Supplementary Material

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**Table 3:** Distribution details of variables (predictors, approach, outcome) split by fold. All variables are binary, excluding age which is continuous. For the binary variables the number of entries where the variable is present (represented as a 1) is given. For the singular continuous parameter (age), median; and inter-quartile range (IQR) are given instead.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Fold** | **Fold 1** | **Fold 2** | **Fold 3** | **Fold 4** | **Fold 5** | **All** |
| *Participants* | 174 | 174 | 173 | 172 | 172 | 865 |
| *EEA Approach* | 028 | 028 | 028 | 028 | 028 | 140 |
| *Median Age (IQR* | 54 (41-64)years | 51 (37-66)years | 54 (42-64)years | 53 (41-63)years | 51 (39-61)years | 53 (40-63)years |
| *Male Sex* | 080 | 086 | 083 | 092 | 075 | 416 |
| *BMI > 30* | 042 | 052 | 049 | 055 | 040 | 238 |
| *Tumour Diameter ≥ 1cm* | 151 | 149 | 146 | 152 | 139 | 737 |
| *Revision Surgery* | 022 | 032 | 022 | 019 | 024 | 119 |
| *Presence of Intraoperative CSF Leak* | 055 | 060 | 061 | 059 | 058 | 293 |
| *CSF Diversion* | 014 | 010 | 017 | 015 | 011 | 067 |
| *Dural Closure* | 000 | 000 | 000 | 000 | 000 | 000 |
| *Dural Replacement* | 050 | 053 | 061 | 050 | 048 | 262 |
| *Vascularised Flap* | 036 | 037 | 048 | 053 | 032 | 206 |
| *Tissue Graft* | 048 | 062 | 056 | 066 | 054 | 286 |
| *Synthetic Graft* | 052 | 039 | 054 | 059 | 046 | 250 |
| *Tissue Glue* | 112 | 115 | 123 | 120 | 117 | 587 |
| *Haemostatic Agent* | 116 | 107 | 102 | 098 | 109 | 532 |
| *Rigid Buttress* | 008 | 008 | 014 | 009 | 009 | 048 |
| *Gasket Seal* | 005 | 004 | 007 | 004 | 006 | 026 |
| *Nasal Packing* | 128 | 137 | 122 | 125 | 122 | 634 |
| *CSFR* | 008 | 008 | 008 | 007 | 007 | 038 |

**Table 4:** SHAP score correlation coefficient for each predictor across all ten NNs. SHAP scores are mean-averaged across the 5-folds and the standard deviations are given after the ‘±’ sign. All values are given to two significant figures.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | TSA | EEA | TSA or EEA | TSA | EEA | TSA or EEA | TSA | EEA | TSA or EEA | TSA or EEA |
| Risk Factors | Risk Factors | Risk Factors | Repair Techniques | Repair Techniques | Repair Techniques | Risk FactorsandRepair Techniques | Risk FactorsandRepair Techniques | Risk FactorsandRepair Techniques | All (including Approach) |
| Age | -0.86±0.06 | -0.06±0.62 | -0.73±0.15 | - | - | - | **-0.77±0.07** | -0.45±0.66 | -0.7±0.25 | -0.77±0.14 |
| Male Sex | 0.64±0.33 | 0.27±0.8 | 0.51±0.53 | - | - | - | 0.47±0.65 | 0.17±0.60 | 0.79±0.12 | 0.68±0.21 |
| BMI > 30 | 0.47±0.47 | 0.27±0.8 | 0.48±0.4 | - | - | - | 0.43±0.70 | -0.4±0.62 | 0.46±0.36 | 0.55±0.28 |
| Tumour Diameter ≥ 1cm | -0.77±0.15 | 0.74±0.21 | 0.33±0.51 | - | - | - | 0.04±0.64 | 0.12±0.94 | 0.28±0.57 | -0.07±0.64 |
| Revision Surgery | 0.63±0.27 | -0.51±0.82 | -0.30±0.56 | - | - | - | 0.17±0.59 | -0.44±0.77 | -0.10±0.57 | 0.27±0.35 |
| Presence of Intraoperative CSF Leak | 0.84±0.04 | 0.00±0.87 | 0.80±0.11 | - | - | - | **0.86±0.04** | 0.43±0.63 | 0.80±0.08 | 0.77±0.10 |
| CSF Diversion | - | - | - | -0.49±0.67 | -0.60±0.46 | -0.8±0.14 | **-0.86±0.04** | **-0.72±0.24** | -0.68±0.37 | -0.83±0.06 |
| Dural Closure | - | - | - | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 |
| Dural Replacement | - | - | - | 0.64±0.29 | -0.19±0.85 | 0.71±0.22 | 0.49±0.53 | 0.36±0.62 | 0.83±0.07 | 0.54±0.29 |
| Vascularised Flap | - | - | - | 0.28±0.77 | 0.81±0.08 | 0.13±0.84 | **-0.71±0.23** | **0.77±0.18** | 0.26±0.57 | -0.1±0.67 |
| Tissue Graft | - | - | - | 0.77±0.27 | -0.49±0.79 | 0.66±0.45 | 0.52±0.71 | -0.33±0.82 | 0.79±0.08 | 0.63±0.28 |
| Synthetic Graft | - | - | - | -0.05±0.89 | 0.46±0.71 | 0.44±0.40 | **0.77±0.11** | **0.73±0.23** | 0.70±0.10 | 0.77±0.09 |
| Tissue Glue | - | - | - | -0.80±0.14 | -0.54±0.72 | -0.68±0.24 | **-0.77±0.06** | -0.33±0.74 | -0.77±0.08 | -0.80±0.06 |
| Haemostatic Agent | - | - | - | 0.43±0.61 | -0.87±0.07 | 0.28±0.38 | 0.52±0.52 | -0.56±0.64 | 0.32±0.46 | 0.46±0.57 |
| Rigid Buttress | - | - | - | -0.9±0.05 | -0.23±0.83 | -0.61±0.69 | **-0.88±0.07** | **0.78±0.12** | -0.43±0.62 | -0.81±0.03 |
| Gasket Seal | - | - | - | -0.64±0.72 | -0.81±0.34 | -0.91±0.07 | **-0.96±0.01** | **-0.79±0.2** | -0.85±0.11 | -0.92±0.03 |
| Nasal Packing | - | - | - | 0.70±0.42 | 0.85±0.12 | 0.71±0.25 | 0.24±0.71 | 0.53±0.71 | 0.72±0.13 | 0.45±0.61 |
| Surgical Approach | - | - | - | - | - | - | - | - | - | 0.71±0.23 |

**Figure 1:** SHAP scores for predictors displayed as a bee diagram where the NNs are split by both prediction category and approach. Scores are shown for each predictor across all 5-folds. As shown in the ‘predictor value’ legend – a high value is indicated in red, and a low value is indicated by blue; for binary variables this means red indicates a value of 1 (i.e. present) and blue indicates a value of 0 (i.e. not present).



**Figure 2:** SHAP scores for predictors displayed as a bee diagram for the approach category ‘TSA or EEA’, where the NNs are split by prediction category. Scores are shown for each predictor across all 5-folds. As shown in the ‘predictor value’ legend – a high value is indicated in red, and a low value is indicated by blue; for binary variables this means red indicates a value of 1 (i.e. present) and blue indicates a value of 0 (i.e. not present).

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