

**TABLE E-1 Preoperative, Intraoperative, and Postoperative Data Collected\***

Preoperative Data	Intraoperative Data	Postoperative Data
Planned procedure	No. of vertebrae fused, no. and type of anchors used	CBC two days after surgery
Curve magnitude (Cobb angle)	Measured periop. and postop. Hb/Hct from CBC	Units of postop. autologous or allogeneic blood, FFP, or platelets transfused
Patient age	Hematocrit (via ABG) at: <ul style="list-style-type: none"> <li>• start of incision</li> <li>• screw placement</li> <li>• rod correction</li> <li>• skin closure</li> </ul>	Drain output (recorded daily every 8 hr)
Height and weight	Duration of surgical exposure, anchor placement, surgical correction, and total surgical time	Length of drain use (uniformly remove drains when output of <40 mL/8-hr shift)
No. of units of autologous blood donation	Average exposure MAP, calculated on basis of patient MAP recorded every fifteen minutes between incision and closure	Length of hospital stay
CBC: Hb/Hct/WBC/platelet count (after autologous donation)	EBL (uniformly estimated as three times the cell saver volume when EBL of $\geq 300$ mL; for lower EBL, anesthesiologist and/or surgeon estimates of blood loss were used)	Autologous or allogeneic transfusion reactions, thromboembolic events, increasing BUN/Cr, persistent wound drainage or infection, and all other complications
Coagulation profile: <ul style="list-style-type: none"> <li>• PT/PTT/INR</li> </ul>	Units of autologous or allogeneic blood, fresh-frozen plasma, or platelets transfused	
Medical history	Volume of crystalloids or colloids given	
Medication use	Urine output	
Tobacco, alcohol, drug use	No. of drains placed	
Allergies	Any complication or intraoperative event prolonging operating-room time or increasing patient blood loss	
<p>*Hb/Hct = hemoglobin/hematocrit, FFP = fresh-frozen plasma, ABG = arterial blood gas, MAP = mean arterial pressure, CBC = complete blood-cell count, WBC = white blood-cell count, EBL = estimated blood loss, BUN = blood urea nitrogen, Cr = creatinine, and PT/PTT/INR = prothrombin time/partial thromboplastin time/international normalized ratio.</p>		

TABLE E-2 Intraoperative Blood Loss Data for Individual Groups					
	TXA*	EACA*	Saline Solution*	P Value	Comparison
Estimated blood loss (mL)					
Overall	785 (637)	769 (559)	1080 (835)	0.058 0.037† 0.920	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per level	84.1 (84.0)	78.2 (58.0)	114.3 (77.4)	0.066 0.022† 0.726	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per degree	13.8 (12.9)	13.9 (10.5)	19.9 (15.7)	0.042† 0.036† 0.969	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per anchor	45.0 (43.1)	44.3 (32.7)	67.8 (65.4)	0.042† 0.029† 0.950	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
*The values are given as the mean, with the standard deviation in parentheses. For individual treatment groups, estimated blood loss per degree and estimated blood loss per anchor were significantly reduced for tranexamic acid (TXA) and epsilon-aminocaproic acid (EACA) versus saline solution; overall estimated blood loss and estimated blood loss per level fused were significantly reduced for EACA versus saline solution. †Significance achieved at $p < 0.05$ .					

TABLE E-3 Intraoperative Blood Loss Data for Combined Groups			
	TXA or EACA*	Saline Solution*	P Value
Estimated blood loss (mL)			
Overall	776 (592)	1080 (835)	0.019†
Per level	80.9 (70.8)	114.3 (77.4)	0.015†
Per degree	13.8 (11.5)	19.9 (15.7)	0.015†
Per anchor	44.7 (37.6)	67.8 (65.4)	0.013†
*The values are given as the mean, with the standard deviation in parentheses. For the combined treatment group, all blood loss parameters were significantly reduced versus saline solution. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid. †Significance achieved at $p < 0.05$ .			

