



BRANCHIAL CLEFT CYST; SECOND BRANCHIAL CLEFT CYST AND SINUS, DIAGNOSIS AND MANAGEMENT.

Muhammad Arshad¹, Umair Ashafaq², Mohammad Aslam³

1. MBBS, FCPS (ENT)
Assistant Professor
Department of ENT
Benazir Bhutto Hospital
Rawalpindi Medical University
2. MBBS, FCPS (ENT)
Senior Registrar
Department of ENT
Yusra Medical & Dental College,
Islamabad.
3. MBBS, FCPS (ENT)
Professor
Department of ENT
Benazir Bhutto Hospital
Rawalpindi Medical University

Correspondence Address:

Dr. Muhammad Arshad
Assistant Professor
Department of ENT
Benazir Bhutto Hospital
Rawalpindi Medical University.
darshad185@yahoo.com

Article received on:

24/09/2018

Accepted for publication:

15/12/2018

Received after proof reading:

23/02/2019

ABSTRACT... Background: Branchial cleft cyst is rare congenital anomaly and most common cause of head and neck pathology in children. Second branchial cyst accounts 95 % of the all brnchial anomalies. It mostly manifest in 2nd and 3rd decade of life. Early diagnosis, controlling the infection status and complete excision without nerve injury is mainstay of treatment. Recurrence rates is very low after complete surgical excision. **Study Design:** Retrospective study. **Setting:** Department of Otolaryngology, Head and Neck Surgery, Benazir Bhutto Hospital Rawalpindi. **Period:** 02 year from August 2016 to July 2018. **Methods:** 04 cases of branchial anomalies. Age, sex, and duration of symptoms were noted from the case records. The side and site of the lesion and the site of opening of sinuses and fistula were noted. The cystic lesions were investigated with ultrasound and CT scan. Surgical excision of cyst and sinus done. **Results:** The structure of the studied group was as follows: the ratio men/women was of approximately 3/1; the ratio branchial cysts/branchial sinuses/branchial fistulae = 2/2/0. Age ranged from 16 to 27 years. Two patients presented with left neck swelling and one patient presented with right neck swelling and one with right sided discharging sinus. Complete surgical excision was done in all cases and no complication occurred. **Conclusion:** Branchial cysts are commonly misdiagnosed and rarely included in the differential diagnosis. Physician should suspect in any patient with a swelling in the lateral part of the neck.

Key words: Branchial Cyst, Branchial Cleft, Sinus, Fistulogram.

Article Citation: Arshad M, Ashafaq U, Aslam M. Branchial cleft cyst; second branchial cleft cyst and sinus, diagnosis and management. Professional Med J 2019; 26(3):523-527. DOI: 10.29309/TPMJ/2019.26.03.3263

INTRODUCTION

Branchial cleft cyst (BCC) is an anomaly that has a different pathogenesis. BCC, although relatively rare, in childhood, it is second major cause of head and neck diseases.¹ Approximately 20% of all pediatric cervical masses are due to branchial anomalies.² Branchial cleft cysts are benign, however it can cause morbidity due to infections, mass effects and surgical complications. In the early embryonic life, branchial apparatus has important role to play in the development of head and neck structures.³ Ascherson in 1832 first described the name of branchial cyst. He recommended that branchial cysts were results of failure of obliteration of branchial clefts.⁴

Second branchial arch remnants are considered developmental cause of congenital second branchial cleft cysts. Second branchial cleft anomalies represent 95 % of all branchial cleft

anomalies.^{5,6,7} Second branchial cleft cysts are usually located in the lateral part of neck anterior to the sternocleidomastoid muscle. The most of cases arise in young patients between the age of 20 to 40 years of age however these branchial cleft cysts can present in infants and children. Branchial fistulae or sinuses are more common in infants or young children and clinically manifest as discharging sinus from an opening in the lateral part of neck.⁸ Clinically, a branchial cyst is smooth, round, fluctuant and non-tender and usually occurs over the upper part of the neck, anterior to the sternocleidomastoid muscle. Sometimes, infection can cause abscess in cyst, sinus or fistula.⁹ Ultrasound, computed tomography, or MRI will describe the cystic nature of the mass. A fine-needle aspiration can help to differentiate branchial cleft cyst from malignancy or to guide antibiotic therapy for infected cysts. The main aim of the treatment includes early

diagnosis, complete excision without any major complications like neurovascular injury. Prognosis is generally good in these patient.¹⁰

