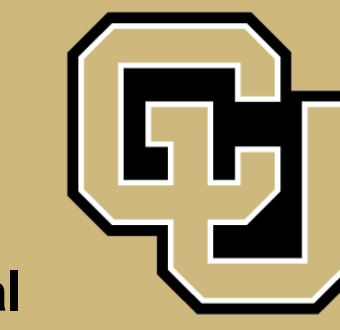


# Is there an increased Risk of Venous Thromboembolism in Patients Undergoing Major Orthopaedic Surgery

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## What we learned:

- Orthopaedic patients with active lithium use, compared to a control group with a history of lithium use, had a trend of having more postoperative VTEs

### Background:

- Lithium is used primarily as a mood stabilizer in bipolar disorder
- Emerging evidence of positive effect on fracture healing
- Evidence of causing increased risk of VTEs
  - Concerning for orthopaedic patients who are already at increased risk of VTEs

### LiFT Study:

- Lithium for Fracture Treatment (LiFT) Study
- Phase II clinical trial researching the effects of lithium treatment in long bone fractures
- Lithium has been linked to the Wnt/ $\beta$ -catenin pathway for embryological skeletal development
  - Study aims to use lithium to stimulate mesenchymal precursor cells to differentiate into mature osteoblasts
- Can this treatment increase a patient's VTE risk?

### Objective:

- To investigate if there is an increased incidence of VTEs in patients undergoing major orthopaedic surgery

### Methods:

- Patients treated with lithium undergoing major orthopedic surgery (>45 min) involving hip, pelvis, or leg at a single level one trauma were identified
  - Patients were excluded if they were less than 18 years of age
- Patients with perioperative lithium use, defined as lithium use at the time of surgery, were compared to a control group of patients with a history of lithium use
  - Groups were compared in terms of demographics, operative characteristics, and VTE rate
- VTE risk for each patient was quantified using the Caprini score
- The Wilcoxon rank sum test was used to compare continuous nonparametric data between groups
- Chi-square testing was used to compare categorical variables between large groups
- Fisher's exact test was used to compare categorical variables with small sample sizes (any cell number <5)
- All analyses were performed using JMP Pro version 17 statistical software (SAS; Cary, NC)

### Results:

- There were 2 VTEs in 2 patients
  - The active lithium use group had a trend of more VTEs than the control group approaching significance (11.1% (2/18) vs. 0.0% (0/26), p=0.09)
- There were no significant differences between the active lithium group and the control group
  - However, the active lithium use group had a non-statistically significant trend of being less likely to have a history of prior VTE (0.0% (0/18) vs. 15.8% (6/26), p=0.16)
  - Active lithium group may have been less likely to have a VTE based on this trend

### Conclusions & Future Directions:

- Lithium use is a factor that may influence risk of VTEs in patients undergoing major orthopaedic surgery
  - Should be considered when assessing VTE risk
- A larger cohort of patients is necessary to further evaluate this trend

### Comparison of procedures in patients with active lithium use versus history of lithium undergoing major orthopaedic surgery

|                      | Active lithium use (n=18) | History of lithium use (n=26) | Difference (95% CI)   | P-value |
|----------------------|---------------------------|-------------------------------|-----------------------|---------|
| Age                  | 46.0 (29.7, 58.0)         | 41.5 (32.7, 62.0)             | 0.5 (-9.0, 10.0)      | 0.50    |
| Prior VTE            | 0 (0.0%)                  | 6 (15.8%)                     | -15.8% (-27.6%, 2.6%) | 0.16    |
| Location:            |                           |                               |                       |         |
| Hip/thigh            | 7 (38.9%)                 | 8 (21.1%)                     | --                    | 0.13    |
| Knee                 | 8 (44.4%)                 | 14 (36.8%)                    |                       |         |
| Leg                  | 3 (16.7%)                 | 16 (42.1%)                    |                       |         |
| Operation type       |                           |                               |                       |         |
| Fracture             | 8 (44.4%)                 | 14 (36.8%)                    | --                    | 0.38    |
| Arthroplasty         | 5 (27.8%)                 | 10 (26.3%)                    |                       |         |
| Sports               | 4 (22.2%)                 | 5 (13.2%)                     |                       |         |
| Other                | 1 (5.6%)                  | 9 (23.7%)                     |                       |         |
| Caprini Score        | 8.5 (4.5, 13.0)           | 9.0 (7.0, 11.5)               | 0.0 (-3.0, 2.0)       | 0.73    |
| Operative time (min) | 137.5 (108.0, 193.7)      | 125.0 (97.0, 172.0)           | 14.5 (13.0, 43.0)     | 0.27    |
| VTE                  | 2 (11.1%)                 | 0 (0.0%)                      | 11.1% (-3.8%, 28.9%)  | 0.09    |

### Limitations:

- Low number of outcomes
- This study only looked at orthopaedic procedures and could not assess other specialties

