Sinonasal Schwannoma and Progressive Nasal Obstruction

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ABSTRACT

Introduction: Schwannomas, are non-malignant tumors with well-defined encapsulation and gradual growth patterns. These tumors consist of Schwann cells, which originate from the neural crest. The prevalence of schwannoma cases in the head and neck region ranges from approximately 25% to 45%. However, in the sinus cavity, the occurrence is only 4%.

Case Presentation: In this study, we provide a clinical case with a 25-year-old female patient with rhinorrhoea symptoms, recurrent epistaxis, and a decreased sense of smell. The patient had a progressive obstruction in the right nasal cavity over one year. A biopsy and computed tomography (CT) scan identified a schwannoma and soft tissue density lesions in the right maxillary ethmoid sinuses and left septal deviation. The confirmation of schwannoma diagnosis is also achieved through histopathological examination. The tumor was surgically excised from the patient’s body utilizing lateral rhinotomy and an extirpation technique under general anesthesia. The patient had positive outcomes during the follow-up; the patient revealed the absence of symptoms and no evidence of disease recurrence.

Conclusions: Lateral rhinotomy with extirpation methods represents an effective option for managing sinonasal schwannoma due to its ability to access challenging anatomical regions and facilitate the sensitive excision of tumors.

INTRODUCTION

Schwannomas, often referred to as neuromas, neurinomas, and neurilemmomas, are non-malignant tumors with well-defined encapsulation and gradual growth patterns. These tumors consist of Schwann cells, which originate from the neural crest, and may originate in the skull, the periphery, or the autonomic sheath [1–3]. According to data from the Central Brain Tumor Registry of the United States, non-malignant nerve sheath tumors comprise 8.6% of all recorded central nervous system tumors. The age at diagnosis exhibits a median value of 56 years. The prevalence of this condition in adults is from 4.4 to 5.23 cases per 100,000 individuals per year. In contrast, it is 0.44 cases per 100,000 individuals per year in children and adolescents [4]. The prevalence of schwannoma cases in the head and neck region ranges from approximately 25% to 45%; however, in the sinus cavity, the occurrence is only 4% [5].

The cause may be in the paranasal sinuses, the ophthalmic, maxillary, or autonomic branches of the trigeminal nerve [6]. This condition is commonly observed in several anatomical regions, including the scalp, face, orbit, intracranial cavity, oral and nasal cavity, para-pharyngeal area, mastoid, and larynx. The para-pharyngeal area is the most commonly affected in the head and neck region [7]. Despite schwannomas being hypovascular tumors, most cases show an intense and delayed contrast enhancement on dynamic imaging [8]. It is difficult to determine what causes nasal schwannomas since there aren’t many nerves in the nasal cavity. The sympathetic, parasympathetic, and sensory nerves are potential causes [9]. Additionally, schwannomas in the olfactory groove may originate from the nerve and the olfactory bulbs [10].

Sinonasal schwannomas can cause a wide range of symptoms, such as nasal blockage, epistaxis, rhinorrhoea, a diminished sense of smell, headaches, facial hypertrophy, and usually appear between the ages of 40 and 60 [9]. Epistaxis is a typical symptom that raises the risk of nasal angiofibroma and complicates clinical presentations [11]. In all ages, ethnicities, and genders, sinonasal schwannomas are the same. The gold standard treatment for schwannomas is complete surgical excision,
which has resulted in minimal recurrence rates [12]. This report reveals an uncommon occurrence of schwannoma observed in a 25-year-old female patient.

CASE PRESENTATION

A 25-year-old housewife experiencing increasing right nasal blockage visited the otorhinolaryngology clinic. A year ago, the patient initially felt a right-sided nasal blockage that was becoming uncomfortable. The patient also had a history of rhinorrhea, recurrent epistaxis, and a decreased sense of smell.

The clinical examination showed no abnormalities in the nasal dorsum, infraorbital boundaries, ocular motions, and visual acuity. The assessment of the cranial nerves is within the expected range. Upon doing an anterior rhinoscopy, it was observed that a mass was present on the right side, accompanied by a deviation of the septum towards the left. During the diagnostic nasal endoscopy, a polypoidal tumor was observed in the middle meatus, resulting in a deviation of the medial turbinate and nasal septum towards the left side of the nasal cavity. The inferior turbinate on the left side of the septum, which was deviated, was in contact with it (Figure 1).

