

Effect of Obesity on Efficacy of Medical Thromboprophylaxis After Total Knee Arthroplasty- A Case Control Study

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Chart Abstraction

- Fifteen volunteer hospitals/health organizations participated.
- Up to 20 cases and up to 40 controls in each hospital were abstracted.
- UHC collected and managed the data for data analysis.
- UCD team analyzed the case control study.



Case Control Study

● Cases:

- Uni-TKA or Bilat-TKA
- Oct 2008 to Mar 2010
- >40 yrs
- Code for VTE within 90 days

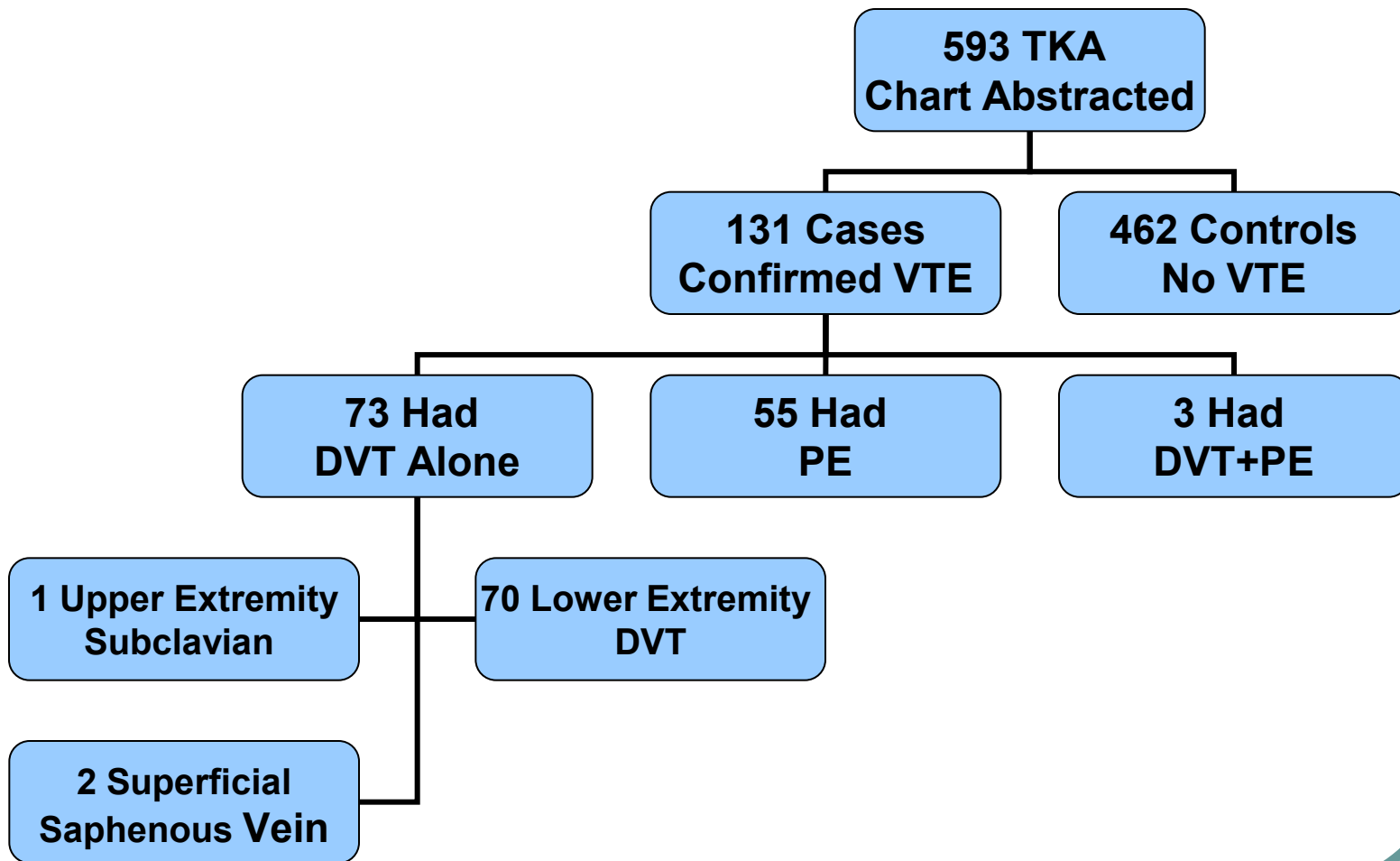
● Controls:

- Uni-TKA or Bilat-TKA
- Oct 2008 to Mar 2010
- >40 yrs
- No Code for VTE within 90 days

- No TKA or THA within 90 days prior
- No VTE as principal ICD-9-CM diagnosis
- No VTE as POA
- No pregnancy, childbirth, or puerperium



Results





Classification of Types of Thromboprophylaxis

- Pharmacologic and non-pharmacologic prophylaxis in cases and controls (ordered, ITT)

Pharmacological Prophylaxis		VTE = Yes N = 129	VTE = No N = 464
LMWH/ Heparin	Enoxaparin/ Daltaparin/ Fondaparinux, Unfractionated Heparin Subcutaneous	46%	48%
Warfarin Alone (no LMWH)		33%	31%
Non-pharmacological Prophylaxis			
Intermittent Pneumatic Compression Device, Graduated Compression Stockings/Foot Pump		21%	20%
No prophylaxis		0	0

- The numbers are mutually exclusive within each stratum



VTE Cases versus Controls

Bivariate Analyses

- There was no significant difference between cases and controls with respect to the type of thromboprophylaxis given.



Cases Versus Controls

Variable		VTE N = 129	No VTE N = 464	Total N = 593
Gender	Male	34%	38%	37%
	Female	66%	62%	63%
Age P<0.05	Mean (StD)	65.5 (10.4)	63.5 (10.4)	63.9 (10.5)
LOS P<0.01	Mean (StD)	6.1 (4.7)	3.4 (1.5)	4.0 (2.8)
Type of TKA P<0.01	Unilateral	76%	92%	89%
	Bilateral	23%	7%	11%
	Revision	1%	1%	1%
BMI P=0.07	Mean (StD)	34.6 (8.0)	33.3 (7.1)	33.6 (7.3)
Ambulation P<0.01	No ambulation	8%	4%	5%
	Steps day 1 or 2	71%	90%	86%
	Steps day 3 and later	21%	6%	9%

- No difference in race, primary payer, and co-morbid risk factors



VTE Cases versus Controls

Bivariate Analyses

VTE Cases:

- were significantly older ($P < 0.05$),
- had more bilateral TKA ($P < 0.01$) than unilateral TKA,
- took longer time to mobilize after TKA ($P < 0.01$),
- stayed longer in hospital ($P < 0.01$),
- were heavier, but not statistically significant ($P = 0.07$).

