Third Branchial Arch Fistula-a case study

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Abstract : Congenital fistulas of the neck are branchial in origin and of these second arch fistulas is by for the most common, 3rd and 4th arch fistula being very rare. Here a case of fistula studied in co-ordination with plastic surgery department, a patient aged about 18 years, normal male. The patient was having mucous discharge in the neck since birth. On examination revealed a 3mm diameter opening seen 1 inch distal to the center of Stenocleidomastoid muscle along the anterior border on the right side.To confirm as branchial fistula Fistulo-gram was done, which revealed a communication with the oral cavity. Thus surgery was undertaken and fistulous tract was excised.

Key Words: Third branchial arch fistula, Branchial fistula, Congenital anomalies.

Introduction

We know the branchial arches developing in the neck having pouch and cleft. The fate of this ends up in formation of smooth neck. Any errors during this process of development may form branchial cysts, sinus or fistula. We have taken up a study on fistula to see the course of the fistula in the neck which is variable in relation to carotid arteries, depending upon from which pouch it is derived.

Hence it is a critical point for surgeons during surgical procedures because it is in relation to vagus nerve & carotid vessels.

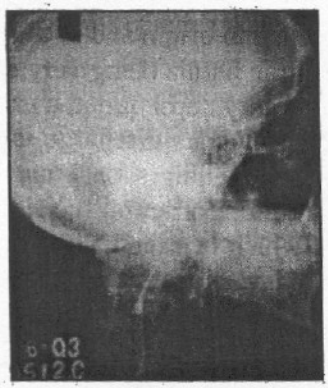
Materials & methods

On routine clinical examination at OPD an 18-year male patient came with history of mucous discharge in the neck since birth. It increased on taking food.

On examination revealed a 3mm opening seen 1 inch distal to the center of anterior border of Sterno-cleidomastoid on right side. There was mucous discharge through the opening. On palpation it was not associated with pain or swelling.

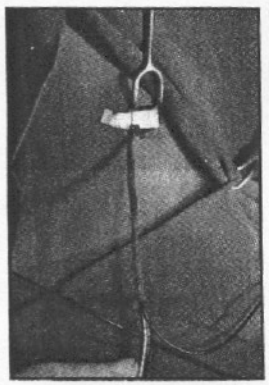
Investigation:

Fistulogram : showed a tract extending cranially and internally which communicated with the laryngopharynx. The middle part of the tract was more dilated than the proximal part, while the distal part was very narrow.



Before surgery Methylene blue was injected into the tract & the dye spilled into the pyriform fossa, which was confirmed by the Anesthetist.

The fistula tract was dissected from outside towards the pharynx. During excision, the tract was observed to run deep to the carotid vessels, which was confirmed by the surgeon. Length of Excised fistula was 6.5 cms.

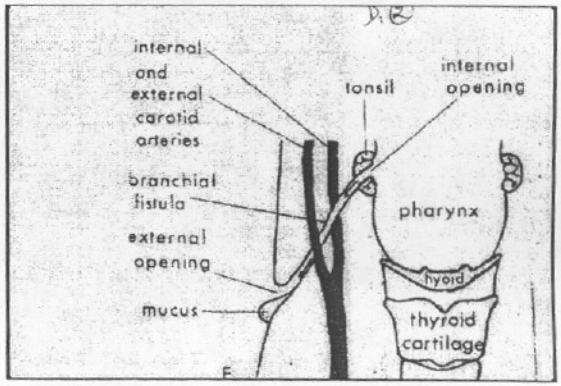


Discussion

Embryology : The branchial apparatus develops during the 3rd & 4th embryonic week and persists until the end of 6th week.

The branchial arches consists of five parallel bars of mesoderm, with ectoderm externally and endoderm internally. Inside the arches form pouches, while outside it form clefts. Each having its own nerve supply and blood vessels. Clefts and groove run obliquely downwards and forwards by the growth of upper 2nd arch with fusion of lower arches form smooth neck. Incomplete fusion of these leads to formation of cysts, sinus or branchial fistula, which could be unilateral or bilateral.

