

Sternal Mass with Respiratory Compromise in a 10-year-old Child

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Abstract

Enlarging sternal masses are critical to manage due to proximity of various vital structures nearby. Association of respiratory compromise or vascular compression still worsens the issue. We here present a case of multiple enchondromas primarily affecting the ribs and upper part of sternum and presented as a swelling in upper chest and lower neck with a history of compressive respiratory compromise. The child was later taken for shaving off of the lesion for relieving the respiratory compromise. Absence of the swelling was a definite cosmetic outcome for the child and the parents; however, relieve of respiratory compromise was a worthy addressed need.

Keywords: Enchondroma, multiple enchondroma, Ollier's disease, giant sternal mass, sternal mass with respiratory compromise.

Introduction:

Enlarging sternal masses are serious concern due to proximity of vital structures. Impending compressive respiratory/vascular/cardiac compromise exacerbate the concerns. Surgical removal needs various issues to be considered while planning the surgery as lungs and heart need a bony cover to protect these vital organs and creating a cavity with negative pressure for lungs to adequately function. Establishment of airway during surgery needs to be delicately planned and in children and adolescents care must be taken not to interfere in the process of growing skeleton which unless cared will lead to future skeletal abnormality for patients. We present a case of a 10-year-old child who presented with a giant sternal enchondroma which was compressing trachea and causing deformity in chest and neck. The management involved various specialties such as cardiothoracic and vascular surgery, Otolaryngology and head and neck surgery, plastic surgery, anesthesia

and diagnostic and interventional radiology.

Case Report

Enlarging sternal masses are serious concern due to proximity of vital structures. Impending compressive respiratory compromise exacerbates the concerns [1]. This 10-year-old child presented to our super specialty teaching hospital with worrisome clinical history of noisy breathing for the past 2 months and breathing difficulty during upper respiratory tract infections (URI) episodes/supine positions. Examination revealed a 20 cm×20 cm×15 cm multi-lobulated, smooth, hard bony immobile swelling involving the lower neck and upper chest (Fig. 1a-c) with distal normal carotid pulses, suggesting impending respiratory obstruction without vascular compression. X-ray and computerized tomographic scan revealed multiple swellings involving manubrium, upper half of sternum, RT upper ribs, RT clavicle, and both RT and LT sternoclavicular joints (Fig. 1d). Posteriorly,

it compressed the trachea (Fig. 1e). Considering the nature of disease, age of the child, functional status, and expected post-operative morbidity, surgical contouring with shave off on the anterior and posterior aspect was planned instead of a complete intoto excision. Airway was established with initial femoro-femoral cardiopulmonary bypass which was later reversed to oro-tracheal intubation. J-shaped incision with horizontal transverse cervical Kocher's incision combined with vertical midline sternotomy incision curving to right along the costochondral border was planned (Fig. 1f). A 20 x 20 cm exposed lobulated bony hard mass (Fig. 1g) was shaved off in piecemeal along the anterior border of the sternum and ribs anteriorly and along the posterior border of the sternum posteriorly to release the pressure on trachea (Fig. 1h and i). Histopathology was consistent with enchondromas [2, 3]. There is no post-operativetracheo-malacia, which is relieving for the child and his parents.

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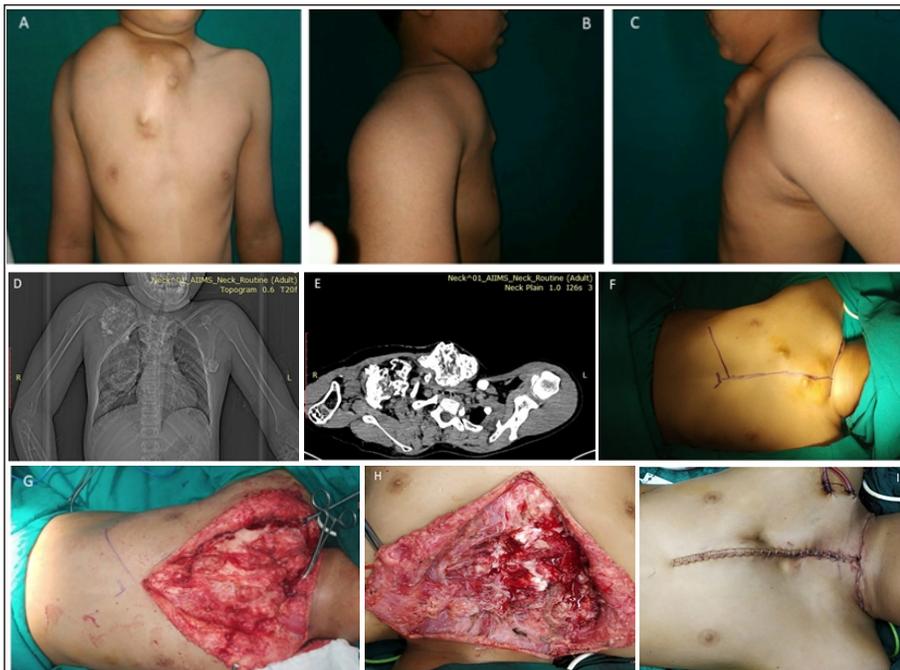


Figure 1: Photograph showing anterior (a), right lateral (b), and left lateral view (c) of the patient showing multi-lobulated swelling in lower neck and upper chest involving medial 2/3 of the right clavicle, right upper ribs, manubrium and upper half of sternum, and both the right and left sternoclavicular joints reaching superiorly up to the mid of thyroid cartilage. X-ray of the patient showed involvement of multiple bones (d). Computerized tomographic axial section at thoracic inlet showed tracheal compression by posterior aspect of the tumor (e). J-shaped incision with horizontal transverse cervical Kocher's incision combined with vertical midline sternotomy incision curving to right along the costochondral border (f), 20 cm x 20 cm exposed lobulated bony hard mass (g), post-shave off status (h), and T-shaped closure of the wound (i).

Discussion

Giant enchondromas, especially involving sternum, are difficult situations to handle surgically. In this case, we had multiple issues to deal with including retaining a bony cover for chest, relieving the respiratory obstruction, avoiding any injury to heart, great vessels, trachea and esophagus, and establishing airway for surgery to be

performed. Airway was established with bag and mask ventilation with cardiopulmonary bypass followed by posterior shave off and drilling of sternum to relieve some bony compression of trachea for making intubation possible. This was followed by oro-tracheal intubation, reversal of bypass, and further surgery of shave off and drilling of tumor from both anterior and post surfaces of

sternum. Various specialties were involved and coordinated surgical and airway planning helped in the treatment of the child. Reconstruction of chest wall is of paramount importance as far as breathing is considered [4]. In our case the benign nature of disease and multimodality surgical team approach to the tumor from both anterior and posterior aspect with shaving off the lesion, helped us to avoid major thoracic repairs and its associated morbidities. As we had preserved the bony architecture of the chest wall without compromising stability, we did not consider using bony plates which has also been shown to have complications in the past [5]. Hence, proper surgical planning and multispecialty team approach helped us in resolving the surgical issues involved in the case.

Conclusions

Giant bony tumors of sternum in both adults and children can be addressed surgically. However, it needs great degree of detailed surgical planning and coordinated involvement of multiple surgical and critical care specialties including radio diagnosis and pathology for successful completion of treatment.

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Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

Sahu R K, Sharma A K, Patel S, Kala P, Goyal A, Patro S K. Sternal Mass with Respiratory Compromise in a 10-year-old Child. *Journal of Bone and Soft Tissue Tumors* May-August 2019;5(2): 2-3.