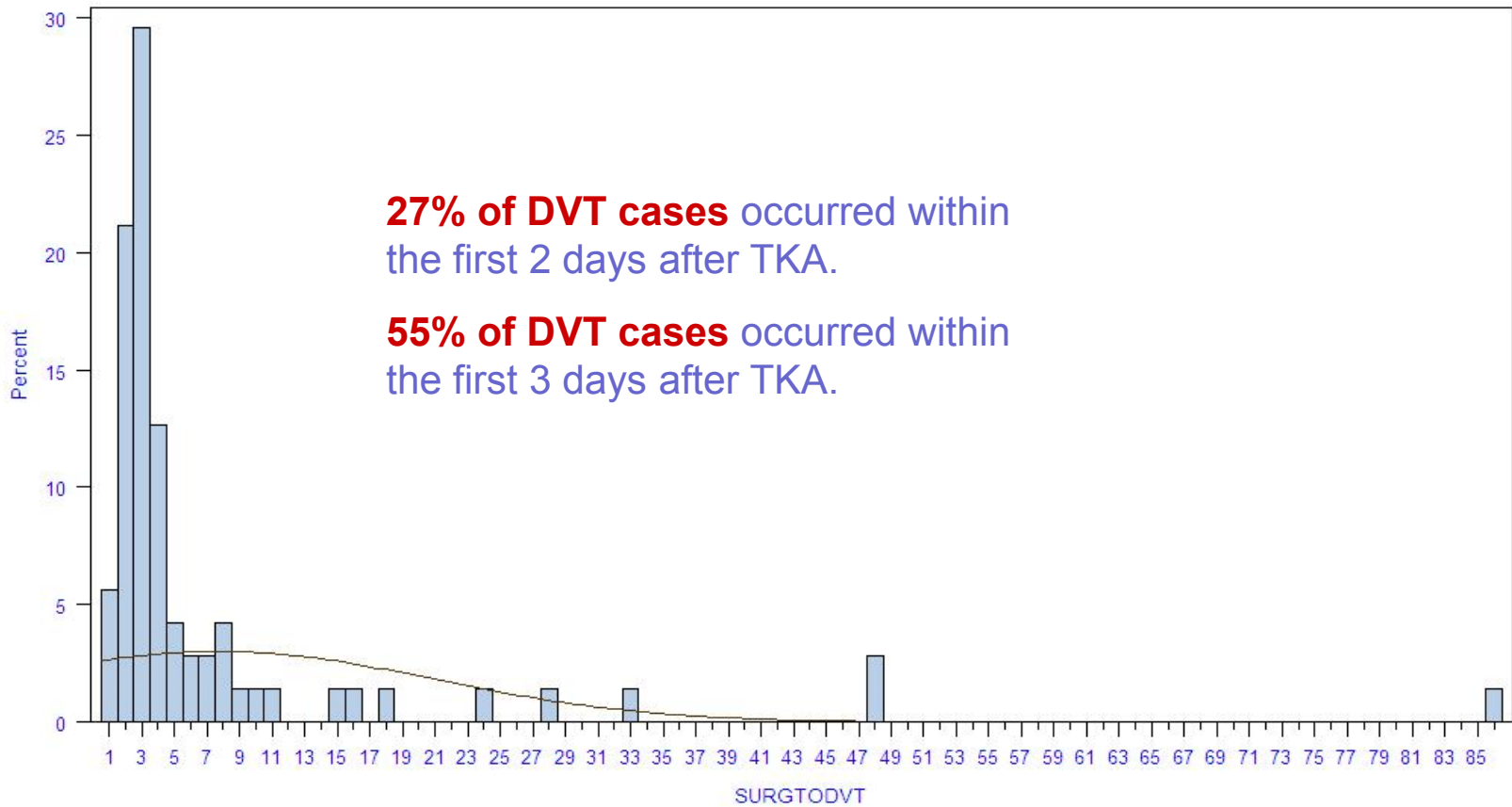


Cases Versus Controls

- No Gender Difference,
- No Race Difference,
- No Major Difference in Type of Primary Payer,
- No Difference in Co-morbidities,



