IS THERE A CORRELATION BETWEEN MORBID OBESITY & INCREASED RISK OF VTE AFTER TOTAL JOINT ARTHROPLASTY?

R Thompson, R Cassidy, J Hill, L Bryce, D Beverland

Primary Joint Unit, Musgrave Park Hospital, Belfast BT9 7JB

Introduction

In the UK in 2019, the average THA patient was overweight (BMI 28.8) whilst the average TKA patient was obese (BMI 30.9).[1] Current risk assessment guidelines, published by NICE state that factors associated with increased risk of VTE include joint arthroplasty and obesity.[1] Lower limb total joint arthroplasty (TJA) patients are therefore of immediate concern.

Extensive research on the association between BMI and VTE risk, however, remains divided. Most recently, the 2022 International Consensus Meeting (ICM) examining this question found the literature inconclusive.[2] As the waistlines of today's population continues to expand, determining the association between obesity and VTE risk is of increasing importance.

Aims

To determine whether morbid obesity (BMI≥40) increased risk of VTE within 90 days of THA, TKA or UKA compared to those of BMI<40.

Methods

Between January 2016 and December 2020, 10217 primary joints were replaced in our institution: THA (n=5262), TKA (n=4506) and UKA (n=449). Data was collected retrospectively from a hospital-maintained database and a regional electronic care record database.

CT pulmonary angiography (CTPA) for suspected pulmonary embolism (PE) and ultrasound scan (USc) for suspected proximal deep vein thrombosis (DVT) were recorded up to 90 days post-operatively. Indications for investigations were based on NICE guidelines[2].

Data were assessed for normality using the Shapiro-Wilk test. Categorical variables were assessed using Chi-Squared or Fisher's Exact Test. Non-parametric continuous variables were assessed with Mann-Whitney U or Kruskal-Wallis test. Univariate analysis was carried out to determine factors associated with PE and/or proximal DVT. Statistical significance was set at p<0.05.

References

1. National Institute for Health & Care Excellence (www.nice.org.uk)
2. Recommendations from the ICM-VTE: General. J Bone Joint Surg Am. 2022;104(Suppl 1):4-162.

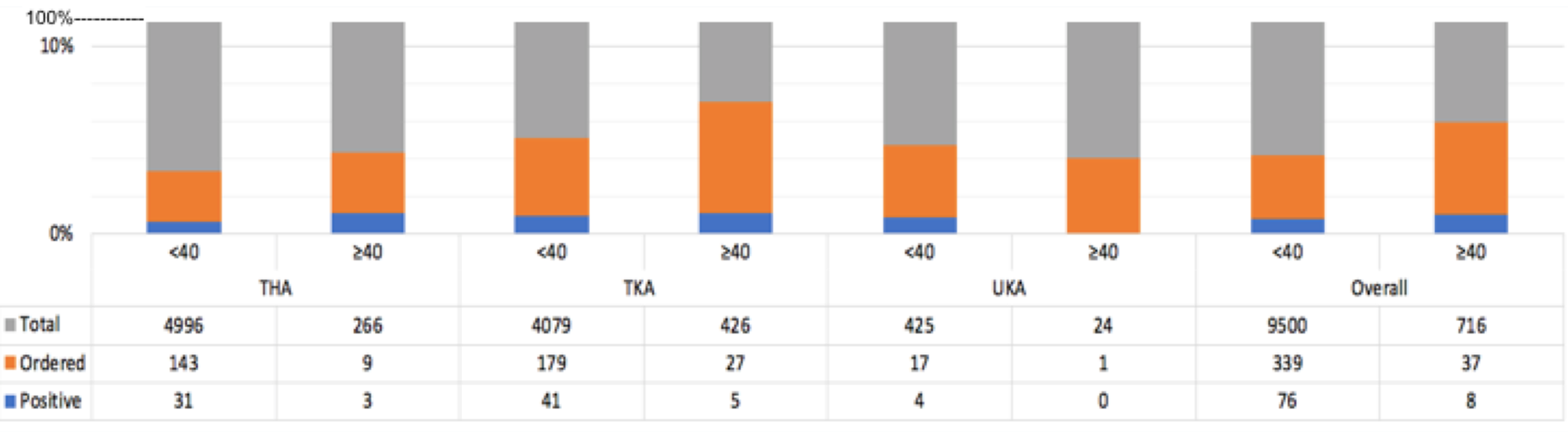
Results

- 716 joints (7.0%) were morbidly obese.
- Joint replacements for those of BMI≥40 were required earlier than those of BMI<40 (64.0 vs 69.0 years, p<0.001). This was true for both THAs (63.0 vs 69.0 years, p<0.001) and TKAs (66.0 vs 70.0 years, p<0.001). The difference was not significant for UKAs (64.5 vs 68.0 years, p=0.176).
- More TKAs were of BMI≥40 compared to THAs; 9.1% (450/4954) vs 5.0% (266/5262); OR = 1.80 (95% CI 1.55-2.081, p<0.001).

