

# Lack of utility and excess cost of routine perioperative hematologic testing in patients undergoing elective neurosurgical procedures of the spine

Lucas Philipp, MD MPH; Catriona Harrop, MD; David Wyler, MD; James Harrop, MD

## Background

### Current practice standards...

...require perioperative hematologic lab testing for all patients undergoing elective spine surgery

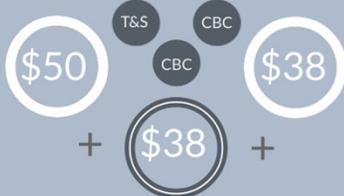
**Compulsory testing of all patients may portend avoidable economic burden and risk to patient satisfaction**

The incidence of perioperative anemia is exceptionally low and transfusion requirement is likely dependent upon specific operative factors and patient characteristics.



### Conservative Estimate:

Assuming preoperative CBC + Type & Screen and one postoperative CBC....



More than **\$150** per patient

### Objective:

To prospectively conduct a "mock trial" among 100% (minimum n=200) of elective neurosurgery spine patients, to estimate the total projected cost, savings, risk, and feasibility of a redefined/restricted lab testing protocol over the next 12 months.

1

Perform retrospective analysis of (approx 100 words) existing data to define Risk Factors for transfusion. Define extent of superfluous testing in estimated dollar amounts. Devise predictive model for transfusion need.

2

In collaboration with multidisciplinary team, generate new practice standard/protocol for lab testing/areas where testing is not needed.

3

Continue ongoing prospective "mock trial" of agreed upon changes prior to actual implementation to ensure no potential patient harm

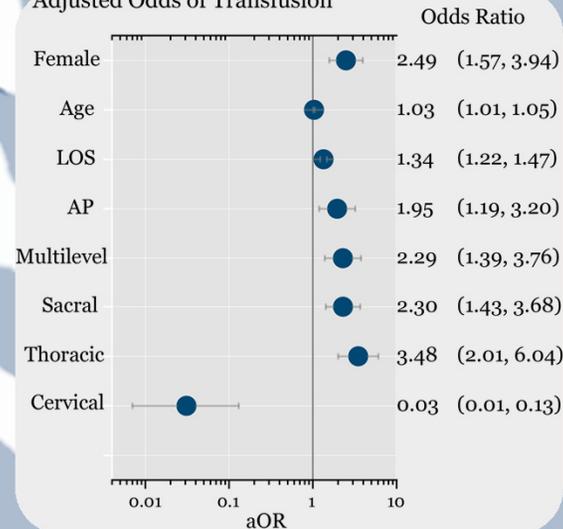
4

Prospective tracking of patient hospital and pre-admit charges. Prospective tracking of departmental adherence to new standards

5+

Quarterly reevaluation of data and multidisciplinary update

### Adjusted Odds of Transfusion



A retrospective cohort study of all elective patients from 2016-2018 was conducted. Transfusion requirement was compared for each procedure, and multivariate logistic regression was employed to identify specific risk factors associated with transfusion.

## Results

Of the 1516 cases identified, 138 required transfusion (9.10%). Operative factors associated with transfusion in multivariate analysis were thoracic or sacral involvement (OR: 3.48 [95% Confidence interval: 2.01, 6.04]; p<0.0001) and (OR: 2.29 [1.43, 3.68]; p=0.0006) respectively, multilevel surgery (OR: 2.29 [1.39, 3.76]; p=0.0011), Anterior+Posterior (flip) procedures (OR: 1.95, p=0.0082), and LOS (OR: 1.34 per 1 day increase, p<0.0001).

Associated patient factors were female sex (OR 2.49 [1.57, 3.94]; p=0.0001), and age (OR 1.37 [1.12, 1.68] per 10 year increase). Cervical spine involvement was inversely associated with transfusion (OR: 0.03 [0.01, 0.13]; p<0.0001). 527 cases involved the C-spine, 383 cervical only and 144 cervicothoracic. Zero C-spine only cases required transfusion. Cervicothoracic cases required 3 transfusions, combined transfusion rate=0.57%, NNT=175.

Lumbar spine involvement (n=876) was not independently predictive of transfusion. Of 535 Lumbar-only procedures, 35 (6.54%; NNT=15) were transfused, as were 47 of 341 (13.78%, NNT=7) lumbosacral cases. Factors predicting transfusion in lumbar cases were multilevel surgery (OR=3.35, p

## CONCLUSIONS

**The rate of transfusion among elective nontraumatic cervical-only cases, and single-level lumbar/lumbosacral cases without fusion, is zero.**

Perioperative hematologic testing of these patients has no apparent utility, and signifies greater than \$200,000 of excess charges. Transfusion requirement is strongly associated with specific case/patient factors. With further analysis, the need for testing is likely predictable on the basis of these factors, and superfluous testing/spending may be further mitigated on a patient-specific basis.