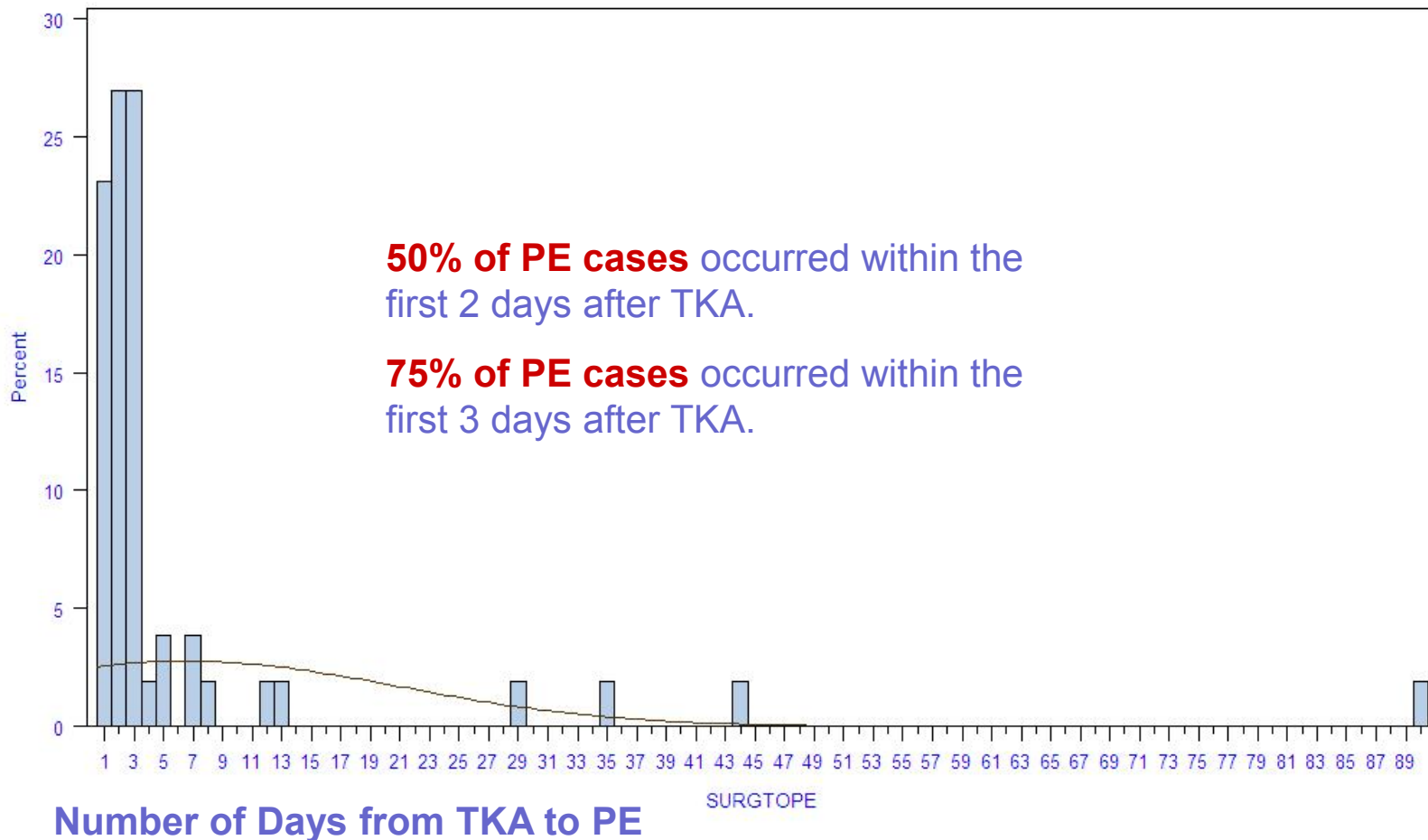
DVT Occurrence Relative to TKA



Number of Days from TKR to DVT



PE Occurrence Relative to TKA





Multivariate Analysis

- **Outcome:** Development of Symptomatic VTE on or after day 2 post-TKA
- **Rationale:** VTE on day 1 not preventable
 - Model included risk factors for VTE

$$\text{logit}(p\text{VTE}_i) = \beta_1\text{Age} + \beta_2\text{Sex} + \beta_3\text{BMI} + \beta_4\text{Type TKA} + \beta_5\text{Prophylaxis} + \beta_6\text{Mobilization}$$

- Adjusted for hospitals' clustering effect.
- Systematic assessment of interaction between BMI and type of prophylaxis; and between BMI and post-op mobilization.



Multivariate Analysis

- Multivariate Adjusted Odds Ratios and 95% Confidence Intervals
 - Outcome: Any VTE Event Diagnosed Day 2 of Surgery or Later
 - Excluded One Hospital That Screened The TKA Patients Routinely For VTE

Predictive Factor	Odds Ratio (95% CI)	P value
Age	1.02 (0.99 – 1.05)	0.12
Gender (ref: male)	1.40 (0.80 – 2.38)	0.25
Ambulation (ref: no ambulation) <ul style="list-style-type: none">● Taking steps day 1 or 2● Taking steps after day 2	0.30 (0.10 – 0.88) 0.67 (0.22 – 2.07)	<0.01 0.56
Type of TKA (ref: unilatera TKR) <ul style="list-style-type: none">● Bilateral TKR	3.30 (1.40 – 7.50)	<0.01
Pharmacological Prophylaxis (ref: only mechanical prophylaxis)	0.50 (0.20 – 1.09)	0.07
BMI ≥ 35 (ref: BMI < 35)	0.94 (0.54 – 1.62)	0.82



Interaction terms

- None of the interactions between Obesity, type of prophylaxis, type of surgery or time to ambulation were significant.
 - There was no significant difference in the effect of LMWH among extremely obese versus non/less obese patients
 - There was no significant difference in the effect of use of any medical prophylaxis among extremely obese versus non/less obese patients



Discussion

Expected finding:

- Having no-VTE was associated with receiving medical thromboprophylaxis.

Interesting but not unexpected findings:

- Bilateral TKA was associated with higher odds of having VTE.
- Early mobilization was associated with lower odds of VTE.

Unexpected findings:

- Medical prophylaxis was as effective in morbidly obese as in less obese pts.