Peripheral Nerve Sheath Tumors: Clinicopathological Evaluation of 76 Cases

Periferik Sinir Kılıfı Tümörleri: 76 Olgunun Klinikopatolojik Değerlendirmesi

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Geliş Tarihi / Received : **25.03.2019** Kabul Tarihi / Accepted : **19.06.2019**

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This article has been presented as an oral presentation in part at the 2. International Gevher Nesibe Health Sciences Congress at Ankara, held at November 30- December 2, 2018.

Abstract

Objective	In this study, we aimed to present the descriptive statistics of patients diagnosed with peripheral nerve sheath tumor (PNST) between January 2010 and May 2018. **(Sakarya Med J 2019, 9(2):337-341)**
Materials and Methods	The data of 76 cases who were histopathologically diagnosed as PNST in our hospital between January 2010 and May 2018 were retrospectively evaluated. Clinical and histopathological features were examined.
Results	Of the 76 cases 52.6% (n:40) were diagnosed as NF, 35.6% (n:27) as schwannoma, 9.2% (n:7) as neuroma, 2.6% (n:2) as granular cell tumor. No malignant lesion was determined. The mean age value was 49.1 for NF, 42.3 for schwannoma, 36.1 for neuroma and 50,5 for granular cell tumor. The age of the patients ranged from 16 to 78 with the mean value of 45.5. Fourty-seven male and 29 female patients were included. All the tumors were planned to be fully excised. In approximately half of NF cases the lesions had non head and neck localization,16 cases had head and neck localization, localization was not mentioned in 5 patients. Approximately 78% of schwannomas were located in non head and neck region, the remaining 4 cases scalp, neck, tongue, antrochoanal region, the localization was not mentioned for two patients. Two of neuromas were localized on hand, while 2 of them on the foot, 1 on the lip, 1 on the jaw, 1 on the frontal region. The localizations of granular cell tumors were esophagus and arm. Recurrence was not detected in the localization of excised lesions. The most prevalent histologic type was NF. Male population -with the most in NF-was predominant in all tumor groups. Tumors were more frequently seen in middle age group especially between 40-50 years. In all tumor groups, most of the tumors were localized in non head and neck region (total:60.6%);the vast majority of schwannoma lesions and approximately half of NF were localized in non head and neck region.
Conclusion	PNST are generally benign, slow growing lesions but when found in atypical localizations wrong diagnosis can be established and this may lead to suboptimal surgical treatment. Preoperative planning, meticulous surgical excision and histopathological evaluation are essential for the prevention of recurrences and optimizing postoperative functional results.
Keywords	peripheral; nerve sheath; tumor; pathology; clinic

Öz

Amaç	*Bu çalışmada Ocak 2010-Mayıs 2018 tarihleri arasında hastanemize başvurup periferik sinir kılıfı tümörü (PSKT) tanısı alan hastaların tanımlayıcı istatistiklerini sunmayı amaçladık. (**Sakarya Tıp Dergisi 2019, 9(2):337-341**).*
Gereç ve Yöntemler	*Hastanemizde Ocak 2010-Mayıs 2018 tarihleri arasında histopatolojik olarak periferik sinir kılıfı tümörü tanısı alan 76 olgunun verileri geriye dönük analiz edildi. Klinik ve histopatolojik özellikleri incelendi*
Bulgular	*Serimizde yer alan 76 olgunun %52.6 (n:40)'sı nörofibrom (NF), %35.6 (n:27)'sı Schwannom, %9.2 (n:7)'si Nörom, %2.6 (n:2)'sı Granüler hücreli tümördü. Malign tanılı olgu saptanmadı. Ortalama yaş NF'de 49.1, Schwannomda 42.3, Nöromda 36.1, Granüler hücreli tümörde 50.5'di. Hastaların yaşları 16-78 yılları arasında değişmekte olup ortalaması 45.5 idi. Olguların 47'si erkek, 29'u kadındı. Tümörlerin hepsi tam olarak çıkarılmaya çalışılmıştı. NF'lerin yaklaşık yarısı baş-boyun dışı yerleşimli olup, 16 olgu baş-boyun yerleşimli, 5'inde lokalizasyon belirtilmemişti. Schwannomların yaklaşık %78'i baş-boyun dışı, geri kalan 4 olgu; skalp, boyun, dil, antrakoanal bölgedeydi, 2'sinde lokalizasyon belirtilmemişti. Nöromların 2'si el, 2'si ayak (2 Morton nöromu), 1'i dudak, 1'i çene, 1'i frontal yerleşimliydi. Granüler hücreli tümörler özofagus ve kol yerleşimliydi. Eksize edilen kitlelerde nüks izlenmedi. En sık histolojik tip NF idi. Tüm tümör gruplarında erkek olguların oranı-nörofibromda daha fazla olmak üzere-daha fazlaydı. Tümörler en sık orta yaş grubunda, 40-50 yaş arasında dağılım gösteriyordu. Lokalizasyon olarak tümörlerin tamamında baş-boyun dışı yerleşim daha sıktı (total:%60.6); Schwannom tanılı olguların büyük kısmı; NF olgularının ise yaklaşık yarısı baş-boyun dışı yerleşimliydi.*
Sonuç	*PSKT'leri, genellikle benign, yavaş büyüyen kitleler halinde bulunurlar, ancak nadir yerleşimli bölgelerde yanlış teşhise ve suboptimal cerrahi tedaviye yol açabilir. Preoperatif planlama, dikkatli bir cerrahi eksizyon ve histopatolojik değerlendirme tümör nüksünü önlemek ve postoperatif fonksiyonel sonuçları iyileştirmek için gereklidir.*
Anahtar Kelimeler	*periferik; sinir kılıfı; tümör; patoloji; klinik*