MATERIAL AND METHODS

This is a retrospective study of 04 cases of branchial anomalies, which presented to the Department of Otolaryngology, Head and Neck Surgery, Benazir Bhutto Hospital Rawalpindi, over a period of 02 year from August 2016 to July 2018. Age, sex, and duration of symptoms were noted from the case records. Family history and previous history of infection and/or surgery were noted. The side and site of the lesion and the site of opening of sinuses and fistula were noted. All the patients underwent routine blood examination. The cystic lesions were investigated with ultrasound and CT scan. Patients with sinus and fistulas underwent sino/fistulogram, by injecting contrast material urografin into the tract. All patients were operated upon. In cases of infections, patients were put intravenous antibiotics and in cases of abscess incision and drainage were done. Such patients were taken up for surgical excision of tract four weeks later. During surgery, an attempt was made to remove some fascia and tissues close to the branchial tracts to avoid recurrences. The excised specimens were sent for histopathological examination. Surgeries were performed under general anesthesia.

Excision of Branchial Cyst

Branchial cyst was exposed by giving horizontal skin incision. Subplatysmal flaps were raised and attempt was made to save marginal mandibular branch of facial nerve. Sternocleidomastoid muscle was retracted away from the surgical field and preserving the greater auricular nerve. The cyst was carefully separated from the surrounding structures and completely excised with its walls. Hemostasis secured, surgical drain was placed in neck and wound was repaired in layers.

Excision of Branchial Sinuses

The tract was identified by injecting methylene blue. Elliptical skin incision was made over the sinus opening and the dissection done in the direction of the tract. Step-ladder incision was used for the complete excision of the sinus tract.

This second incision was given at the level of the thyroid cartilage and the 3rd incision was given at the level hyoid bone and whole tract was brought out through this incision. It was then followed to its opening into the lateral wall of pharynx. During their course towards the pharynx, the second branchial fistula were seen passing between the carotid bifurcations, where they were in close relation to the hypoglossal nerve. Both nerve and vessels were preserved and whole tract with cyst was excised. Hemostasis secured and drain was placed in neck. All the incisions were closed in layers.

RESULTS

The structure of the studied group was as follows: the ratio men/women was of approximately 3/1; the ratio branchial cysts/branchial sinuses/branchial fistulae = 2/2/0.

CASE 1

The patient XYZ, 26-years-old male, lab technician by occupation, was hospitalized in ENT department Benazir Bhutto Rawalpindi for a swelling of the left lateral neck region Figure-1. On examination there was cystic swelling of 8/5 cm in the left lateral neck region. The swelling was initially painful, oval in shape and soft to firm in consistency, mobile in all planes and unadherent to underlying structures. The ultrasound neck showed cystic swelling in the left lateral-cervical region. CT scan neck with contrast was done that showed a cystic lesion in left lateral region of neck in close proximity to the carotid vessels and neural structures. Excision of the cyst was planned. Informed consent was taken and possibility of need to give step ladder incision was explained to the patient.

Transverse skin incision was given over the swelling, subplatysmal flap was raised and sternocleidomastoid muscles was retracted. Location of the cyst was confirmed by aspirating the fluid. Whole cyst along with its capsule and wall was removed. Carotid sheath and its contents, Marginal branch of facial nerve, Accessory nerve and Hypoglossal nerve were identified and saved during excision. Surgical drain was kept in and was removed on second day of surgery.

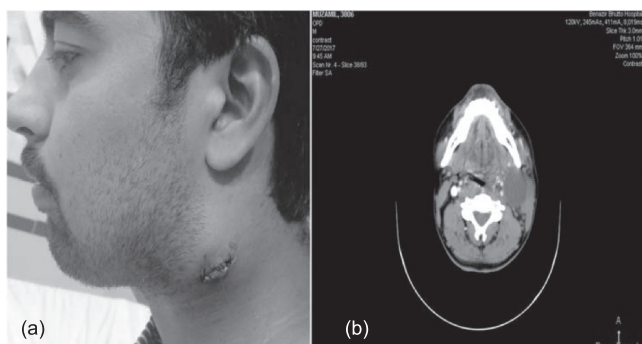


Fig-1. (a) Left sided neck swelling (b) Ct scan showing homogenous density mass in side of neck.

