**Supplemental Appendix 1**

**Table 1**. Tumor subtype classification.

|  |  |  |
| --- | --- | --- |
| **Histologic tumor subtype** | **No TXA** **Number (%)****N=274** | **TXA** **Number (%)****N=245** |
| Acoustic neuroma | 149 (54) | 135 (55) |
| Meningioma | 60 (22) | 71 (29) |
| Pituitary tumor | 12 (4) | 8 (3) |
| Craniopharyngioma | 13 (5) | 4 (2) |
| Schwannoma | 6 (2) | 8 (3) |
| Chondrosarcoma | 6 (2) | 5 (2) |
| Chordoma | 3 (1) | 3 (1) |
| Squamous cell carcinoma | 2 (1) | 1 (<1) |
| B cell lymphoma | 2 (1) | 0 (0) |
| Cholesterol granuloma | 2 (1) | 0 (0) |
| Medulloblastoma | 2 (1) | 0 (0) |
| Pilocytic astrocytoma | 2 (1)  | 0 (0) |
| Hemangioblastoma | 1 (<1) | 1 (<1) |
| Epidermoid tumor | 1 (<1) | 0 (0) |
| Hemaniopericytoma | 1 (<1) | 0 (0) |
| Epidermoid tumor | 1 (<1) | 0 (0) |
| Adenoid cystic carcinoma | 1 (<1) | 0 (0) |
| Cholesteatoma | 1 (<1) | 0 (0) |
| Hemangioma | 1 (<1) | 0 (0) |
| Neurofibroma | 1 (<1) | 0 (0) |
| Teratoma | 1 (<1) | 0 (0) |
| Rathke’s cleft cyst | 1 (<1) | 0 (0) |
| Unknown | 1 (<1) | 0 (0) |
| Paraganglioma | 0 (0) | 1 (<1) |
| Malignant peripheral nerve sheath tumor | 0 (0) | 1 (<1) |

**Table 2.** Definition of procedural categories.

|  |  |  |
| --- | --- | --- |
| **Procedure** | **No TXA****Number (%)****N=274** | **TXA****Number (%)****N=245** |
| **Resection of Acoustic Neuroma** | 173 (63) | 161 (66) |
| Retrosigmoid craniotomy  | 164 | 158 |
| Translabyrinthine resection | 9  | 3 |
| **Anterior or Anteriolateral Approaches** | 91 (33) | 68 (28) |
| Frontotemporal or temporal craniotomy | 50 | 30 |
| Orbital zygomatic osteotomy | 26 | 24 |
| Bifrontal craniotomy | 12 | 11 |
| Bilateral orbital osteotomy or bicoronal craniotomy | 1 | 2 |
| Craniofacial resection | 1  | 0 |
| Pterional craniotomy | 1 | 0 |
| Inferotemporal fossa craniotomy | 0 | 1  |
| **Posteriolateral Approaches** | 10 (4) | 16 (7) |
| Partial labyrinthine petrous apectomy | 8 | 12 |
| Posterior temporal craniotomy | 1 | 2 |
| Petrous bone resection | 1 | 0 |
| Extreme lateral approach | 0 | 2 |

## Table 3. Association of candidate predictors with perioperative transfusion.

|  |  |  |  |
| --- | --- | --- | --- |
| **Predictor** | **Not transfused****N=466** | **Transfused****N=53** | **P-value** |
| Age (years) (mean, SD) | 49 (13) |  49 (12) | 0.99 |
| Weight (kg) (mean, SD) | 77 (19) |  73 (18) | 0.10 |
| Male (number, %) | 197 (42) | 12 (23) | 0.006 |
| Preoperative hemoglobin (g/dL) (mean, SD)\* | 14.4 (1.3) | 13.4 (1.6) | <0.001 |
| Tumor diameter (cm) (mean, SD)\*\* | 3.1 (1.2) |  4.4 (1.4) | <0.001 |
| Procedure category (number, %)Resection of acoustic neuromaAnterolateral approachesPosterolateral approaches | 321 (69)126 (27)19 (4) | 13 (25)33 (62)7 (13) | <0.001 |
| Surgery year (median, range) | 2008 (2000-2013) | 2005 (2002-2012) | <0.001 |
| Tranexamic acid (number, %) | 227 (49) | 18 (34) | 0.04 |

Abbreviations: SD, standard deviation; kg, kilogram; cm, centimeters; g, gram; dL, deciliters.

\* Missing data in 1 patient who received tranexamic acid.

\*\* Missing data in 7 patients who received tranexamic acid and 8 patients who did not receive tranexamic acid.

**Table 4.** Multivariate model predicting perioperative transfusion in complex skull-base neurosurgery, including surgery year and an interaction term between tranexamic acid and surgery year, centered on the year 2006.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Predictor** | **Unadjusted OR** | **Adjusted****OR** | **Adjusted OR 95% CI** | **P-value** |
| Tranexamic acid used | 0.56 | 0.51 | 0.13 to 1.78 | 0.31 |
| Surgery year | 0.81 | 0.68 | 0.54 to 0.85 | 0.001 |
| Interaction term (surgery year#tranexamic acid) | - | 1.50 | 1.05 to 2.17 | 0.026 |
| Surgical Procedure Category \*\* |  |  |  |  |
| Resection of Acoustic Neuroma | Reference |  |  |
| Anterolateral Approaches | 6.47 | 4.47 | 2.05 to 10.19 | <0.001 |
| Posterolateral Approaches | 9.10 | 3.62 | 0.93 to 12.96 | 0.054 |
| Preoperative hemoglobin\* | 0.95 | 0.94 | 0.92 to 0.97 | 0.001 |
| Tumor diameter# | 2.16 | 1.95 | 1.45 to 2.65 | <0.001 |

Abbreviations: OR, odds ratio; CI, confidence interval.

\*OR for preoperative hemoglobin reported per g/L.

\*\*OR for surgical procedure category compared to reference category (resection of acoustic neuroma)

#OR for tumor diameter reported per centimeter.