

# Autotransfusion Suction Line: A Comparison of Types and Effects on Blood Collected

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## Introduction

- Autotransfusion is a blood salvage technique that involves shed blood being collected at the field with suckers and transferred to a reservoir by a dual lumen line.
- This dual lumen line allows for the administration of anticoagulant at the tip of the sucker in order to anticoagulate the shed blood before it travels to the reservoir.
- The purpose of this research was to help determine if coated suction tubing can replace a dual-lumen suction line in autotransfusion.
- The use of biocoated tubing could reduce the complexity of the circuit and also reduce costs.

## Results

- The mean plasma free hemoglobin for X-coated tubing differs significantly from the mean plasma free hemoglobin for dual lumen coating.
- The mean R-value for X-coated tubing differs significantly from the mean R-value for dual lumen coating and astute coating.
- Both Astute and Dual lumen line had a statistically significant difference in R-value when comparing between port 1 and port 2.
- Also there was a statistically significant difference in the mean alpha angle between the dual lumen tubing of Port 1 and the dual-lumen tubing of Port 2.

## Discussion

- Hypothesis: Dual lumen tubing would produce significantly less hemolysis indicated by lower PFH levels and better preservation of platelets with longer mean R-values and alpha angles.
- Citrate, a permanent anticoagulant, used in dual lumen tubing inhibits the coagulation cascade consequently inhibiting fibrin formation. Therefore the blood samples from the dual-lumen ports are questionable as numerous TEG parameters were out of range due to time constraints.
  - Stagnant blood in the Astute and X-coated tubing made pulling samples from Ports (1 and 2) difficult through 19 gauge needles.

## Methods and Materials

- Three Types of Tubing:
  - Astute coated tubing
  - X-Coated tubing
  - Dual-Lumen suction line
- Bovine Blood collected through all three lines simultaneously
- 15 samples collected at each of the two locations in each line
- Parameters Measured:
  - Thromboelastography
    - R value, Alpha angle
  - Plasma Free Hemoglobin (PFH)