**TABLE E-4 Hematocrit Data for Individual Groups**

	TXA*	EACA*	Saline Solution*	P Value	Comparison
Intraop. hematocrit					
Incision	32.9 (2.5)	32.9 (3.4)	34.7 (3.4)	0.010† 0.008† 0.985	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Anchors	30.7 (2.8)	31.9 (3.4)	32.7 (3.4)	0.005† 0.229 0.102	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Rod placement	28.3 (4.9)	29.3 (5.0)	29.5 (4.8)	0.276 0.878 0.360	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Closing	26.5 (5.0)	28.4 (5.1)	28.0 (5.2)	0.215 0.675 0.111	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Change in hematocrit					
Incision-anchor	-2.2 (2.3)	-1.2 (2.4)	-2.0 (3.0)	0.690 0.165 0.093	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Incision-closing	-6.4 (4.7)	-4.5 (4.7)	-6.8 (5.0)	0.752 0.031† 0.089	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Postop. change in hematocrit‡					
PACU-POD1	-2.4 (2.4)	-2.7 (2.8)	-3.2 (2.8)	0.154 0.370 0.584	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
POD1-POD2	-1.1 (2.2)	-0.3 (2.7)	-2.0 (2.5)	0.096 0.000† 0.063	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
PACU-POD2	-3.4 (3.4)	-2.7 (2.7)	-4.7 (4.0)	0.097 0.011† 0.431	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA

\*The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid.  
†Significance achieved at  $p < 0.05$ . TXA and EACA demonstrated significantly reduced hematocrit versus saline solution at the time of incision; TXA also had a significant reduction of hematocrit at anchor placement versus saline solution. ‡EACA demonstrated a significantly lessened hematocrit drop from incision-to-closing, postoperative day 1 to day 2 (POD1-POD2) and postanesthesia care unit (PACU)-POD2 versus saline solution.

TABLE E-5 Hematocrit Data for Combined Groups			
	TXA or EACA*	Saline Solution*	P Value
Intraop. hematocrit			
Incision	32.9 (3.0)	34.7 (3.4)	0.002†
Anchors	31.3 (3.2)	32.7 (3.4)	0.021†
Rod placement	28.9 (5.0)	29.5 (4.8)	0.480
Closing	27.5 (5.1)	27.9 (5.2)	0.677
Change in hematocrit			
Incision-anchor	−1.7 (2.4)	−2.0 (3.0)	0.536
Incision-closing	−5.4 (4.7)	−6.8 (5.1)	0.132
Postop. change in hematocrit‡			
PACU-POD1	−2.5 (2.6)	−3.2 (2.8)	0.177
POD1-POD2	−0.5 (2.5)	−2.0 (2.5)	0.002†
PACU-POD2	−3.0 (3.1)	−4.7 (4.0)	0.012†
<p>*The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid.  †Significance achieved at <math>p &lt; 0.05</math>. ‡For the combined treatment group, the decrease in hematocrit from postoperative day 1 to day 2 (POD1-POD2) and postanesthesia care unit to (PACU) to POD2 were similarly significantly reduced versus saline solution.</p>			

**TABLE E-6 Variations with Average Exposure Mean Arterial Pressure for Individual Groups**

Parameter*	TXA†	EACA†	Saline Solution†	P Value	Comparison
Incision MAP ( <i>mm Hg</i> )	75.9 (8.50)	77.4 (11.72)	77.1 (12.34)	0.647 0.897 0.571	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
EBL for patients with MAP of <75 mm Hg‡ ( <i>mL</i> )					
Overall	715 (520)	761 (615)	1124 (938)	0.042§ 0.061 0.827	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per level	79.3 (53.2)	76.1 (49.8)	119.9 (85.8)	0.008§ 0.010§ 0.876	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per degree	13.7 (10.9)	14.2 (10.7)	20.8 (17.5)	0.025§ 0.055 0.700	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per anchor	43.8 (32.3)	42.9 (30.7)	72.0 (75.2)	0.023§ 0.030§ 0.871	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Drain total	784 (495)	1018 (458)	1063 (579)	0.05 0.736 0.116	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Total losses	1441 (866)	1749 (928)	2180 (1364)	0.013§ 0.180 0.244	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Change in hematocrit from PACU to POD2	−2.9 (3.5)	−2.9 (2.6)	−5.2 (2.9)	0.005§ 0.005§ 1.000	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
EBL for patients with MAP of ≥75 mm Hg‡ ( <i>mL</i> )					
Overall	925 (832)	784 (463)	851 (488)	0.777 0.644 0.428	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per level	118.2 (109.6)	89.8 (64.6)	89.1 (51.6)	0.463 0.885 0.343	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per degree	18.0 (13.4)	14.4 (9.0)	15.5 (10.4)	0.677 0.654 0.364	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Per anchor	60.0 (50.9)	50.6 (32.7)	50.6 (26.3)	0.631 0.768 0.406	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Drain total	798 (363)	1014 (358)	996 (500)	0.277 0.866 0.170	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA

