Persistent Right Jugular Lymph Sac Simulating Cervical Tumor

By Israel S. Steinberg, M.D.

A patient who had had trauma to the right shoulder and upper chest complained of a right supraclavicular mass. Examination revealed a cystic tumor made larger by performance of the Valsalva maneuver. Angio-cardiography demonstrated that there was partial stenosis of the terminal end of the right innominate vein. This and the Valsalva maneuver were responsible for the filling of a right persistent jugular lymph sac that simulated a cervical tumor.

COMMUNICATION of the subclavian vein with a persistent jugular lymph sac is very rare. Indeed, only one other case recently reported by Deaton1 is recorded in the literature. Deaton's patient, a 5-year-old girl, had had a right supraclavicular cystic mass upon performance of the Valsalva maneuver. At operation an abnormal vascular channel was found and excised. Histologic study suggested that it was either a vein or mixed venous and lymph channel.

In the case herein reported, trauma to the right side of the neck and upper chest was followed by the development of a large right supraclavicular mass. Angio-cardiographic studies demonstrated that the right jugular veins were opacified and a large venous channel became markedly distended during the Valsalva maneuver due probably to partial thrombosis of the distal portion of the right innominate vein. The supraclavicular mass was caused by the abnormally dilated venous channels.

Case Report

A 50-year-old electrician (N.Y.H. #731658) was admitted on February 16, 1956, with the chief complaint of a lump in the right side of the neck. The patient claimed that he was well until December 8, 1954, when on completion of the day's work, he grasped a block and tackle weighing 75 pounds and swung it on his right shoulder. Then, with a combination lifting and throwing motion, he transferred the apparatus from his shoulder to beneath a table. Suddenly he experienced pain in the right supraclavicular area and for about 25 minutes was unable to "straighten up." Subsequently, there was pain along the right parasternal area and when he looked into a mirror, he discovered for the first time that a "lump" had appeared in the right side of the neck. Since then, the patient has continued to have right supraclavicular and parasternal pain of a throbbing character in the right paratracheal and temporal regions. The bulge in the right neck persisted and was made larger by bending and straining movements. Dizziness, syncope, paresthesia, and anesthetic sensations were denied.

On examination, the patient was thick set, well developed and nourished, and in no discomfort. The only abnormal finding was a nontender, soft, cystic, noncrepitant, and nonpulsatile mass about 3 by 3 cm. in diameter located in the right supraclavicular area. It was observed that while demonstrating the mass the patient performed the Valsalva maneuver. Indeed, it reached its maximum size (about 5 by 5 cm.) (fig. 1) during this
Lateral angiocardiogram reveals pronounced narrowing of the right innominate vein as it enters the superior vena cava (arrows).

No bruits were heard over the mass or neck. The cardiovascular system was otherwise normal. Venous distention of the thorax was not found. Blood pressure readings were 132/92 in the right arm and in the left, 130/90 mm. Hg. The pulses were equal and unaltered by movements of abduction or hyperabduction. Laboratory examinations including electrocardiographic studies were normal. Conventional and laminographic x-ray examinations of the chest and neck did not reveal cervical, mediastinal, or pulmonary masses other than the supraclavicular lesion.

Angiocardiographic studies were made on February 20 and 23, 1956. Serial frontal films at 1-

tion reveals opacification of the right axillary, subclavian, innominate veins and the superior vena cava. Note narrowing of the right innominate vein, becoming abrupt at entrance into superior vena cava (arrows). Upper arrows point to the external and internal jugular veins. Middle. One second later, when patient has begun performing the Valsalva maneuver, the axillary and jugular veins are markedly distended. A large paired venous channel (arrow) arising from the right subclavian vein and lateral to the jugulars is evident. Bottom. At the height of the Valsalva maneuver, 6 seconds after beginning of injection, opacification of the persistent jugular lymph sacs is still present (arrow); the axillary and subclavian veins are dilated.
second intervals were taken with the patient supine on a roll-film magazine. At first, with gentle inspiration, the veins of the right side of the neck were seen to fill from the right subclavian vein (fig. 2A). Later, at about 3 seconds after the beginning of injection, the patient was observed to be performing the Valsalva maneuver; at this time, large abnormal veins in the right subclavian area became evident (fig. 2B). The right innominate vein was slightly diminished in caliber but at its terminal end it appeared narrowed, rigid, and poorly opacified (fig. 2A and B). In the lateral, erect view (fig. 3) the narrowing and rigidity of the terminal end of the right innominate vein was even more striking. Angiocardiography via the opposite arm in the supine position disclosed a normal left innominate vein (fig. 4).

After discharge, attempts to have the patient return for further observation and treatment were unsuccessful. Recent communication with the patient revealed that although the cervical swelling and symptoms persisted, he had not lost time from work. Indeed, he stated that he felt so well that he was reluctant to take time off from work for re-examination.

