The study presented a case of a patient with a neurilemoma of the median nerve. It presented as a six centimeters tumor, at the level of the proximal one third of the arm with only mild paraesthesias within first to third ray of the hand. MRI showed the relationship of the tumor and the median nerve, and allowed for the preliminary diagnose of a benign peripheral neural sheath tumor (neurilemoma or neurofibroma). During the first operation the tumor has not been excised, because nerve reconstruction technique was not available. During the second procedure excision of the tumor has been performed without resection of the median nerve trunk with no postoperative deficiencies. The paper provides a detailed description of a surgical procedure. The presented case, like current publications shows that peripheral neural sheath tumor may be usually excised without resection of the nerve trunk, although the possibility of nerve fascicles injury or the need to excise them in the case of neurofibroma clearly suggest that these type of operations should be carried out in centers with microsurgical facilities.

**Key words:** neurilemoma, schwannoma, peripheral neural tumor, microsurgery

In case of patients with tumors of the upper limb due, differential diagnosis should take into account the tumors derived from the peripheral nerves. The aim of this paper is to present symptomatology and preoperative diagnosis of this type of tumors. Prior to surgery the surgeon may raise concerns about the risk of nerve damage. Article provides guidance on the surgical technique to remove a tumor derived from nerve tissue on the basis of their own experience and data from the literature.

**CASE REPORT**

42 year-old female patient was referred to the Department of Plastic Surgery Medical Centre for Postgraduate Education due to tumor of the right arm inner surface. The patient observed the tumor five years ago. Then observed a gradual increase. The tumor was not the cause of pain and did not impair motor or sensory functions. Only in the last six months the patient felt a slight tingling in the fingers I-III of the right hand.

During examination, visible inner surface tumor in the proximal one third of the right arm (fig. 1). The skin over the tumor unchanged. Soft tumor, movable relative to the surrounding tissue perpendicular to the long
axis of the arm. Well-distinguished pulse in the brachial artery distal to the tumor. Positive Tinel’s sign during tumor auscultation.

In laboratory studies without deviation.

Imaging studies

Magnetic resonance imaging (fig. 2) showed: in the proximal part of the right arm, on the medial side, a nodular change of dimensions 3.5x4.5x6 cm, with smooth contours, sharply demarcated from the muscles, with intense, mostly circumferential reinforcement, with foci of necrosis. No evidence of infiltration of the humerus. The change associated with a neurovascular bunch models artery and shoulder veins. MR image corresponds to mild tumor of nerve sheath (schwannoma, neurofibroma).

(Doctor describing Beata Szczuka, Laboratory of Diagnostic Imaging, SPSK No. 1 in Lublin).

Ultrasound and biopsy of the tumor were not performed.

Surgical treatment

The first surgery was carried out in February 2013 in the Department of Orthopaedics in Poniatowa. The encysted tumor was reached intraoperatively, all of which was easily visualized. In the proximal part proper trunk of the median nerve was found, which then disappeared in the tumor tissue disperse, so that it was impossible to distinguish the tumor mass of nerve bundles. Not affected median nerve trunk appeared again on the periphery of the tumor. The distance between the ends of intact nerve trunk was about 4-5 cm. Auscultation and pressure of the tumor induced contraction of the muscles closed by the median nerve. Brachial artery is subcapsularly adjacent to the tumor and it can be easily separated. Tumor did not infiltrate adjacent tissues as well as the ulnar nerve located nearby. Because of the risk that it might be possible to remove the tumor in its entirety without resection of the median nerve and the need for reconstruction of the nerve with grafts tumor resection was abandoned.

The patient was referred to a center specializing in peripheral nerve surgery. The second surgery was performed at the Department of Plastic Surgery Medical Centre for Postgraduate Education in Warsaw in August 2013. In general anesthesia (without ischemia due to the high location of the tumor on the shoulder) the tumor, with the size of 6x5x4 cm, was trough an old scar (fig. 3). After careful hemostasis, tumor was dissected in magnifying surgical loupes, evidencing its combination of a vascular-nervous bunch in the proximal and distal parts. Careful dissection was continued identifying and sliding nerve bundles off the tumor. Brachial artery and identified and spared. The tumor was removed with sheaths. Redon’s suction drainage which was as from a separate cut was left in the bed. The wound was sutured in layers.

Postoperative period

In the first postoperative day, there was no deviation in the study of active mobility of the
elbow and right hand. Feeling in the area closed by the median nerve measured by two-point resolution of sensation (2 PD) was 10 mm unchanged compared to the preoperative examination, the patient did not suffer from deterioration of sensation. The patient was discharged after drainage removal on the first postoperative day in good general and local condition. Check-up was carried out two weeks after surgery, the stitches were removed, examination as the first day after surgery.

The results of histopathological examination

Macroscopically: oval, nodular tissue fragment 6 cm long, a diameter of 4.3 cm. At the sections on the outskirts of grey and yellow tissue, and in the central part grayish brown, fibrous tissue with irregular spaces partially filled with small clots. The whole seems to have a discontinuous bag (fig. 4). Microscopically: neurilemoma. Within the lesion visible broad field of glassy degeneration, hemorrhage and cystic degeneration.

The diagnosis was made by dr Joanna Ostrowska, SPSK im. Prof. W. Orlowskiego in Warsaw.

DISCUSSION

Peripheral nerve tumors derived from the sheaths, referred to in the English literature as peripheral neural sheath tumors (PNST) typically can be divided into: benign and malignant tumors (MPNST), and, depending on the cells from which they derive. Most of these tumors are benign. Most common tumors containing Schwann cells (also called neurilemoma) and neurofibroma (1, 2, 3).

Neurilemoma represent 5% of tumors of the upper limb (4). They are characterized by slow growth and scarce symptoms (5). Sometimes manifested by pain and paresthesias (3, 4, 6). The course of disease and the symptoms in the present case are consistent with typical hitherto described in the literature. Large population, long-term studies indicate that their incidence is 0.62/100 000/year (3). Most often they include the median nerve, then the ulnar nerve and finger nerves, and the most common locations are the forearm, thumb and fingers (3). Neurilemoma is less likely to occur as multiple tumors within the trunk of a single nerve or its branches (7).

As preoperative diagnosis MRI is currently selected (1). It is believed, however, that imaging studies do not allow for the unequivocal diagnosis and still histopathological examination is conclusive (4, 6). According to some studies MRI allows in 75% to determine the location of the tumor relative to the trunk of the nerve and the nerve tumor diagnosis (8). However, in general in nerve imaging diagnostics MRI and ultrasound complement, predominantly MRI in the case of deeper nerves (9). In specialized centers a biopsy is performed under CT control in case of suspicion of a malignant tumor (10). In the present case, MRI revealed that the lesion is associated with arm neuro-vascular bundle and allowed to place the initial diagnosis of a benign nerve sheath tumor (neuroma, neurofibroma). On the basis of imaging studies is not possible to bring a clear diagnosis of the nature of the tumor. In particular, it is difficult to differentiate between neurilemoma and neurofibroma (6). In the first case, the tumor includes only the sheaths and is generally possible to cut it without compromising the continuity of the nerve. It is different in the case of neurofibroma. Then we generally observe median nerve lesion growth and often several nerve bundles penetrate the precinct tumor preventing its excision without cutting of the nerve bundles. In such cases, sometimes original sutures or nerve grafts reconstruction are necessary.

The differential diagnosis should consider: paraganglioma (glomus tumor), angioleiomyoma, gelatinous cyst, median nerve benign
tumors (e.g. lipoma, lipofibromatous hamartoma, median nerve hemangioma), median nerve malignant tumors (e.g. synovial sarcoma) and post-traumatic hematoma (11, 12).

In the present case there was no need for resection of the trunk of the median nerve during removal of the tumor. Similar observations were presented by Kellner et al., and Kwon et al. performing the removal of lower limb nerve sheath tumors (13, 14). The authors believe that in many cases, the tumor can be safely removed without nerve trunk resection. Give the following rules for cutting sheath nerve tumors: a wide opening of the tumor with a proximal and distal margin, and surgery using a microscope. Intraoperative neurostimulation is useful to confirm the visualized anatomy. A good example of its application is where the tumor is within the smaller nerve branches of only sensory function. Then, neurostimulation is useful in determining lesion section site and during neurolysis to distinguish bungles from the tumor.

From the author’s own experience, in the case of surgeries of nerve trunk tumors more important than neurostimulation is a bloodless operative field and magnification (magnifying glass or surgical microscope).

SUMMARY

Peripheral nerve sheath tumors should be considered in case of non-specific symptoms often scarce within the affected limb. This case, as well as reports in the literature show that the most often peripheral nerve sheath tumor can be removed without resection of the nerve trunk. However, due to the fact that diagnostic imaging does not provide such certainty and that decisions on the scope of resection and the need for a possible reconstruction are taken intraoperatively, we believe that such surgeries should be performed in the centers with microsurgery skills and facilities.

REFERENCES