*continued*

**TABLE E-6 (continued)**

Parameter*	TXA†	EACA†	Saline Solution†	P Value	Comparison
Total losses	1706 (1007)	1828 (714)	1861 (571)	0.977 0.930 0.951	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA
Change in hematocrit from PACU to POD2	−4.4 (3.2)	−2.3 (3.0)	−2.4 (6.6)	0.337 0.885 0.253	TXA vs. saline solution EACA vs. saline solution TXA vs. EACA

\*MAP = mean arterial pressure, EBL = estimated blood loss, PACU = postanesthesia care unit, POD = postoperative day. †The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid. ‡There were twenty-four patients in the TXA group, twenty-seven in the EACA group, and thirty-four in the saline solution group with an MAP of <75 mm Hg. §Significance achieved at  $p < 0.05$ . When controlling for low MAP, TXA significantly reduced all blood loss parameters, as well as total losses and change in hematocrit from PACU to POD2 versus saline solution. EACA demonstrated significant reductions in EBL per level fused and EBL per anchor placed versus saline solution. #There were twelve patients in the TXA group, fourteen in the EACA group, and ten in the saline solution group.

**TABLE E-7 Variations with Average Exposure Mean Arterial Pressure for Combined Groups**

Parameter*	TXA or EACA†	Saline Solution†	P Value
Estimated blood loss for patients with MAP of <75 mm Hg (mL)			
Overall	739 (567)	1124 (938)	0.019‡
Per level	70.3 (57.7)	119.9 (85.8)	0.005‡
Per degree	12.8 (11.7)	20.8 (17.5)	0.017‡
Per anchor	39.7 (34.5)	72.0 (75.2)	0.008‡
Drain total	910 (485)	1063 (579)	0.241
Total losses	1607 (904)	2180 (1364)	0.023‡
Change in hematocrit from PACU to POD2	−2.9 (3.0)	−5.2 (2.9)	0.001‡
Estimated blood loss for patients with MAP of ≥75 mm Hg (mL)			
Overall	822 (642)	851 (488)	0.898
Per level	98.4 (89.0)	89.1 (51.6)	0.760
Per degree	15.3 (11.2)	15.5 (10.4)	0.949
Per anchor	51.7 (40.9)	50.6 (26.3)	0.937
Drain total	916 (377)	996 (500)	0.623
Total losses	1748 (854)	1861 (571)	0.716
Change in hematocrit from PACU to POD2	−3.2 (3.3)	−2.4 (6.6)	0.671

\*MAP = mean arterial pressure, PACU = postanesthesia care unit, POD2 = postoperative day 2. †The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid. ‡Significance achieved at  $p < 0.05$ . For the combined treatment group, all parameters except total drainage were significantly reduced versus saline solution. When controlling for high MAP, estimated blood loss trends were erratic and no significant differences were noted.

TABLE E-8 Transfusion Data for Individual Groups					
	Transfusion Rates*				Comparison
	TXA	EACA	Saline Solution	P Value†	
All patients					
Intraop.	13/36 (36)	11/42 (26)	10/47 (21)	0.136	TXA vs. saline solution
				0.605	EACA vs. saline solution
				0.101	TXA vs. EACA
Postop.	4/36 (11)	1/42 (2)	4/47 (9)	0.651	TXA vs. saline solution
				0.267	EACA vs. saline solution
				0.141	TXA vs. EACA
Transfusion rates only for patients with hematocrit of <25 intraop. and <22 postop. who had transfusion					
Intraop.	10/33 (30)	5/36 (14)	8/45 (18)	0.092	TXA vs. saline solution
				0.665	EACA vs. saline solution
				0.097	TXA vs. EACA
Postop.	4/33 (12)	1/36 (3)	3/45 (7)	0.355	TXA vs. saline solution
				0.499	EACA vs. saline solution
				0.133	TXA vs. EACA

