Benign peripheral nerve sheath tumor case series

2021

Data from consecutive adult patients who underwent resection of a benign peripheral nerve sheath tumor at 7 participating institutions were combined. Propensity score matching was used to balance covariates. The primary outcomes of interest were the association between IONM and GTR and the association of intraoperative neuromonitoring (IONM) and the development of a permanent postoperative neurological complication. The secondary outcomes of interest were the association between IONM and GTR and the association between IONM and the development of a permanent postoperative neurological complication in the subgroup of patients with tumors involving a motor or mixed nerve. Univariate and multivariate logistic regression were then performed on the propensity score-matched samples to assess the ability of the independent variables to predict the outcomes of interest.

Results: A total of 337 patients who underwent resection of benign nerve sheath tumors were included. In multivariate analysis, the use of IONM (OR 0.460, 95% CI 0.199-0.978; p = 0.047) was a significant negative predictor of GTR, whereas none of the variables, including IONM, were associated with the occurrence of a permanent postoperative neurological complication. Within the subgroup of motor/mixed nerve tumors, in the multivariate analysis, IONM (OR 0.263, 95% CI 0.096-0.723; p = 0.010) was a significant negative predictor of a GTR, whereas IONM (OR 3.800, 95% CI 1.925-7.502; p < 0.001) was a significant positive predictor of a permanent postoperative motor deficit.

Overall, 12% of the cohort had a permanent neurological complication, with new or worsened paresthesias most common, followed by pain and then weakness. The authors found that formal IONM was associated with a reduced likelihood of GTR and had no association with neurological complications. Wilson et al. believed that these data argue against IONM being considered the standard of care but do not believe that these data should be used to universally argue against IONM during resection of benign peripheral nerve sheath tumors [1)].

2019

Between September 2018 and February 2019, 20 consecutive patients with a total of 25 suspected PNSTs underwent fluorescein-guided surgery performed under a microscopic view with a dedicated filter integrated into the surgical microscope (YELLOW 560) and with intraoperative monitoring. All patients presented with a different degree of contrast enhancement at preoperative MRI. Fluorescein was intravenously injected after intubation at a dose of 1 mg/kg. Preoperative clinical and radiological data, intraoperative fluorescein characteristics, and postoperative neurological and radiological outcomes were collected and analyzed.

Six patients were affected by neurofibromatosis or schwannomatosis. There were 14 schwannomas, 8 neurofibromas, 1 myxoma, 1 reactive follicular hyperplasia, and 1 giant cell tumor of tendon sheath. No patient experienced worsening of neurological status after surgery. No side effects related to fluorescein injection were found in this series. Fluorescein allowed an optimal intraoperative

distinction between tumor and surrounding nerves in 13 of 14 schwannomas and in all neurofibromas. In 6 neurofibromas and in 1 schwannoma, the final YELLOW 560 visualization showed the presence of small tumor remnants that were not visible under white-light illumination and that could be removed, obtaining a gross-total resection.

Fluorescein was demonstrated to be a feasible, safe, and helpful intraoperative adjunct to better identify and distinguish PNSTs from intact functional nerves, with a possible impact on tumor resection, particularly in diffuse neurofibromas [2].

2017

A retrospective review of clinical and radiological findings of 442 patients with benign PNSTs involving the neck and extremities treated surgically from 2000 to 2014 was performed in the Department of Neurosurgery, P. D. Hinduja National Hospital and Medical Research Center, Mumbai, India.

In this series, benign PNSTs involved the extremities in 290 (65.6%) patients and the brachial plexus in 146 (33%) patients, and 6 (1.4%) patients had tumors of the extracranial portion of the vagus nerve and hypoglossal nerves in the neck. The mean age of patients was 38 yr. The presenting features were painful mass and paresthesia. Preoperative motor weakness in the extremity was noted in 15.6% of patients. The common nerves involved by the tumors were the ulnar nerve (15.8%), sciatic nerve (12.7%), and upper cervical roots (11.5%). The excision was total in 81.2%, gross total (>90%) in 17.9%, and subtotal (>50%) in 0.9% patients. In 17.6% of patients, there was severe postoperative neurogenic pain. In 28 (6.3%) patients, a new motor deficit was noted following surgery. Recurrence was seen in 2 patients in our series. The mean follow-up was 30.2 mo.

Benign PNSTs have excellent clinical outcome, and the goal for surgical treatment is total to gross total excision of the tumor with neural preservation [3].

1)
Wilson TJ, Hamrick F, Alzahrani S, Dibble CF, Koduri S, Pendleton C, Saleh S, Ali ZS, Mahan MA, Midha R, Ray WZ, Yang LJS, Zager EL, Spinner RJ. Analysis of the effect of intraoperative neuromonitoring during resection of benign nerve sheath tumors on gross-total resection and neurological complications. J Neurosurg. 2021 Feb 12:1-10. doi: 10.3171/2020.8.JNS202885. Epub ahead of print. PMID: 33578389.
2)
Vetrano IG, Acerbi F, Falco J, Devigili G, Rinaldo S, Messina G, Prada F, D'Ammando A, Nazzi V. Fluorescein-guided removal of peripheral nerve sheath tumors: a preliminary analysis of 20 cases. J Neurosurg. 2019 Dec 6:1-10. doi: 10.3171/2019.9.JNS19970. [Epub ahead of print] PubMed PMID: 31812148.
3)
Desai KI. The Surgical Management of Symptomatic Benign Peripheral Nerve Sheath Tumors of the Neck and Extremities: An Experience of 442 Cases. Neurosurgery. 2017 Oct 1;81(4):568-580. doi: 10.1093/neuros/nyx076. PubMed PMID: 28475798.