

**EFFICACY OF APROTININ AS A
BLOOD CONSERVATION TECHNIQUE
DURING ADULT DEFORMITY SPINE
SURGERY:
A RETROSPECTIVE STUDY**

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BACKGROUND

- Massive blood loss is a real possibility when operating on adult spine deformity patients
- Anti-fibrinolytic agents have been found to effectively reduce blood loss in coronary artery bypass surgery as well as in certain orthopaedic surgeries.
- Specifically, aprotinin (Trasylol, Bayer), a serine protease inhibitor, decreases bleeding by acting on:
 1. The coagulation cascade
 2. Anti-fibrinolytic pathway
 3. Inflammatory response
 4. The platelet membrane

OBJECTIVE

The purpose of this study is to assess the efficacy and safety of aprotinin in reducing blood loss in adult spine deformity patients requiring six or more levels of fusion or instrumentation.



METHODS

- We conducted a retrospective study reviewing hospital charts from 82 spinal deformity patients
- Inclusion Criteria:
 - 18 years and older
 - Pt's who underwent fusion surgery or instrumentation of at least 6 or more levels
- Comparison Groups:
 - Cases--41 pt's who received aprotinin from January 2003 to July 2005
 - Controls--A random sample of 41 pt's who underwent surgery from June 2000 to December 2002

METHODS

	Cases n= 41	Controls n=41	P-value
Age (mean, range)	47years (19; 70)	41 years (18; 69)	0.07
female	33(81%)	32(78%)	0.785
Diagnosis			
Scoliosis	35(85%)	34(83%)	0.762
Kyphosis/Flat back	15(37%)	8(20%)	0.077

METHODS

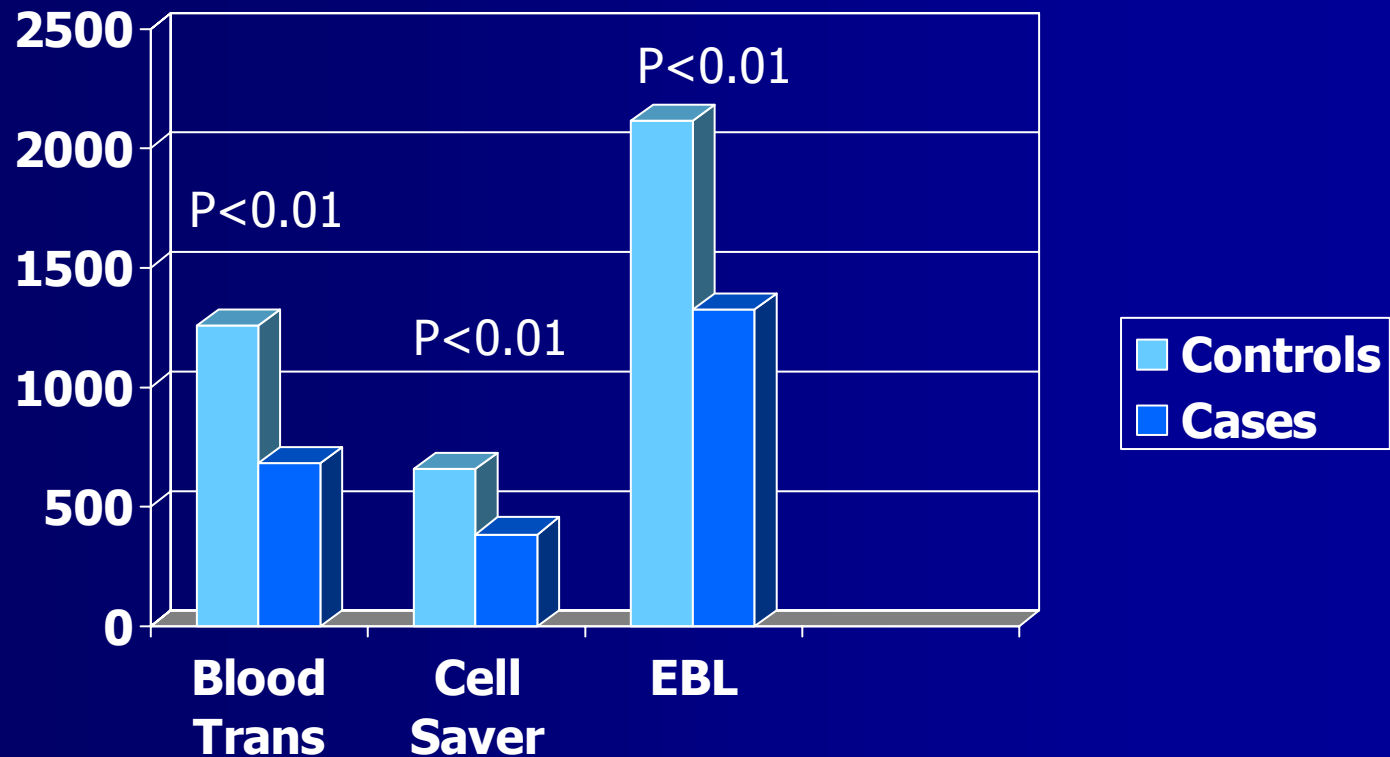
	Cases n= 41	Controls n=41	P-value
Heart diseases	19%	10%	0.2
History of thrombotic events	12%	0	0.06
Hematologic disorders	15%	5%	0.3
Cerebral palsy	0	2.4%	1
Neuromuscular disorders	5%	2%	1

