Different Considerations Across Surgical Subspecialties Regarding Functional Reconstructions and Nerve Handling in Malignant Peripheral Nerve Sheath Tumors: an International Survey

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Background

Malignant peripheral nerve sheath tumors (MPNSTs) are rare and aggressive sarcomas. Their resection may require resection of major nerves causing serious morbidity. This study investigated whether surgical considerations and the use of functional reconstructions differed among surgical subspecialties treating MPNSTs.

Methods

A survey was distributed online among members of multiple surgical societies: the Dutch Society of Surgical Oncology (NVCO), the Dutch Society for Surgery of the Hand (NVVH), the peripheral nerve section of the Dutch Society for Neurosurgery (NVVN), the American Society for Peripheral Nerve (ASPN), the peripheral nerve section of the European Association of Neurosurgical Societies (EANS), and the Soft Tissue and Bone Sarcoma Group of the European Organization for Research and Treatment of Cancer (EORTC). Responses were summarized per surgical subspecialty: oncologic surgery, neurosurgery, plastic surgery, and other surgical subspecialties. Differences were calculated with χ^2-tests for categorical data. P-values <0.05 were considered statistically significant. Statistical analyses and data visualization were conducted using R version 3.6.0 (R Core Team, 2019).

Fig. 1

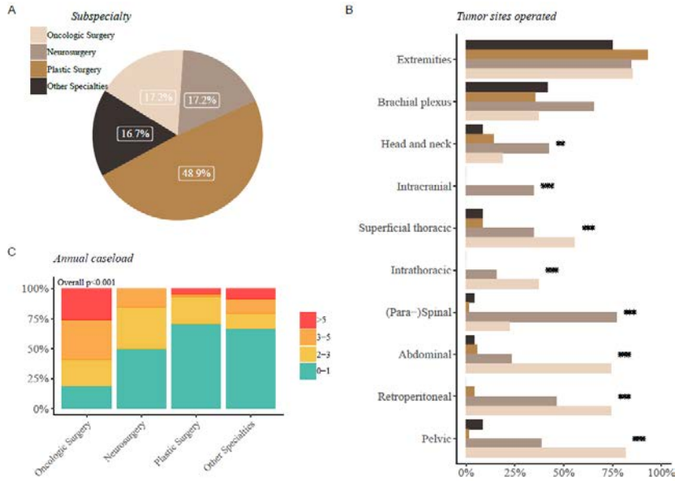

Fig. 2

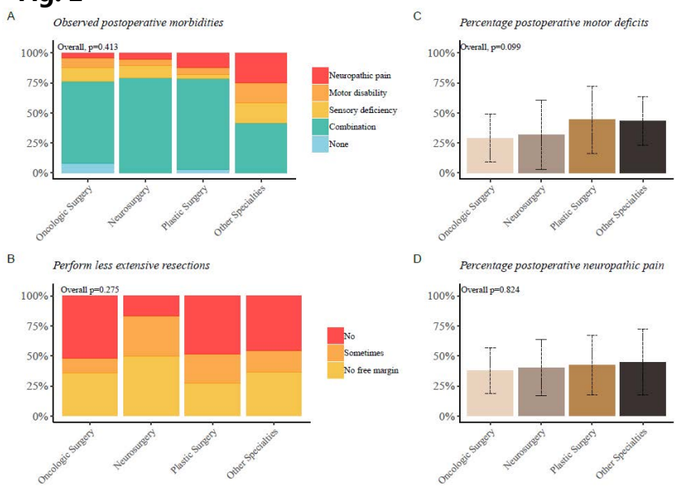

Fig. 1 Demographical data of respondents
Fig. 2 Observed complications after MPNST resections
p-values: * = <0.05, ** = <0.01, *** = <0.001.

Results

A total of 30 oncologic surgeons, 30 neurosurgeons, 85 plastic surgeons, and 29 'others' filled out the survey. Surgical oncologists had the highest case load (p<0.001, **Fig. 1**). Most respondents operated extremity tumors (75.0-93.0%). Functional status was usually considered preoperatively among all subspecialties (65.1%); 42.2% never considered performing less extensive resections to preserve function (data not shown). Neuropathic pain and motor deficits were present in 40.9±22.9% and 36.7±25.5% respectively among all respondents (**Fig. 2**). Neuroma prevention was most commonly performed by burying the stump into bone/muscle/vein (39.3%, data not shown). Functional reconstructions for motor and sensory deficits were more commonly considered by plastic surgeons and 'others' (**Fig. 4**). Relative contraindications for reconstructions did not differ between subspecialties (p>0.05). Most surgeons would reconstruct directly or directly unless radiotherapy would be administered (62.7%). On average, surgeons would consider functional reconstructions at a mean survival of 3.0±2.0 years.

Conclusion

Surgical treatment of MPNSTs differs among subspecialties. Neuropathic pain, motor deficits, and sensory deficits are common postoperative morbidities. Consensus has yet to be reached on the preservation and reconstruction of function in MPNST. Highest surgical caseloads are among surgical oncologists and neurosurgeons, yet these subspecialties are least likely to consider reconstructions to restore function. Surgeons agreed upon an average prognosis of three years before considering functional reconstructions.

Fig. 3

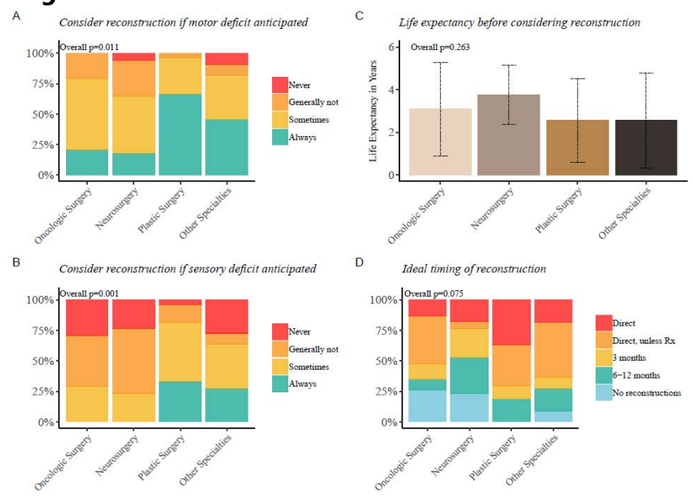

Fig. 4

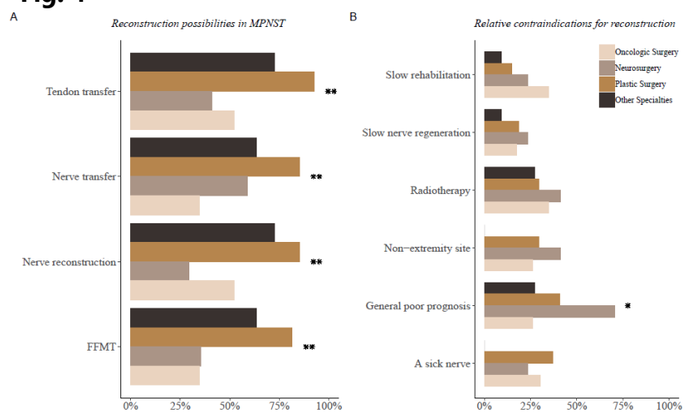

Fig. 3 Considerations for performing functional reconstructions
Fig. 4 Type of reconstructions and relative contraindications
p-values: * = <0.05, ** = <0.01, *** = <0.001.