Figure 1. Anterior rhinoscopy examination. (A) Septum; (B) A mass

Soft tissue density lesions were observed in the sinonasal computed tomography (CT) scans. The presence of the lesion is responsible for the development of the right maxillary ethmoid sinuses and the left septal deviation (Figure 2). A schwannoma was detected during the process of doing a biopsy. According to the CT scan, the right nasal cavity and the right maxillary and ethmoid sinuses were the sites of the schwannoma in this patient. The patient had a growing right nasal blockage for a year. The tumor that persisted and slowly expanded in the right nasal cavity was the origin of the nasal blockage. The patient’s sense of smell progressively altered due to the tumor in his right nasal cavity blocking odor molecules from reaching the olfactory nerve. The patient also had a history of epistaxis and rhinorrhea. The location, nerve of origin, and degree of nerve compression all affect the symptoms of paranasal sinus schwannomas.

Figure 2. The right nasal cavity and the right maxillary and ethmoid sinuses were the sites of the schwannoma

Figure 3 shows the presence of a palisading tumor with lymphocytes, a spindle-like shape, a wavy and vesicle-Indented pattern, proliferating obstructed vascular channels, aberrant cells, and myxoid and cystic degeneration foci.

Figure 3. (A) and (B) show a 400 times magnification with hematoxylin and eosin; (C) and (D) show a 100 times magnification with Immunohistochemistry in histopathological analysis of a schwannoma tumor.

The lateral technique was chosen as a result of the tumor’s size. The tumor was surgically excised from the patient’s body utilizing a lateral rhinotomy technique and an extirpation method while under general
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anesthesia. The skin incision begins under the medial side of the brow. The structure extends approximately 4 to 5 millimeters, starting from the anterior medial canthus and continuing across the nasal bone. It then follows the deepest area of the nasomaxillary cleft, ultimately tracing the ala rice cavum. There is no necessity to perform a lip split to extend the incision. The infraorbital region is surrounded by the cheek flap, which is elevated from the maxilla subperiosteal layer to enhance the visibility of the operative area.

After removing the periorbital from the lamina papyracea, the frontoethmoidal suture is visible and continued posteriorly until the posterior ethmoid artery is located. The Kerrison rongeur raises the antrostomy above the infraorbital nerve and toward the orbital rim. Then, the lacrimal fossa and the orbital margin remove the bone. The lacrimal sac is opened, detached from the nasolacrimal duct, and marsupialized. Subsequently, tissue removal and osteotomy are carried out. The osteotomy is prolonged through the piriformis hole and directed backward to the back wall of the antrum at the level of the base of the nasal cavity. The Orbita is first retracted laterally to conduct an osteotomy at the frontoethmoidal suture that extends 2 to 3 mm behind the posterior ethmoidal artery (i.e., in front of the optic foramen). The lacrimal fossa and the superior osteotomy are followed to cut the medial orbital floor’s thin bone. The process of bone cutting involves three different procedures. The medial posterior antrum wall is first penetrated with the osteotome after it has been inserted through the anterior antrostomy. The osteotomy is extended upwards to reach the level of the superior osteotomy and pushed medially. Afterward, a broader osteotome is passed through the nose, directed into the anterior sphenoid sinus wall, and moved laterally. Finally, the rear cut behind the concha is started by inserting straight scissors with one side inside the nose and the other inside the antrum through the inferior osteotomy. One side of the bent scissors is placed into the rice cavum. At the same time, the other side is introduced into the superior osteotomy area along the fine attachment of the concha. Pulling downward and forward removes the tissue. Haemostasis is performed with clamps or cautery. The bone edge is smoothed with a rongeur. The remaining ethmoid mucosa is removed with ethmoid forceps, and a sphenoidotomy is completed with a Kerrison rongeur. The cavity was closed with tampon tape and antibiotic ointment. The wound was sutured layer by layer.

The efficacy of the lateral rhinotomy surgery remains intact for the excision of sinonasal malignancies that have traversed the nasal region. No issues were encountered as a consequence of the treatment. The ease of removal of the mass, accompanied by minimum blood loss, can be attributed to its inherent flexibility and softness. The postoperative recovery exhibited no notable abnormalities. The patient had no symptoms during the follow-up period (three months after surgery) and did not experience any additional symptom recurrence.