\*The data are given as the number of patients who had a transfusion divided by the total number in group, with the percentage in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid. †Significance achieved at  $p < 0.05$ . There were no significant differences in transfusion rates between treatment groups. When controlled for transfusions specific to protocol hematocrit parameters, the cases of eleven patients were eliminated; however, no significant differences in transfusion rates were observed. A post-analysis of patients who had a transfusion was performed to evaluate the effect of autologous blood donations on transfusion rates; no significant differences were identified, although thirty-five patients (none of whom received transfusions) lacked autologous donation data.

TABLE E-9 Transfusion Data for Combined Groups			
	TXA or EACA*	Saline Solution	P Value†
Intraop.‡	24/78 (31)	10/47 (21)	0.30
Postop.‡	5/78 (6)	4/47 (9)	0.56

\*TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid.  
 †Significance achieved at  $p < 0.05$ . There were no significant differences in transfusion rates between treatment groups. ‡The data are given as the number of patients who had a transfusion divided by the total number in group, with the percentage in parentheses.

**TABLE E-10 Autologous Versus Allogenic Transfusions\***

Type of Transfusion	No. of Patients	Intraop. Transfusions (no. of patients)	Postop. Transfusions (no. of patients)
Autologous	28	9	1
Allogeneic	62	25	8
Unknown	35	0	0
P value		0.464	0.176

\*A post-analysis of patients who had a transfusion was performed to evaluate the effect of autologous blood donations on transfusion rates; no significant differences were identified, although thirty-five patients (none of whom received transfusions) lacked autologous donation data.

**TABLE E-11 Exposure Times and Lengths of Stay for Individual Groups**

	TXA*	EACA*	Saline Solution*	P Value	Comparison
Duration (min)					
Incision-anchor	68.4 (19.9)	82.1 (28.0)	78.0 (30.3)	0.109	TXA vs. saline solution
				0.477	EACA vs. saline solution
				0.027†	TXA vs. EACA
Anchor-rods	94.1 (40.0)	105.1 (46.4)	104.6 (41.3)	0.269	TXA vs. saline solution
				0.954	EACA vs. saline solution
				0.260	TXA vs. EACA
Rods-closing	52.8 (28.9)	55.4 (28.3)	57.4 (26.8)	0.458	TXA vs. saline solution
				0.736	EACA vs. saline solution
				0.686	TXA vs. EACA
Total	215.3 (65.7)	241.5 (62.6)	240.0 (65.7)	0.087	TXA vs. saline solution
				0.916	EACA vs. saline solution
				0.077	TXA vs. EACA
Length of stay (days)	5.4 (1.2)	5.5 (1.1)	5.3 (0.9)	0.767	TXA vs. saline solution
				0.487	EACA vs. saline solution
				0.718	TXA vs. EACA

\*The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid.  
 †Significance achieved at  $p < 0.05$ . The surgical time from incision to anchor placement was significantly reduced for TXA versus EACA. No other significant differences in operative times and lengths of hospital stay were observed between all treatment groups.



TABLE E-12 Exposure Times and Lengths of Stay for Combined Groups			
	TXA or EACA*	Saline Solution*	P Value†
Duration ( <i>min</i> )			
Incision-anchor	75.8 (25.4)	78.0 (30.3)	0.656
Anchor-rods	100.0 (43.6)	104.6 (41.3)	0.559
Rods-closing	54.2 (28.5)	57.4 (26.8)	0.532
Total	229.4 (65.0)	240.0 (65.7)	0.379
Length of stay ( <i>days</i> )	5.4 (1.1)	5.3 (0.9)	0.551
*The values are given as the mean, with the standard deviation in parentheses. TXA = tranexamic acid, and EACA = epsilon-aminocaproic acid. †Significance achieved at $p < 0.05$ .			