CASE 2

A 23 years old lady house wife presented with left side of neck from one year that was gradually increasing in size. On examination A 3x3 cm swelling present in left upper third of neck anterior to SCM lower the mandible. Swelling was non tender, soft to firm in consistency and fixed to underlying structure. CT scan neck with contrast showed a cystic lesion in left lateral region of neck in close relation to the carotid vessels and neural structures.

Excision of the cyst was planned. Informed consent was taken and transverse skin incision was given over the swelling, subplatysmal flap was raised. Some fluid fistula aspirated from cyst to confirm its cystic lesion. Whole cyst along with its capsule and wall was removed. Major vessels like common carotid artery, vagus nerve, Marginal branch of facil nerve, Accessory nerve and Hypoglossal nerve were recognized and preserved during excision. Surgical drain was placed in and wad removed on second day of surgery.

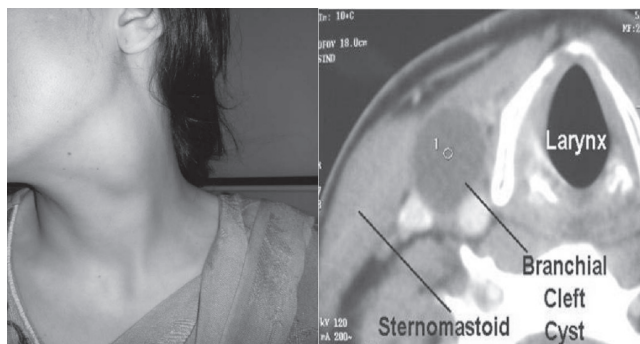
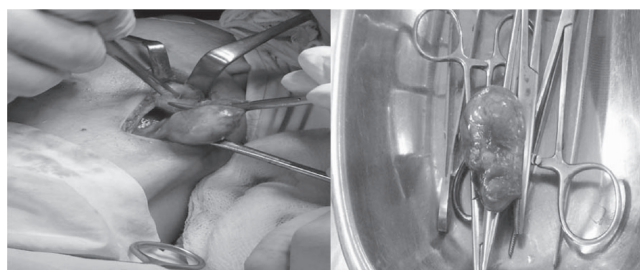


Figure-2. (a) Left sided neck swelling (b) CT scan showing branchial cleft cyst as homogenous mass.



(c) Excision of 2nd branchial cleft cyst (d) Excised specimen of branchial cyst.

CASE 03

A 16-year-old male presented in ENT Department Benazir Bhutto Hospital, rawalpindi, with complaints of a whitish discharge from a small opening on the right lower neck since birth. On local examination, a small opening was seen on the right side of neck almost at the junction of middle and lower third of neck just anterior to sternocleidomastoid. Clinical diagnosis of a branchial fistula or sinus was made and fistulogram/sinogram was requested. It showed a tract, which traveled up, curved medially, possibly passing between the internal and external carotid arteries at the bifurcation and ended in the area of oropharynx (Figure-3).

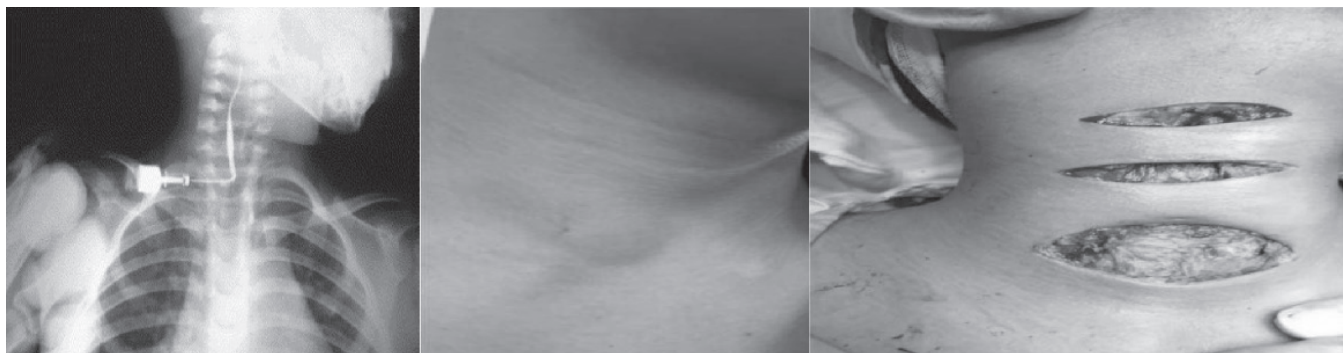


Figure-3. (a) Fistulgram showing tract (b) Branchial sinus right side of neck (c) Stepladder incision.