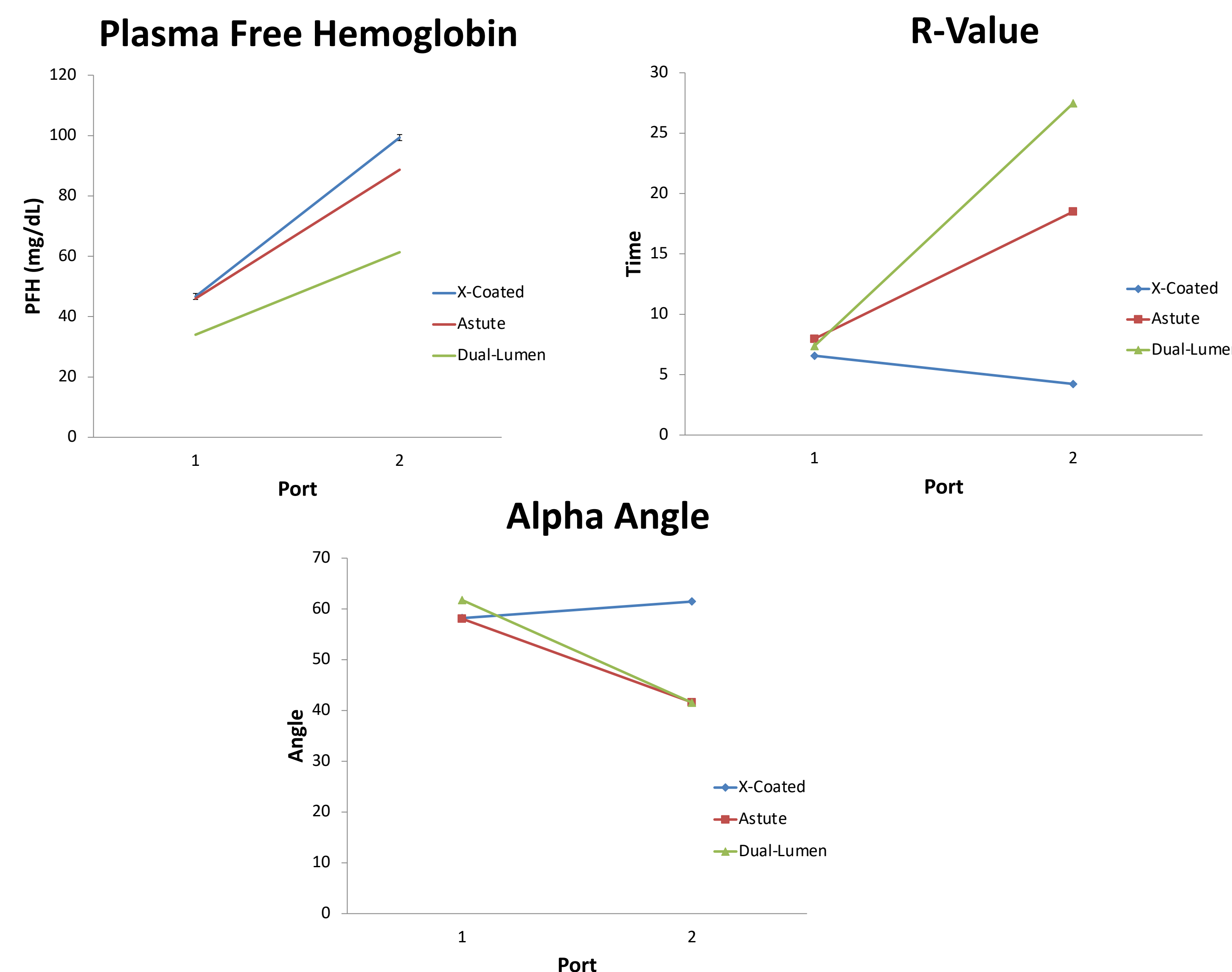
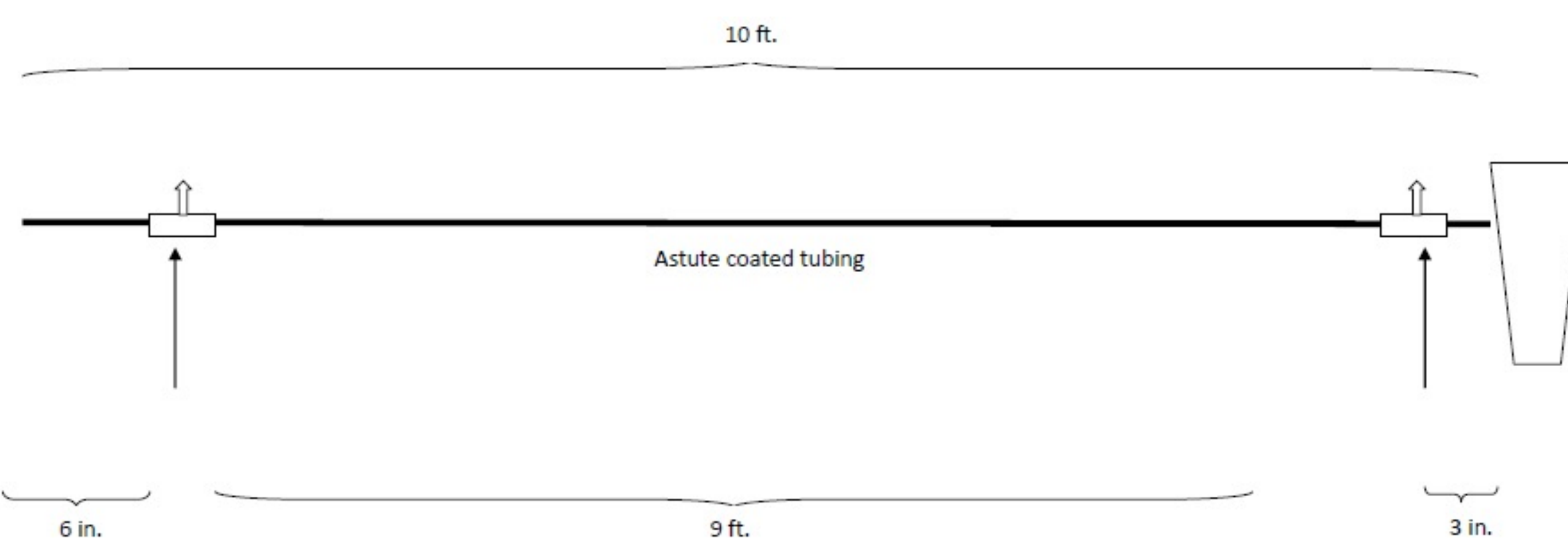


Figure 1: Mean PFH levels indicated statistical significance at Port 2 between X-coated and dual-lumen tubing (top left). Mean R-values proved statistical significance at Port 2 between X-coated and Dual lumen and Astute (top right). Mean alpha angle calculations showed statistical significance between the X-coated tubing compared to the Dual lumen tubing at Port 2 (middle bottom).

## Conclusion

- Based on the statistical analysis utilizing the data from this experiment the dual lumen tubing seems to be the best option for blood cell preservation and reduced platelet activation utilizing autotransfusion methods.
- No statistical significance between the Astute and Dual lumen tubing, in terms of TEG parameters, the Astute tubing should be considered a reasonable alternative until more data is collected to confirm or reject this statement.

## Future Direction

- Utilize heparinized saline as well as citrate in dual lumen tubing (Harr et al. 2011)
- Use human blood instead of bovine blood which has shown to be hypercoagulable when measuring TEG parameters (Sondeen et al. 2013)

## References

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