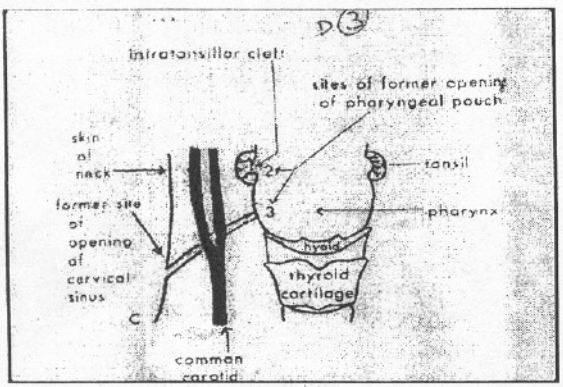
1st arch anomaly: originates anywhere along the nasopharynx, middle ear or external auditory meatus internally & extends downward below the angle of mandible.



2nd arch anomaly: consists of external opening located along the middle of anterior border of Sterno-cleidomastoid. The fistula

passes between the internal & external carotid arteries. It opens in the tonsillar fossa.

3rd arch anomaly: consists of external opening located along the middle of anterior border of Sterno-cleidomastoid. The fistula passes behind the internal & external carotid arteries. It opens in the pyriform fossa internally.



4th arch anomaly: it arises from Oesophagus lies anterior to the carotid arteries and opens in the lower part of the neck along the anterior border of Sterno-cleidomastoid or may be dragged to superior Mediastinum in relation to the arch of aorta or its branches.

Discussion-contd. . . .

Dio et al. (1988) - stated that 3rd and 4th Branchial arch anomalies are rare. And only 31 reports of such branchial anomalies are recorded, all of which have been sinuses.

Takimato etal. (1990)- A complete fistula although theoretically feasible has never been demonstrated. The sinuses usually present with recurrent episodes of neck abscess or retropharyngeal abscess

Godin et al. (1990)- These abnormalities occur in left hand side in 93% of the 28 reported cases. This left sidedness is probably due to the asymmetry of transformation of the fourth. branchial arch artery to form the aorta & innominate arteries.

Agaton Banilla (1990)- has come across only 19.2% of branchial fistula between 1970-1990 (183 cases) out of which branchial fistula of 3rd & 4th pouch are very rare. Dio et. al. also stated this.

Medical encyclopedia et medical imaging (1991) mentions 3rd branchial arch fistula course is posterior to common & internal carotid artery. This enters to pyriform sinus and most third branchial anomalies originate in the posterior neck compartments

- Bobby R Alford (1997-maintains that 95% of branchial anomalies are 2nd arch anomalies. Males and females are equally affected and there is occasional heriditary tendency.

Timothy. L, Black MD (1999)-Has stated about 10% family history seen in cases of branchial fistulas.

In the present study the tract course is posterior to common carotid and internal

Author	Side	Resp. Obst.	Barium	At Operation	Site	Pouch of Origin
Raven 1933	L	?	-	Yes	Pyri	III/IV
Mackey 1962	L	Yes	-	Yes	Tons	II
Karlan 1965	L	No	-	Notment	Notment	III/IV
Sanniah 1972	L	Yes	No	Yes	Post Phary	? III/IV
Juna 1977	L	Yes	Yes	Yes	Phary	? III / IV
D. Burge 1983	L	Yes	Yes	Yes	Pyri	? IV
Present study 2004	R	No	Yes	Yes	Pyri	III

carotid arteries. The external opening along the middle of anterior border of Sterno-cleidomastoid and internal opening in relation to pyriform fossa, which is similar to as mentioned in Medical encyclopedia, Bobby.R.Alford, etc.

Most workers have obtained left sided fistula but this case occurred on the right side, which is very rare.

Timothy.L.Black (1999) has stated about 10% family history. It was also seen by Bobby.R.Alford. But in the present work no such family history was noticed.

Agaton Banilla (1990)- has come across only 19.2% of branchial fistula between 1970-1990 (183 cases) out of which branchial fistula of 3rd & 4th pouch are very rare. Dio et. al. also stated this.

Conclusion

Earlier authors noticed the anomaly was usually leftsided which was not completely demonstrated clinically, but in our case a complete **Right-sided Third Branchial Fistula has** been clinically demonstrated. Surgeons have to be careful because it lies posterior to the carotid arteries, vagus nerve and carotid body, and have to avoid their injuries otherwise may lead to cardiac arrest or death.

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DISCLAIMER

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