Excision of the fistulous tract from external approach was planned under general anaesthesia. During operation, three horizontal incisions were made in the neck, one elliptical incision over the external opening and other high-up along neck crease (Figure-2). The elliptical patch of skin containing the external fistula opening was dissected from the lower incision. The dissected tract was then pushed-up to bring it out from upper incision. The tract was then carefully dissected passing between carotid bifurcation right upto pharyngeal wall. It was left attached there. The whole tract was excised completely. Biopsy was sent for histopathology.

DISCUSSION

Branchial cleft cyst is a common cause of soft tissue swelling in the neck of a young adult. They usually develop unilaterally and are mostly seen in the lateral part of the neck. It clinically manifest in first or second decade of life. In older patient's with this manifestations, it is important to differentiate tuberculosis, metastatic lymphadenopathy and lymphoma.¹¹

The second branchial cleft cyst accounts 90 % of branchial malformations. Bailey has previously categorized it into four different sub-types in 1929.¹²

- Type I – Superficial and occur along the anterior surface of sternocleidomastoid but not in contact with the carotid sheath.
- Type II – The branchial cleft cyst lies anterior to the sternocleidomastoid muscle adjacent and lateral to the carotid sheath.
- Type III – It Lies between the bifurcation of the internal and external carotid arteries, lateral to the pharyngeal wall.
- Type IV- Exists deep to the carotid sheath within the pharyngeal mucosal space and opens into the pharynx.

Branchial cleft cyst grow slowly and takes years to develop. Size and location of the cyst can be variable. The most common presentation of these lesions are difficulty in swallowing, Breathing and change in quality of voice. When secondary infections occur in these cysts, they become painful or tender with suppuration and

fistula formation.¹³ Second branchial cleft cysts on radiological imaging typically manifest as homogeneous ovoid or round masses with fluid contents. The metastatic lymph node are thick enhancing solid masses with central necrotic non-enhancing area. In a published series, in 3 % of patients squamous cell carcinoma have been reported on pathologic examination of second branchial cleft cyst.⁴ There are reported cases of papillary carcinoma of thyroid in branchial cleft cyst.¹⁴

Second branchial cleft anomalies can also manifest as fistulas and sinuses, which are less common and usually present during the first decade of life.^{15,16} Male to female ratio is almost equal.¹⁷ When 2nd branchial arch fails to fuse with the 5th pharyngeal arch, a branchial sinus is formed. Thus, it manifest as a remnant of cleft or pouch that has an external or internal opening.¹⁸

Histopathology

The lining epithelium of branchial cleft cyst is stratified squamous epithelium but sometimes lined with pseudostratified, columnar. The epithelium may be ulcerated. There are abundant lymphoid tissue in connective wall, which shows germinal centers.¹¹

The treatment of branchial anomalies begins with a detailed and complete history and physical examination looking for associated systemic anomalies such as branchio-oto-renal syndrome or craniofacial anomalies. The complete surgical excision is definite treatment of branchial anomalies.¹⁹ An early excision is recommended because of the high incidence of secondary infection of these anomalies. Antibiotic therapy is needed in those patients who have undergone acute inflammatory episodes. If there is any abscess, incision and drainage is indicated. Due to the complexity of the dissection general anesthesia is usually recommended. surgical removal will not allow a recurrence of the branchial anomaly.²⁰

CONCLUSION

Branchial cysts are frequently misdiagnosed and rarely included in the differential diagnosis.


Physician should suspect branchial cysts in any patient with a swelling in the lateral part of the neck, painful or painless. Second branchial anomalies are frequently diagnosed in first and second age decades. Careful, complete history and detailed physical examination with radiologic studies is very helpful in diagnosing these lesions. The definite treatment for branchial anomalies is a complete surgical excision. The recurrence of the branchial anomalies is low if complete surgical removal is done.

Copyright© 15 Dec, 2018.