INTRODUCTION

Peripheral nerve sheath tumours (PNSTs) are soft tissue neoplasms associated with peripheral nerve. PNSTs can be classified as benign and malignant. The first category includes neurofibroma (NF), Schwannoma, neuroma (traumatic, Morton and palisaded encapsulated neuroma (PEN)), and the second category includes malignant peripheral nerve sheath tumour (MPNST). These tumours share a common neural origin but show microscopic and clinical heterogeneity.[1] Benign peripheral nerve sheath tumours (BPNSTs) constitute 10-12% of benign soft tissue neoplasms. MPNSTs constitute 5-10% of all soft tissue sarcomas and occur in 0.001% of the general population.[2] In this study, we aimed to present the descriptive statistics of patients diagnosed with peripheral nerve sheath tumor (PNST) between January 2010 and May 2018.

MATERIALS and METHODS

The data of 76 cases with histopathological diagnosis of PNST between January 2010 and May 2018, at Ahi Evran University Training and Research hospital, were retrospectively analysed. The study was descriptive and conducted using pathology reports in the archive of our pathology laboratory. The data, such as the mean age of the patients, gender distribution, tumour localization, tumour characteristics, histopathological type were examined. Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) Version 22.0 (IBM Corp.; Armonk, NY, USA) for Windows program. The study protocol complied with the ethical principles of the Helsinki Declaration. The approval for the study was obtained from the local ethics committee (decree no: 2019-02/18).

RESULTS

Of the 76 cases in our series, 52.6% (n: 40; M / F: 26/14) had NF, 35.6% (n: 27; M / F: 15/12) Schwannoma, 9.2% (n: 7; M / F: 4/3) Neuroma, and 2.6% (n: 2; M / F: 2/0) had Granular cell tumour. Cases with malignancy diagnosis were not found. The mean age was 49.1 in NF, 42.3 in Schwannoma, 36.1 in neuroma and 50.5 in Granular cell tumour. The ages of the patients ranged between 16-78 years and the mean was 45.5 years. Fourty-seven cases were male and 29 were female (Table 1).

Table 1: Distribution of 76 Cases with Peripheral nerve sheath tumors by mean age and gender

Tumor	Mean age±SD	Female n (%)	Male n (%)	Total: n (%)
Schwannoma	42.37 ± 14.35	12(%44.4)	15(%55.6)	27(%100)
Neurofibroma	49.07 ± 15.38	14(%35)	26(%65)	40(%100)
Neuroma	36.14 ± 11.95	3(%42.9)	4(%57.1)	7(%100)
Granular cell tumor	50.50 ± 7.78	0(%0)	2(%100)	2(%100)
Total:	45.54 ± 15.02	29(%38.2)	47(%61.8)	76(%100)

All tumours were attempted to be removed completely. Approximately half of the NFs are located outside head and neck (19 cases: 4 cases of back and arm, 3 cases of throax front side, 2 cases of fingers and feet, 1 case of lumbar, axilla, abdomen and penis), 16 head and neck localized (16 cases: 4 cases face, 3 cases scalp, 2 cases neck, postauricular, forehead, jaw, 1 case nose), 5 localization was not specified. Approximately 78% of the Schwannomas were head and neck (21 cases: 4 cases hand, 3 cases ankle, 2 cases foot, hand wrist, leg, finger, back, 1 case arm, thigh, abdomen, spinal canal) the remaining 4 cases were scalp, neck, tongue, antrochoanal region, and no localization was reported in 2 cases. Of the neuromes, 2 hand, 2 feet (2 Morton neuroma), 1 lip, 1 jaw, 1 was located in the frontal. Granular cell tumours were located in the esophagus and arm (Table 2,3). Lesions were multiple localized in two NF cases. No recurrence was observed in excised masses.

Table 2: Anatomical Locations of Peripheral nerve sheath tumors (head and neck region).	
Tumor	Head&Neck (n=23)
Schwannoma	scalp(1), neck(1), tongue(1), antrochoanal(1)
Neurofibroma	face(4), scalp(3), neck(2), postauricular(2), forehead(2), jaw(2), nose(1)
Neuroma	lip(1), jaw(1), frontal(1)
Granular cell tumor	0

Table 3: Anatomical Locations of Peripheral nerve sheath tumors (outside the head and neck region).	
Tumor	Non- head&neck (n=46)
Schwannoma	hand(4), foot ankle(3), foot(2), wrist(2), leg(2), finger(2), back(2), arm(1), thigh(1), abdomen(1), spinal canal(1)
Neurofibroma	back(4), arm(4), chest(3), foot(2), finger(2), lomber (1) , axillary(1), abdomen(1), penis(1)
Neuroma	hand(2), foot(2)
Granular cell tumor	esophagus(1), arm(1)

DISCUSSION

In our study, all cases were benign. In all tumour groups, the rate of male cases was higher- more in the neurofibroma. Tumours were most commonly distributed in the middle age group between the ages of 40-50. The localization of all tumours outside head and neck was more frequent (total: 60.6%).

NF is mostly seen in the 20-30 age groups and in head and neck region. They are relatively common in the superficial cutaneous areas, where they are particularly localized, pedunculated. The growth pattern is in the form of diffuse infiltration in the extraneural areas of well-limited intraneural or soft tissue. NF is a limited, non-encapsulated tumour consisting of a mixture of Schwann cells, perineural cells, and endoneural fibroblasts. Wavy collagen fibres varying from myxoid ground and thin to thick are the key stromal properties. As gross, the cross section is bright flesh-white in colour.[3,4] Although Schwannomas constitute the majority of PNSTs in various studies, the most common histological type is NF.[2,4-6] Approximately half of the NF cases were located outside the head and neck (Table 3). Lesions were found multiple in 2 cases. The average age was 49.1 years.

Schwannomas are slow-growing solitary tumours, most of which are diagnosed coincidentally, with no sex preference, seen in middle-aged individuals. It is an encapsulated neoplasm consisting of Schwann cells arranged in two ways as Antoni type A and Antoni type B. Although it may occur in any region, the most common involvement is in the brachial plexus and spinal nerves with 25-48% of the head and neck region, and involvement in the extremities are rarely seen. It is more frequent between the ages of 20-50. Schwannomas located at the most periphery can be resected with no minimal or no postoperative neurological deficits.[1,3,4,7] In our study, the mean age was 42.[3] in accordance with the literature. In our series, the second most common histological type was different from the literature, with the majority (78%) (n:21) located outside the head and neck. It was noteworthy that most of them were located (finger, hand, wrist, arm, foot, ankle, leg, thigh) in the (n:17) extremities (Table 2,3).

Traumatic neuroma is a lesion characterized by the proliferation of Schwann cells and nerve fibres after nerve damage. PEN is a capsulated proliferation, which shows palisading, characterized by Schwann cells and the fasciculi intervening with them.[1] Morton neuroma is a painful lesion developing at the capitulum of the metatarsal bones. The mass occurs as a result of degenerative and proliferative growth of digital plantar nerves. It is most commonly seen in middle-aged women.[8] Four of the 7 neuroma cases in our series were PEN, 2 were Morton neuroma and 1 was traumatic neuroma (Table 1).

It has been proven that granular cell tumour is originally neuroectodermal. Granular cell tumour also develops from Schwann cells. These tumours are common in the head and neck region and are a component of Noonan syndrome. Microscopically, these tumours have granular

eosinophilic cytoplasm which takes their name from.[3] In our study, granular cell tumour was observed in 2 patients; 45 years old male localized in the esophagus, 56 years old male localized in arm (Table 1).

MPNSTs are spindle-cell sarcomas originating from nerve, NF, Schwannoma or nerve-containing tissues. 8-16% MPNST develops in the head and neck region. Unlike BPNST, MPNST is rare (0.001%) and the age group ranges from 16 to 60 years. In contrast to benign PNSTs, MPNSTs are more common in the proximal parts of the extremities and in the trunk than in the head and neck region. Differential diagnosis of MPNST includes other mesenchymal tumours such as rhabdomyosarcoma, leiomyosarcoma, synovial sarcoma, fibrosarcoma and malignant fibrous histiocytoma.[1,3]

The diagnosis of Schwannoma and NF is easy and rarely requires immunohistochemistry. S100 is frequently expressed in Schwannoma and NF. Since the differential diagnosis of MPNST is extensive, immunohistochemistry is required to confirm. The S-100, which is frequently expressed in BPNST, may not be positive in all MPNST cases. In difficult cases of BPNST and MPNST, proliferating cell nuclear antigen and Ki-67 help diagnosis.[3]

PNSTs are usually seen as benign, slow-growing masses, but as in our series, they can also be found in rarely located sites outside head and neck, and may lead to misdiagnosis and suboptimal surgical treatment. Preoperative planning, careful surgical excision and histopathological evaluation are necessary to prevent tumour recurrence and improve postoperative functional outcomes.

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