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## RESEARCH ARTICLE

# A RARE CASE OF CONGENITAL INFECTED BRANCHIAL CYST WITH CONGENITAL PULMONARY AIRWAY MALFORMATION

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### ABSTRACT

**Introduction:** Branchial cleft cysts are the most common congenital neck masses which originate from remnants of the branchial arches or pouches. The term branchial cyst was first given by Ascherson in 1832. Clinically they can present as a cyst, sinus, or fistula. <sup>7</sup>The classical presentation of second branchial cysts are painless neck mass along the anterior border of the upper third part of the sternocleidomastoid. **Case Report:** The branchial cysts are usually Here we present report of a rare case of infected congenital branchial cyst type II in a known case of congenital pulmonary airway malformation. A 10 days old male child who had a swelling below the right side of lower jaw presenting like neck abscess. On ultrasonography and computer tomography of neck it was diagnosed as infected congenital branchial cyst type 2. It was managed with incision and drainage under general anesthesia. The postoperative histopathological examination confirmed the diagnosis of branchial cleft cyst. The most common presentation of branchial cysts are in young most commonly present in second to fourth decade, rarely present in neonatal period. **Conclusion:** The branchial cysts can get infected very rarely & present like neck abscess in a neonate. Any congenital infected mass one of the differential diagnosis is infected branchial cyst should be kept in mind and such cases should be treated promptly.

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## INTRODUCTION

Branchial arch anomalies are approximately 20% of paediatric congenital head and neck lesions. <sup>1</sup> Around 90%–95% represent second branchial cleft anomalies that usually occur clinically at ages 20 to 40 years. Clinically they can present as a cyst, sinus, or fistula. A branchial cleft cyst can first come to clinical attention most commonly in the second through fourth decades of life, and is rare in the neonatal period. <sup>2</sup> A branchial sinus or fistula almost always presents in neonates or at early age. <sup>3</sup> The second branchial cysts are the most common among all of these. They are often infected after upper respiratory tract infection and are found as rapidly expanding cystic mass on the neck. The cyst or fistula occurs from the tonsillar fossa to the cervical skin along the embryologic tract of the second branchial cleft.

Second cleft are the most common, approximately 40 to 95% of all branchial anomalies. <sup>4,5</sup> Sinuses are more frequent than cysts, which are more frequent than fistulae. <sup>6,7</sup> The classical presentation of second branchial cysts are painless neck mass along the anterior border of the upper third part of the sternocleidomastoid, sometimes there is acute enlargement with upper respiratory tract infection. <sup>8</sup> Sinuses typically present inferiorly with a draining opening near the base of the neck where the strap muscles meet the SCM. The Bailey classification of Second Branchial cysts as follows: Type-I cysts are lie along anterior border of sternocleidomastoid muscle and superficial to platysma. Type-II are the commonest and lies just laterally to great vessels beneath enveloping fascia of the neck. Type-III extending between internal and external carotid arteries. Type-IV cysts are lie in the pharyngeal mucosal space just deep to palatine tonsil and medial to great neck vessels, often extending upward towards skull base.

The first three types of cysts are most common while type-IV cysts are extremely rare.<sup>9</sup>



Fig 1. Showing swelling over right side of neck

## CASE REPORT

Informant being parents, 6 days old Female child presented with complaint of swelling over right of lower jaw since 5 days i. e. immediately one day after birth. Patient had fever since 4-5 days after birth. Patient was diagnosed with congenital pulmonary airway malformation. On clinical examination, diffuse swelling was noted on the right submandibular region, it was mobile, erythema present, with smooth surface. On palpation, temperature over swelling was raised, soft in consistency, tender, fluctuant and overlying skin was erythematous. Hematological investigations were done. Complete blood count was showing raised WBC count & it was 20100. Ultrasonography Report showed an ill defined heterogenous lesion on the right side of the upper part of neck measuring 3\*3\*4 cm. Computed Tomography Neck was suggestive of a large cystic lesion with enhancing wall along the right lateral aspect of neck, anterior to the sternocleidomastoid muscle and anterolateral to carotid space extending superiorly upto the submandibular space. There was effacement of the parapharyngeal space fat and right vallecula which was suggestive of infected branchial cyst type II on right side of neck.