METHODS

- Mean # of levels fused or instrumented were 11.2 and 10.7 for cases and controls respectively
- Most common aprotinin regimen:
 - Test dose of 10,000 KIU
 - Loading dose of 2 million KIU given over 20-30 minutes
 - Maintenance dose of 0.5 million KIU per hour

RESULTS

Aprotinin is associated with 40% decrease in blood loss and 50% decrease in transfusions



RESULTS

- The beneficial effect of aprotinin does not depend on the number of levels fused or instrumented
- Regimen of aprotinin administration does not have an effect on blood loss

RESULTS

- Complications were similar in both groups
 - Case group
 - 2 pt's suffered from DVT's
 - 3 pt's needed re-operation
 - 1 pt displayed a slight elevation in creatinine which resolved prior to D/C
 - Control group
 - 1 pt needed re-operation

DISCUSSION

- Overall, our study results are consistent with previous spine literature
 - Cole et al. Aprotinin Reduces Blood Loss During Spinal Surgery in Children. Spine. 2003.
 - Urban et al. The Efficacy of Antifibrinolytics in the Reduction of Blood Loss During Complex Adult Reconstructive Spine Surgery. Spine. 2001
 - Okubadejo et al. Aprotinin Decreases Blood Loss in Complex Adult Spinal Deformity but Increases the Risk of Acute Renal Failure. Presented at 41st SRS meeting.

DISCUSSION

- The prevalence of DVT's in the case group could be explained by history of higher incidence of thrombotic events in that group
- Previous studies have shown no association between aprotinin and prevalence of DVT's
 - Murkin JM. Attenuation of neurologic injury during cardiac surgery. *Ann Thorac Surg.* 2001; 72:S1838-1844.
 - Haas S. Aprotinin-a blood-saving substance. *Infusionsther Transfusionsmed.* 2002; 29:151-155.

DISCUSSION

- Recently, studies have shown that aprotinin administration can cause end organ damage (e.g. Mangano et al, Okubadejo et al)
- The reasons for conflicting results with our study could be:
 - Difference in population studied
 - How aggressively Mean Arterial Blood Pressure was dropped during the surgery

DISCUSSION

- The pt's in our study were in an overall better state of health than the patients in Mangano's study
- The pt's in our study were much younger than the patients in Okubadejo's study
 - The pt's with renal failure were older (ages 61 to 73 years old) and possessed various significant co-morbidities

DISCUSSION

- In our study, all pt's had arterial lines placed and the MAP was monitored constantly during surgery
 - The MAP did not drop below 60 mm Hg
- Extended periods of aggressive hypotension compounded by acute blood loss anemia can lead to end organ damage

CONCLUSION

- In adult deformity patients undergoing fusion procedures requiring six or more levels, the administration of aprotinin appears to be a safe and effective method to reduce blood loss and to decrease the need for transfusions in a relatively younger and healthier patient population
- However, further studies are warranted to evaluate the safety of aprotinin in older, unhealthier patients undergoing fusion procedures requiring six or more levels