	5	3	1	10	12.05%	
Smoking Status	Never	12	26	0	11	49	59.04%	0.681
	Quit	5	9	2	5	21	25.30%	
	Current	0	2	8	3	13	15.66%	
Diabetes	No	17	37	9	17	80	96.39%	0.174
	Yes	0	0	1	2	3	3.61%	
Dehiscence	No	15	32	10	13	70	84.34%	0.145
	Yes	2	5	0	6	13	15.66%	
DVT/PE	No	16	37	10	18	81	97.59%	0.145
	Yes	1	0	0	1	2	2.41%	

Table 2: One-way Anova Test

		Mechanical	Aspirin	Enoxaparin	Rivaroxaban	Total	One-way ANOVA
Age	Mean (SD)	42.88 (11.59)	50.03 (11.99)	45.70 (8.58)	47.95 (16.55)	47.57 (12.85)	0.137
	Range	23-60	22-70	29-57	22-74	22-74	
BMI	Mean (SD)	25.50 (4.90)	26.43 (3.82)	32.06 (6.69)	29.36 (7.49)	27.59 (5.75)	0.005
	Range	19.9-40.2	18.6-38.14	24.4-40.6	19.0-50.3	18.6-50.3	

Table 3: Odds Ratio Estimates for Wound Complications

Type of Prophylaxis	Point Estimate	95% Confidence Limits	
Aspirin vs Mechanical	1.172	0.203	6.749
Enoxaparin vs Mechanical	<0.001	<0.001	>999.999
Rivaroxaban vs Mechanical	3.462	0.593	20.206

Results

- 83 patients met inclusion criteria, consisting of 73 (87.95%) female and 10 (12.05%) male. Patients were divided into 4 groups: Group 1 (17 patients), Group 2 (37 patients), Group 3 (10 patients), and Group 4 (19 patients). Data for each group is presented in Tables 1 and 2, and in the chart.
- There was no significant difference in age, BMI, gender, smoking status, or diabetes between each group.
- A significant difference was noted between the BMI of Group 1 (Mean 25.50) and 3 (Mean 32.06) (P=.0071), and Group 2 (Mean 26.43) and 3 (Mean 32.06) (P = 0.0011). There was no significant difference between Group 4 and all groups.
- Odds ratio analysis (Table 3) performed between comparing group 1 to groups 2-4 showed an increased relationship between wound complications with Xarelto (3.462) however this did not reach significance when compared with the odds ratios of the other prophylaxis groups. The odds ratio comparing aspirin (1.172), and enoxaparin (<.001) to mechanical prophylaxis did not show a significant relationship with wound healing complications. Due to the rare event with low sample size, significant differences were not achieved for each prophylactic option.

Analysis and Discussion

Previous research involving total knee and hip arthroplasties have shown a potential correlation between rivaroxaban and wound healing complications in the post operative period. This study has shown there may be potential relationship between use of rivaroxaban and wound healing complications after 1st metatarsocuneiform arthrodesis, although this did not reach statistical significance. Rivaroxaban's association with wound healing complications remains somewhat controversial. Further studies, including prospective studies with larger patient populations and studies involving other foot and ankle procedures are needed.

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