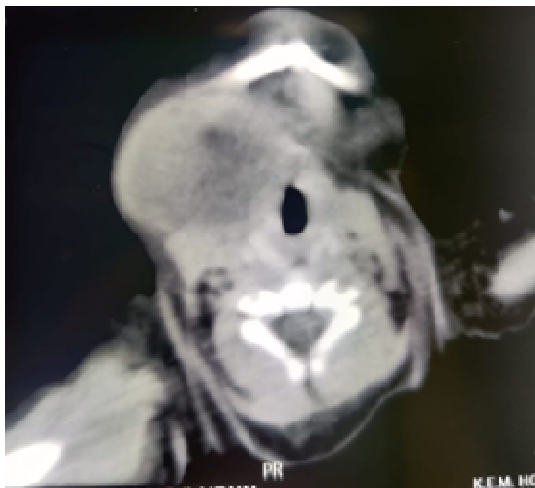


Fig. 2. Computed tomography of Neck, axial view showing extent of mass

**TREATMENT:** Incision and drainage of infected right branchial cyst was done under general anesthesia on emergency basis. Incision taken over most fluctuant part of cystic swelling, around 15 -20 cc pus was drained. The sample sent for histopathological examination (HPE) and culture. The procedure was uneventful. Daily dressing done & intravenous antibiotics were given to the child for 7 days. The neonate was discharged on 10<sup>th</sup> postoperative day. The patient was followed in outpatient clinic at the interval of 2<sup>nd</sup>, 3<sup>rd</sup> Weeks. On examination patient recovered completely with good wound healing without any complications. Final Histopathology report was suggestive of infected branchial cyst showing stratified squamous epithelium with lymphoid tissue aggregate.



Fig 3. Post operative picture showing healed wound in the neck

## DISCUSSION

Rathke in 1828 described the development of branchial arches. During embryogenesis, the second arch develops caudally, encasing the third, fourth, and sixth arches and fusing with skin caudal to these arches, forming a deep groove (cervical sinus). Normally the edges of this groove then meet and fuse. If there is failure of involution of the ectoderm, then it gives rise to a branchial cyst. The other terms for branchial cysts are Congenital hydrocoele of the neck, Hygroma colli, Branchial cyst, tumor of the branchial cleft, Lateral lympho-epithelial cyst, Benign cystic lymph nodes, Dermoid cyst of the sheath of the internal jugular vein, and deep seated atheromatous tumor.<sup>10</sup> Many theories have been postulated for the development of branchial cyst, such as the branchial apparatus theory, cervical sinus theory, thymopharyngeal theory, and inclusion theory. At present, the most accepted theory is that BCC result from incomplete obliteration of the branchial apparatus.<sup>11</sup> Clinical presentation: The patient typically presents as a single mass in the neck, with or without an increase in size. The patient may have symptoms of compression such as dyspnea or dysphagia, or even snoring<sup>12</sup>, if the mass extends to adjacent structures. It can become inflamed and tender after an upper respiratory tract infection. In our case the neonate was only 6 days old & the neck swelling got infected immediately on 2<sup>nd</sup> day after birth & hence it mimicked like an abscess. On examination usually reveals a smooth, nontender and non-fluctuant mass.<sup>13</sup> In review of literature, a rare site of second branchial cyst is nasopharynx.<sup>14</sup>

The differential diagnosis of these lesions includes tuberculous lymphadenitis, lipoma, cystic hygroma, carotid body tumors, thyroglossal duct cysts, lymphomas, suppurative lymphadenitis, dermoid cysts, neurofibroma, hemangioma, lymphangioma. Investigations like preoperative ultrasonography & Fine needle aspiration cytology is useful in diagnosing branchial cyst. Branchial cleft cysts are lined with stratified squamous epithelium with keratin debris. Role of ultrasonography of neck is important in determining accurate diagnosis. Ultrasonography is easily available. On ultrasonography, branchial cysts appear as well defined, smooth and uniform anechoic lesions. Ultrasonography is a commonly used modality, it does not adequately evaluate the extent and depth of these lesions. It is useful in places where CT scanning is not available.<sup>15</sup>CT neck effectively shows relationship with other structures and extent of lesion.<sup>16</sup> Histopathology report of Branchial cleft cysts shows lined with stratified squamous epithelium with keratin debris & it is a final diagnostic tool. The definitive treatment of second branchial cyst is complete surgical excision. In our case, cyst was infected, incision and drainage was done. Also the neonate had fever so it was necessary to operate & remove the pus from the swelling in addition to medical treatment in the form of antibiotics to prevent the complication of septicaemia. Septicaemia can be life threatening. The challenge in our case was also to give general anaesthesia as the child was also having congenital pulmonary airway malformation. However the neonate had good recovery without any complications inspite of such a rare abscess like neck swelling presentation & challenging anaesthesia procedure due to congenital pulmonary airway malformation.

## CONCLUSION

- The second branchial cysts usually present in second and fourth decade and rarely in neonatal period.
- It is necessary to do adequate imaging to know extent of mass and to know its relation to surrounding important structures in the neck.
- The branchial cysts can get infected very rarely & present like neck abscess in a neonate.
- Any congenital infected mass one of the differential diagnosis is infected branchial cyst should be kept in mind and such cases should be treated promptly.

**Conflict of interest:** There is no conflict of Interest

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