REFERENCES

- Panchbhai A, Choudhary M. **Branchial cleft cyst at unusual location; A rare case with brief review.** Dentomaxillofac Radiol. 2012 Dec; 41(8): 696–702.
- Nahata V. **Branchial cleft cyst.** Indian J Dermatol. 2016 Nov-Dec; 61(6): 701.
- Prasad S, Azeez A, Thada N et al. **Branchial anomalies: Diagnosis and management.** International journal of Otolaryngology. Volume 2014.
- Golledge J., Ellis H., **The aetiology of lateral cervical (branchial) cysts: Past and present theories,** J Laryngol Otol, 1994, 108(8):653–659.
- Vogl T., Hypopharynx, larynx, thyroid, and parathyroid. In: Starkd., Bradley W. (eds), **Magnetic resonance imaging, 2nd edition, Mosby-Yearbook, St. Louis,** 1992, 1184–1243.
- Koeller K. K., Alamo L., Adair C. F., Smirniotopoulos J. G., **Congenital cystic masses of the neck: Radiologic-pathologic correlation,** Radiographics, 1999, 19(1):121–146 ; quiz 152–153.
- Anga. H., Pang K. P., Tan L. K., **Complete branchial fistula. Case report and review of literature,** Ann Otol Rhinol Laryngol, 2001, 110(11):1077–1079.
- Muller S, Aiken A, Magliocca K. **Second branchial cleft cyst.** Head and Neck Pathol (2015) 9:379–383.
- Zaifullah S, Yunus M, See G. **Diagnosis and treatment of branchial cleft anomalies in UKMMC; A ten year retrospective studies.** European Archives of Oto-Rhino-Laryngology. (2013) 4: 1501-1506.
- Ball V, Barnwell R, Greene J. **Branchial cleft cyst: An unusual ultrasound diagnosis in an austere environment.** Crit Ultrasound J (2011) 3:87–89.
- Chavan S, Deshmukh R, Karande P, et al. **Branchial cyst: A case report and review of literature.** J Oral Maxillofac Pathol. 2014 Jan-Apr; 18(1): 150.
- Adams A, Mankad K, Offiah C, Childs L. **Branchial cleft anomalies: A pictorial review of embryological development and spectrum of imaging findings.** Insights Imaging. 2016 Feb; 7(1): 69–76.
- Valetino M, Quiligotti C, Carone L. **Branchial cleft cyst.** J Ultrasound. 2013 Mar; 16(1): 17–20.
- Cho J, Shin S, KIM H et al. **Primary papillary carcinoma originated from a branchial cleft cyst.** J Korean Surg Soc. 2011 Dec; 81(Suppl 1): S12–S16.
- Somp. M., Sacher M., Lanzieri C. F., Solodnik P., Cohen B. A., Reede D. L., Bergeron R. T., Biller H. F., **Parenchymal cysts of the lower neck, Radiology, 1985,** 157(2):399–406.
- Michael A. S., Mafee M. F., Valvassori G. E., Tan W. S., **Dynamic computed tomography of the head and neck: differential diagnostic value, Radiology, 1985,** 154(2):413–419.
- Faerber E. N., Swartz J. D., **Imaging of neck masses in infants and children,** Crit Rev Diagn Imaging, 1991, 31(3–4):283–314.
- Naqvi S, Raza S, Azeem Q et al. **Journal of the College of Physicians and Surgeons Pakistan 2008, Vol. 18 (12):** 774-775.
- Sayadi SJ, Gassab I, Dellai M, Mekki M, Golli M, Elkadhi F. **Laser coagulation in the endoscopic management of fourth branchial pouch sinus.** [Article in French]. Ann Otolaryngol Chir Cervicofac 2006; 123:138-42.
- Mitroi M, Dumitrescu D, Simionescu C, et al. **Management of second branchial cleft anomalies.** Romanian Journal of Morphology and Embryology 2008, 49(1):69–74.

AUTHORSHIP AND CONTRIBUTION DECLARATION

| Sr. # | Author-s Full Name | Contribution to the paper | Author=s Signature |
|-------|--------------------|---------------------------|---|
| 1 | Muhammad Arshad | 1st Author |  |
| 2 | Umair Ashafaq | 2nd Author | |
| 3 | Mohammad Aslam | 3rd Author | |