INTRODUCTION
Remnants of embryonic brachial apparatus are common in children and may present as cyst, sinus, fistula and cartilaginous cyst rest. Although congenital by definition they are often unrecognized or misdiagnosed until symptoms or complications initiate an evaluation.

The term Branchial apparatus was described by Von Baer (1827) term branchial fistula by Simpson (1969)\(^1\). All of these lesions have risk of infection and can present as an abscess or with drainage and surrounding erythema, rarely remnants may harbour malignancy\(^2\). Equally common in males and female usually present in childhood or early adulthood\(^3\).

Second branchial cleft anomalies are more common, representing 95% of all branchial cleft malformations\(^3\).

CASE REPORT
A 6 year female girl presented with chief complaints of opening in lower part of right side of neck since birth and recurrent mucoid to mucopurulent discharge from opening since 2 years, and with associated upper respiratory tract infection. Discharge from opening relieved after a course of antibiotic therapy. On physical examination there was a small punctum in the skin at junction of middle two third to lower one third of anterior border of sternocleidomastoid muscle. Ear, nose, throat and general examination was normal. There are no other congenital abnormalities, and all other routine investigations are normal. On the basis of clinical history and general physical examination, it is diagnosed as second branchial fistula, sinogram done which demonstrated sinus tract up to oropharynx, after confirmation of diagnosis planned for surgical excision. Anesthesia fitness was taken, pediatrician opinion for fitness was taken and posted for total excision of fistula tract under GA. Intra operatively, for easy accessibility, dissection and excision of total tract cannula was passed through the fistula after which methylene blue dye injected.

An elliptical incision was taken around the fistula opening over the neck and blunt dissection was carried under sub-platysmal plane along the carotid sheath up to bifurcation of carotids. Second incision made at the level of hyoid bone and dissected portion of tract passed through undermined sub platysmal plane and exposed and proceeded for further higher dissection. Tract separated from underlying soft tissues, and identified the tract entering into parapharyngeal space towards the tonsillar fossa between internal and external carotid artery which is ligated till the reach of tonsillar fossa to prevent recurrence. post excision of tract hemostasis secured and wound closure done in layers using 3-0 catgut and 3-0 prolene subcuticular sutures applied over skin followed by application of sterile dressing.

Post operatively patient is hemodynamically stable and treated with higher antibiotics, analgesics, antacids, daily aseptic dressing and treated symptomatically and discharged in hemodynamically stable state and follow up review done after 5 days, 2 weeks and after 3 months with no complications noted.

**Fig 1**: Dissection of branchial fistula tact

**Fig 2**: Fistula tact complete exposure

**Fig 3**: ligation of fistula tact at base
The branchial arch system forms the neck and face during the first 3 weeks of embryonic development. It consists of 7 branchial arches, 5 branchial grooves, and 5 branchial clefts. Each cleft develops into a specific structure or regresses completely. Branchial anomalies result from incomplete regression or persistence of these structures. The second branchial cleft and sinuses are encountered along the second branchial arch from the hyoid bone and cleft of tonsillar fossa. Type 1 anomalies, which are anterior to the sternocleidomastoid muscle, account for approximately 50% of congenital neck masses. To accurately diagnose and treat branchial anomalies, it is crucial to understand their embryonic origins and anatomical relationships.

During the 4th and 5th weeks of development, 4 pairs of well-developed ridges and associated clefts and pouches are prominent in the lateral cervical region of the human embryo. The mature structures of head and neck are derivatives of these paired branchial arches, clefts, and pouches of the embryo. The first branchial arch forms the mandible and a portion of the upper jaw, and the part of the first branchial cleft remains open as the Eustachian tube and external auditory canal. Abnormal development results in anomalies such as cleft lip and palate, abnormal shape, contour of external ear, and malformation of internal ossicles. The second branchial arch from the hyoid bone and cleft of tonsillar fossa. Second branchial cleft remnants are found along any part of a line extending from the tonsillar fossa inferiorly to a point on the lower third of the anterior border of sternocleidomastoid muscle. Third cleft migrates low in the neck to form the inferior parathyroid gland and thyromma. Fourth cleft also migrates but stops higher up in the neck and forms superior parathyroid gland and C-cells of thyroid gland. Second arch anomalies are classified into 4 types.

Type 1. Lesion lies anterior to the sternocleidomastoid muscle and do not contact the carotid sheath. Type 2. Lesion are the most common and pass deep to the sternocleidomastoid and either anterior or posterior to the carotid sheath. Type 3. Lesion passes between internal and external carotid arteries and are adjacent to pharynx. Type 4. Lesion lies medial to carotid sheath close to the pharynx adjacent to the tonsillar fossa.

The second branchial cleft and sinuses are encountered along the anterior border of the sternocleidomastoid muscle in its lower third and may be bilateral in 10%. Presence of complete branchial fistula with external and internal opening is not common. Preoperative fistulogram of tract with contrast material demonstrate the entire course of the tract, helps in surgical planning, differentiate between sinus and fistula, and decrease the chance of recurrence. In some cases complete tract cannot be delineated because it may be blocked by secretion and granulation. Anatomically fistulous tract passes deep to Platysma muscle to Pharynx. Third branchial cleft and sinuses are most suitable age for surgery is 2 to 3 year or as early as possible if it is already delayed and among surgical techniques step ladder incision is most accepted method, as it provide better visualisation of tract near pharynx which is combined with transoral approach for complete excision of tract, other modalities of treatment includes a) Sclerosing agents which is seldom used today due to the associated inflammatory reaction and the risk of necrosis with perforation into the pharynx, b) stripping method was described by Taylor and Bicknell in 1977, but this has not been widely used due to great risk of damage to adjacent structures. Complication of surgery includes recurrence, which could be 3% in fresh cases 7% and up to 20% in second surgical attempts. Other complication include secondary infection, injury to facial, hypoglossal, glossopharyngeal, spinal accessory nerves, injury to internal jugular vein, and hematoma formation.

REFERENCE: