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CASE REPORT

Surgical Management of Incidental Intercostal Nerve Schwannoma

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ABSTRACT
Schwannomas, also known as neurilemmomas or neurinomas, are benign nerve sheath tumors, representing approximately 5% of benign soft-tissue neoplasms. Thus, intercostal nerve Schwannoma is a rare entity, and biopsy-excision is usually used to establish the diagnosis. Herein, we report a clinical case of a 18 years-old male with a large chest wall mass fortuitously found on a chest X-ray that was performed as part of an employment evaluation. Therefore, the patient was eligible for excisional and diagnostic surgery.
KEYWORDS: chest wall, intercostal nerve, neurogenic tumor, schwannoma.

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INTRODUCTION

Schwanommas represent 15 to 20% of neurogenic tumors [1]. It is generally a solitary, encapsulated and slow-growing tumor [2], with a predilection for the neck [3], mediastinum and the extremities of the limbs [1]. These tumors are non-gender and can occur at any age [4]. In their intrathoracic location, schwannomas are most often found in the posterior mediastinum occuring in the spinal nerve roots [5]. Here, we describe the surgical management of an incidental intercostal nerve schwannoma of a 18 year-old young man.

CASE REPORT

A 18-year-old male admitted to the hospital for surgical management of a left sided chest wall tumor, after being incidentally discovered on a chest X-ray that was performed as part of an employment evaluation.
The patient had no historical medical past, nor clinical symptoms.
Physical examination was unremarkable.
We performed a series of investigations including blood tests, chest radiograph, chest computed tomography (CT), and magnetic resonance imaging (MRI).
His chest radiograph [Figure 1] showed a massive left pleural homogenous opacity. Contrast enhanced computed tomography (CT) scan of chest [Figure 2] demonstrated a heterogeneous, well-limited, oval, parietal chest wall mass, slightly enhanced after injection, measuring 86x40mm, with the presence of calcifications and cortical lysis of the middle arches of the 5th and 6th left ribs. There was no mediastinal lymphadenopathy or lung parenchymal involvement.

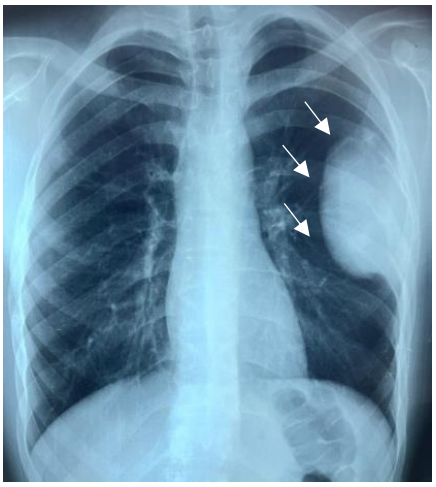


Figure 1: Preoperative chest radiography showing a well-defined medium-sized opacity located along the left parietal region of the chest wall (arrows ↘)

We completed paraclinical examinations with MRI that showed a heterogeneous endothoracic tissular mass, located latterly in the left side of the chest, with a low-signal intensity on T1-weighted images but a high-signal on T2-weighted images [Figure 3].

Computed tomography guided needle biopsy was performed, and anatomopathological examination showed a benign tumor proliferation with a fasciculate architecture, in favor of a Schwannoma [Figure 4].

After thoroughly explaining the situation to the patient and obtaining his consent, he underwent a left posterolateral thoracotomy, preserving Latissimus dorsi muscle. This surgical approach provided direct access to the tumor embedded in the middle arch of the fourth, fifth and sixth left ribs.

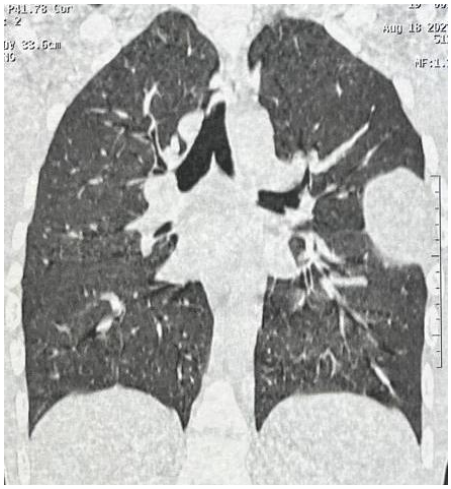
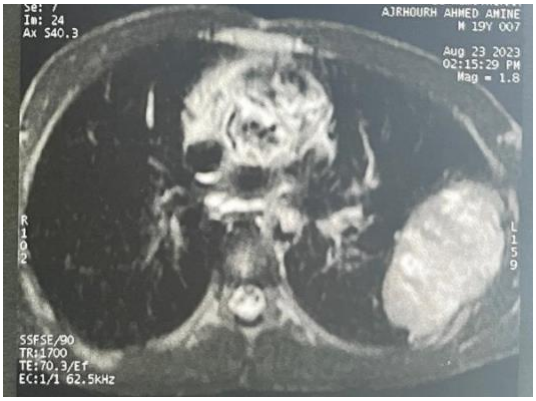


Figure 2: A poorly enhanced heterogeneous chest wall mass identified along the 5th & 6th left ribs on chest computed tomography (coronal slice).

Intraoperative findings revealed a huge endothoracic wall chest mass, no cleavage plane was found between the tumor and the three affected ribs to facilitate an extrapleural dissection that would preserve the chest wall, thus exposing us to the risk of tumor breach.

A wide excision of the three ribs was performed [Figure 5] with implantation of polypropylene mesh to restore sufficient parietal stability. The postoperative recovery was straightforward, and the patient was discharged on the 6th postoperative day.



Figue 3: On T2-weighted images, MRI shows high signal intensity of the mass.

The final histopathological examination revealed a benign lesion: a Schwannoma composed predominantly of cellular and focal hypocellular areas of spindle cell proliferation in a fascicular and palisade arrangement; occasionally forming Verocay nodes. Therefore, in our patient, surgical excision was complete with no local recurrence.

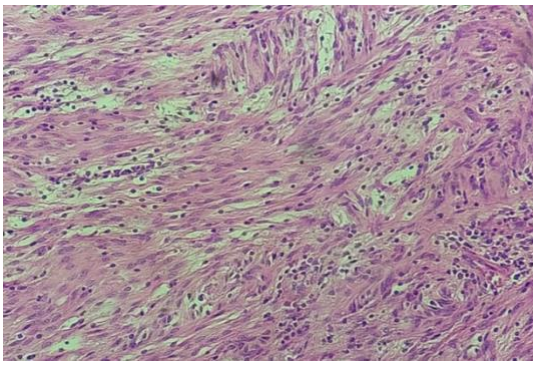
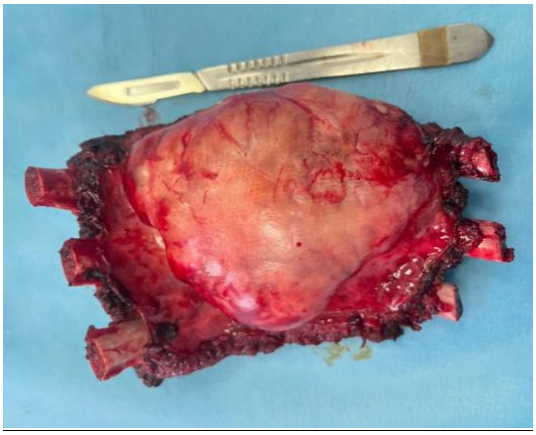


Figure 4 : Microscopic view (HESx20) showing spindle-shaped cells with fine chromatin, no visible nucleoli, and scant cytoplasm (in cellular Antoni A area).



Figue 5 : Removal of the tumor with partial resection of the 4th, 5th, 6th left ribs and parietal pleura.

DISCUSSION

Depending on the series, soft tissue tumors represent 56% to 65% of primary tumors of the chest wall [8]. As for neurogenic tumors, they are exceedingly rare and account less than 5% [9].

Schwanommas are defined as benign, encapsulated neurogenic tumors that originate from the Schwann cells of the nerve sheath [5]. They can occur at any age, but more common between the ages 20 and 50 years, without any gender predominance [1; 4].

In their intrathoracic location, Schwannomas are usually developed from the intercostal nerves of the posterosuperior mediastinum, rarely from the vagus, phrenic or recurrent nerves, however, those of the chest wall remains infrequent and only a limited number of cases are documented in the literature [2].

Chest wall schwannomas of intercostal nerve are extremely rare. They are either asymptomatic; coming in the form of painless mass or represented as a motor or sensory deficit due to compression of nearby nerves [4; 6]. Intercostal nerve Schwannoma is typically discovered incidentally, which was the case with our patient [5; 7].

However, in cases of large tumors, presenting symptoms may result from locoregional compression; often in the form of shortness of breath, localized chest pain or chronic neuralgia [1, 6].

Chronic intercostal neuralgia is relatively uncommon in Schwannomas, and is usually due compressing the nerve against the subcostal groove. It includes pain, tenderness, paresthesia, and hypoesthesia [6; 7].

Schwannomas that induce intercostal neuralgia typically arise from the nerve roots, thus located within the spinal canal [10].

Radiographic examinations including X-ray, CT, and magnetic resonance imaging (MRI) remain a powerful diagnostic aid of parietal mass by their radiological features [11]. They often reveal a solitary circular homogeneous soft tissue with clearly demarcated borders, without any bony destruction but may contain areas of fat or cystic degeneration [12].

Computed tomography (CT) scans of Schwannoma show a well-circumscribed homogeneous mass [12]. The imaging findings of Schwannomas are similar to those seen with neurofibromas and, in many cases, cannot be distinguished which can often lead to misdiagnosis [13].

On CT, the fusiform shape, split-fat sign, and target sign can be seen in either lesion [14]. However, Heterogeneous appearance with degeneration and cystic cavitation are much more common in Schwannomas (especially when larger) than in neurofibromas [12; 14].

In addition, 3-dimensional reconstructions are highly recommended to be performed regularly for the examination of chest-wall tumors [11].

MRI shows, on T1-weighted images, low to intermediate signal intensity (equal to or slightly greater than that of muscle) and on T2-weighted images it shows relatively high signal intensity [2; 12].

There are other thoracic neurogenic tumors that should be considered as differential diagnosis, besides neurofibroma, including neuroblastoma, paraganglioma, ganglioneuroma, and malignant peripheral nerve sheath tumor [12].

Even with the improvement of radiographic examinations, the diagnosis of Schwannoma remains based on histopathological examination, which is initially established by a fine-needle cytology or surgical biopsy [12; 14; 15]. Histopathological examination, itself, also helps to determine extent of necessary resection.

It's worth mentioning that surgical resection remains the primary treatment for both diagnostic and curative purposes [7].

In our case, the diagnosis was established first of all by computed tomography guided needle biopsy and the surgical resection was for therapeutic purposes.

It's important to know that the surgical approach depend on the size of the tumor. Local resection with video-assisted thoracoscopic surgery is usually preferred for small tumors [12]. The larger the Schwannoma is, the wider surgical resection will be performed, sometimes with the need of chest wall reconstruction and titanium plate fixation [6]. However, those type of resection pose challenge to surgeons because of the postoperative complications which can lead to significant pulmonary dysfunction [16].

A malignant degeneration of a Schwannoma is rare and controversial, only complete excision can be the sole guarantee of a cure without recurrence [2; 4].

Most cases documented in the literature demonstrate a favorable prognosis following tumor resection [6].

CONCLUSION

Chest wall Schwannoma is rare entity and only few cases have been reported in the literature. As there are no clinical signs or symptoms, radiographic examinations can provide a diagnostic orientation, however, only histopathological examination ensures an accurate diagnosis. Surgical resection stands out as the primary treatment approach for intercostal nerve Schwannoma.

COMPETING INTERESTS

The authors declare no competing interests with this case.

AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors. Indeed, all the authors have actively participated in the redaction, the revision of the manuscript, and provided approval for this final revised version.

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