CTPA

- Incidence of PE was 0.82% (84/10216).
- 77.7% (292/376) of CTPAs were negative.
- Overall, there was no difference in incidence of PE between BMI<40 and BMI≥40; 0.8% (76/9500) vs 1.1% (8/716), p=0.385.
- Of the scans ordered, there was no difference in proportion of positive scans in joints of BMI<40 vs BMI≥40; 22.4% (76/339) vs 21.6% (8/37), p= 0.912.
- More CTPAs were ordered for BMI≥40 joints compared to those of BMI <40; 5.2% (37/716) vs 3.6% (339/9500); OR= 1.47 (95% CI 1.04-2.09, p=0.028).

% of Positive CTPAs & CTPAs Ordered According to Procedure & BMI

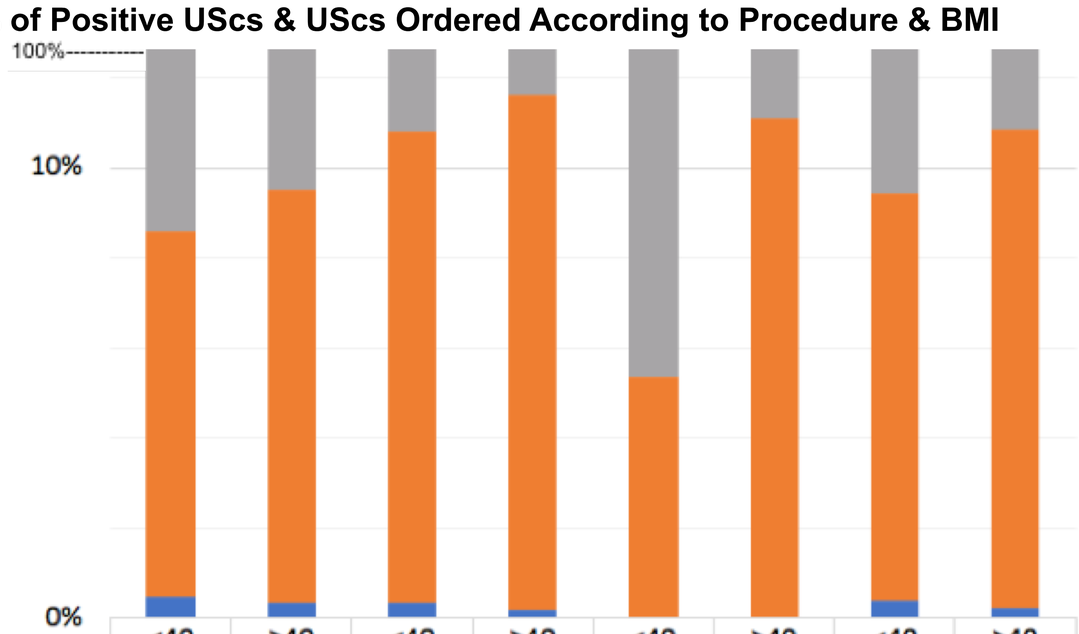


	THA <40	THA ≥40	TKA <40	TKA ≥40	UKA <40	UKA ≥40	Overall <40	Overall ≥40
Total	4996	266	4079	426	425	24	9500	716
Ordered	143	9	179	27	17	1	339	37
Positive	31	3	41	5	4	0	76	8

USc

- Incidence of DVT was 0.43% (44/10216).
- 95.7% (988/1032) of ultrasound scans were negative.
- No UKAs had a DVT.
- Overall, there was no difference in incidence of DVT between BMI<40 and BMI≥40; 0.4% (42/9500) vs 0.3% (2/716), p=0.768.
- Of the scans ordered, there was no difference in proportion of positive scans in joints of BMI<40 vs BMI≥40; 4.4% (42/947) vs 2.3% (2/85), p=0.363.
- There was no difference in proportion of UScs ordered between BMI<40 and BMI≥40; 10.0% (947/9500) vs 11.9% (85/716), OR=1.22 (95% CI 0.96-1.54, p=0.103).

% of Positive UScs & UScs Ordered According to Procedure & BMI



	THA <40	THA ≥40	TKA <40	TKA ≥40	UKA <40	UKA ≥40	Overall <40	Overall ≥40
Total	4996	266	4079	426	425	24	9500	716
Ordered	444	27	479	55	24	3	947	85
Positive	26	1	16	1	0	0	42	2

Multivariate analysis

Morbid obesity did not increase risk of VTE, PE or DVT in either univariate or multivariate analysis after adjusting for gender, age, ASA grade and joint replaced.

Conclusion

- 7.0% of joints were morbidly obese. Morbid obesity did not increase risk of PE or DVT.
- BMI >40 joints were more likely to undergo CTPA, indicating that BMI influenced clinical practice.
- Developing focused risk stratification tools would aid physicians in deciding who to investigate for VTE and ultimately reduce unnecessary imaging.
- We demonstrated high rates of negative investigations. A higher index of suspicion is therefore required in order to reduce unnecessary imaging.
- We propose that studies reporting the incidence of symptomatic VTE should also report the number of negative investigations.
- Revision of national guidelines assessing risk factors for VTE may be required.