Discussion

The development of the lymphatic system is a fascinating study. Up to the beginning of the twentieth century, the lymphatics were believed to be of mesenchymal origin (tissue spaces and serous cavities). Largely due to the American anatomists, Sabin, Lewis, it became established that the lymphatics were derived from veins. In animals the lymphatic system begins as a series of 8 sacs. Three are paired, the jugular, subclavian and posterior lymph sacs, while 2 are unpaired, the retroperitoneal and eisterna chyli. In the human embryo, there are only 6 lymphatic sacs, the subclavian being extensions of the jugular. Only the jugular sacs retain connections with their parent veins; the others forming in regions where there is great shifting of veins do not have secondary communications with their own veins but join with the other lymph sacs to establish an independent system.

Thus, by the end of the ninth week, the adult pattern of the lymphatic system can be recognized. The thoracic duct is a long continuous channel which at its cephalic end communicates freely with the jugular lymph sac in the left side of the body and enters the left innominate vein at the junction of the jugular and subclavian veins (the venous angle). Similarly, the right jugular lymphatic trunk opens into the right innominate vein at the junction of the right subclavian and jugular veins. Well formed valves at the site of entrance of the lymphatic channels into the veins ordinarily prevent reflux of blood into the lymphatic system.

Apparently, in the patient described above, as well as in Deaton's case, persistence of the right jugular lymph sac and damage or absence of the valve at the site of junction with the veins resulted in the appearance of the supraclavicular mass. Retrograde filling of the jugular sac was also aided by partial stenosis of the terminal end of the right innominate vein and the Valsalva maneuver.

Alteration of blood flow into the heart during the Valsalva maneuver has been admirably demonstrated by venography by Candel and Ehrlich. Similarly, during inspiration for the method of angiocardiography, if the Valsalva maneuver is performed, (and often it is done unknowingly by the patient) blood flow into the heart via the great veins of the neck and arms may be almost completely shut off. As a result marked dilatation of the subclavian and cephalic veins with reflux into the shoulder and jugular veins may be demonstrated. Indeed, performance of the Val-
salva maneuver may interfere with the successful performance of intravenous angiocardiology because the delay in passage of contrast material into the cardiac chambers and great vessels results in faulty timing and poor opacification of the cardiovascular structures.\(^{10}\)

Apparently, in the case reported above, trauma to the right side of the neck and upper chest was followed by the appearance of a mass in the right supraclavicular area. Whether it existed before the injury could not be determined. In any event, it was at that time that the patient discovered the mass and that it became larger on straining. Consequently, in order to observe it, he habitually performed the Valsalva maneuver and was rewarded by the appearance of the mass. It appears, however, that the marked dilatation of the right jugular sac was not due to the Valsalva maneuver alone; the partially thrombosed distal end of the right innominate vein by impeding blood flow into the heart apparently also played a significant role. In this case, angiocardiology established the vascular nature of the cervical tumor and excluded other causes of cervical masses such as enlarged lymph nodes, neoplasms, and cervical cysts (thyroglossal, branchial, hygromatic, and bronchogenic).\(^{11-13}\) Angiocardiography also differentiated the mass from brachiocephalic arterial abnormalities such as aneurysms and buckling.\(^{10, 14, 15}\)

Excision of a persistent jugular lymph cyst, principally for cosmetic purposes, seems warranted. In Deaton’s case such treatment was curative.\(^{1}\) In the case herein described, surgery would also have permitted inspection and palpation of the great veins and established with certainty whether or not the apparent stenosis of the terminal end of the right innominate vein really existed or was associated with the physiologic changes produced by the Valsalva maneuver.

**Summary and Conclusions**

Angiocardiography established that a large right supraclavicular cystic mass appearing during the Valsalva maneuver in a patient who had had trauma of the right shoulder and upper thorax was due to a dilated persistent jugular lymph sac. Partial thrombosis of the terminal end of the right innominate vein was also demonstrated and may have been a factor in causing reflux filling of the sac with blood. Thus, a rare and unique cause of a vascular cervical mass was established.

**Acknowledgment**

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**Summario in Interlingua**

Esseva establie per medio de angiocardio-graphia que un grande massa cystic dextro-supraclavicular, manifeste in le manovra de Valsalva in un patiente qui habeva habite trauma del spatula dextere e del thorace superior, indicava le presentia de un persistente dilatation de un sacco lymphatic jugular. Thrombose partial del extremitate terminal del vena innominate dextere esseva etiam demonstrate e representava possibilemente un factor in causar le plenation del sacco per un refluxo de sanguine. Assi un rar o unie causa de un massa vasculo-cervical esseva establite.

**REFERENCES**


Twenty-nine deaths were recorded in a series of 1,706 thoracic aortographic examinations. Use of a 70 per cent concentration was fatal 8 times more frequently than when a 30 or 35 per cent concentration was employed. Retrograde carotid injection was attended by a higher mortality than brachial or catheter injection. No deaths followed the use of retrograde brachial aortography with 30 to 35 per cent media. Most of the deaths and severe reactions appeared to be associated with cerebral damage. Less frequent were renal, cardiac, and respiratory complications. The author recommends that in children under the age of 4 lesser concentrations be employed; in adults 20 to 30 ml. of a 70 per cent agent is relatively safe. The use of a general anesthetic increases the hazards. The roles played by catheter positioning, patient's state of hydration, electrocardiographic monitoring and sensitivity testing are discussed.

SCHWEDEL
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