Skull base meningioma outcome

Peritumoral edema (PTE) in skull base meningiomas correlates to the absence of an arachnoid plane and difference in outcome.

A subset of benign (WHO grade I) skull base meningiomas shows early progression/recurrence (P/R) in the first years after surgical resection.

Though various predictors of adverse postoperative outcomes among meningioma patients have been established, research has yet to develop a method for consolidating these findings to allow for predictions of adverse healthcare outcomes for patients diagnosed with skull base meningiomas.

The objective of a study was to develop three predictive algorithms that can be used to estimate an individual patient's probability of extended length of stay (LOS), experiencing a nonroutine discharge disposition, or incurring high hospital charges following surgical resection of a skull base meningioma.

The study utilized data from patients who underwent surgical resection for skull base meningiomas at a single academic institution between 2017-2019. Multivariate logistic regression analysis was used to predict extended LOS, nonroutine discharge, and high hospital charges, and 2000 bootstrapped samples were used to calculate an optimism-corrected c-statistic. The Hosmer-Lemeshow test was used to assess model calibration, and $p<0.05$ was considered statistically significant.

A total of 245 patients were included in our analysis. Our cohort was majority female (77.6%) and Caucasian (62.4%). Our models predicting extended LOS, nonroutine discharge, and high hospital charges had optimism-corrected c-statistics of 0.768, 0.784, and 0.783, respectively. All models demonstrated adequate calibration ($p>0.05$), and were deployed an open-access, online calculator: https://neurooncsurgery3.shinyapps.io/high_value_skull_base_calc/.

Following external validation, these predictive models have the potential to aid clinicians in providing patients with individualized risk-estimation for healthcare outcomes following meningioma surgery [1].

Ko et al. retrospectively investigated the preoperative CT and MR imaging features for the prediction of P/R in skull base meningiomas, with emphasis on quantitative ADC values. Only patients had postoperative MRI follow-ups for more than 1 year (at least every 6 months) were included. From October 2006 to December 2015, total 73 patients diagnosed with benign (WHO grade I) skull base meningiomas were included (median follow-up time 41 months), and 17 (23.3%) patients had P/R (median time to P/R 28 months). Skull base meningiomas with spheno-orbital location, adjacent bone invasion, high DWI, and lower ADC value/ratio were significantly associated with P/R ($P < 0.05$). The cut-off points of ADC value and ADC ratio for prediction of P/R are $0.83 \times 10\text{-}3$ mm2/s and 1.09 respectively, with excellent area under curve (AUC) values (0.86 and 0.91) ($P < 0.05$). In multivariate logistic regression, low ADC values ($< 0.83 \times 10\text{-}3$ mm2/s) and adjacent bone invasion are high-risk factors of P/R ($P < 0.05$), with odds ratios of 31.53 and 17.59 respectively. The preoperative CT and MRI features for prediction of P/R offered clinically vital information for the planning of treatment in skull base meningiomas [2].

References

1)
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2)
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