DISCUSSION

Rarely have Schwann cell tumors of the alae nasale, nasal cavity, ethmoid region, maxilla, frontal sinus, and sphenoid sinus been described in the medical literature [13]. One frontal ethmoid lesion was also found, as three maxillary lesions, three nasal lesions, and one nasopharynx lesion [14]. Kragh and colleagues examined 152 cases of “benign and malignant neurilemma” of the head and neck in Satyajit and Nirupama’s studies [15]. Five patients were discovered, according to the antral and nasal fossa. In a patient in 1989, a team of researchers found a front-ethmoid complex schwannoma. It returned after seven years, and by then, it had developed into cancer [16]. According to the findings, the patient’s follow-up revealed no evidence of cancer.

A CT scan was used to find the sinonasal schwannoma [17]. A transparent mass and weakening of the bone around the tumor because of its sluggish development make up the typical lesion [6]. A CT scan of the paranasal sinuses is necessary for planning surgical therapy [13]. The size, location, and state of the tumor’s eroding bone surfaces may all be determined by a CT scan [6,13]. It has been claimed that the sphenopalatine ganglion, maxillary and ophthalmic nerves, and other nerves innervating the nasal mucosa are the origin of nasal cavity schwannomas. In the current patient, according to a CT scan, the schwannoma was found in the nasal cavity, maxillary alveolar, and sinus [18]. Magnetic resonance imaging (MRI) may detect residual secretions or inflammatory changes in intracranial or intraorbital malignancies. They are isodense or hypodense on T1 and irregularly hyperdense or hypodense with a little increase in contrast on T2 [19,20]. A histological examination of tissue samples is required to confirm the diagnosis [13,21,22]. There was no need for an MRI in this patient because the CT scan results were sufficient to determine the location, margins, shape, size, structure, pattern, and degree of tumor enhancement and changes to the bone wall in the sinonasal cavity.

The preferred method of treating sinonasal schwannoma is surgery. The surgical technique is determined by the tumor’s size, location, and invasion of adjacent structures. Some surgical techniques include lateral rhinotomies, Weber Ferguson surgeries, midfacial degloving, open septoplasty, and endoscopic procedures [23,24]. According to previous studies, an endoscopic procedure may remove malignancies while progressively retaining cosmetic goals [22,25]. However, in this case, the schwannoma tumor was removed through lateral rhinotomy using the extirpation method.
Some schwannomas react well to endoscopic surgery because it is risk-free, effective, and practical [9,26]. Even though endoscopic surgery has improved in recent years, lateral rhinotomy can still remove sinonasal tumors that have spread throughout the nose. The lateral rhinotomy method gives excellent visibility and makes surgery more accessible. The skin incision for the lateral rhinotomy is done starting at the medial canthus. By reclining the soft tissues, observing the orbital rim, piriform aperture, and front maxillary sinus is possible. The infraorbital nerve will be preserved or sacrificed depending on the carcinologic criteria. When the skin incision is prolonged laterally, the anterior maxilla up to the maxillary tuberosity and zygoma may be seen. The lateral rhinotomy may also be accompanied by osteotomies of the mouth, zygomatic arch, and maxillary bone below the orbit, as well as an incision along the lower floor [27–29]. The lateral rhinotomy is a good alternative because it can reach difficult sinonasal areas and gently remove the tumor. This was why we chose lateral rhinotomy, as the mass was too extensive to be performed endoscopically, as it involved the rice cavum, maxillary, and ethmoid sinuses.

CONCLUSIONS

Lateral rhinotomy with extirpation methods represents an effective option for managing sinonasal schwannoma due to its ability to access challenging anatomical regions and facilitate the sensitive excision of tumors. The patient’s case had positive outcomes during the follow-up period. Specifically, three months post-treatment, the patient revealed the absence of symptoms and no evidence of disease recurrence.

DECLARATIONS

Conflict of Interest
No author has disclosed any potential conflicts of interest.

Ethics approval and consent to participate
This study has received approval from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, with number 197/EC-KEPK FKIK UMY/IX/2022.

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