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P.S.—Since writing the above all the cases have been followed up for a further period of one year. One patient died of tuberculosis. Others are doing very well. The abdominal discomfort which they used to complain of (*vide chart*) has disappeared. 30-4-1952.

### MUSCULAR ANOMALIES

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THE anatomy textbooks describe the most commonly observed features of every structure. But a knowledge of abnormalities is useful for :—

1. Surgeons operating upon various regions of the body.

2. Students of comparative anatomy to connect up the missing links in the story of evolution.

In the experience of the writers, after dissection of a large number of cadavers in the Medical College, Amritsar, some abnormalities of minor or major degree are present in most of the bodies. The following muscular abnormalities are sufficiently rare to merit record :—

#### (I) Abnormal muscle in the axilla (figure 1)

On the right side of the body, a slender fusiform muscle about 5 inches long and 1/6th inch thick was seen arising from the lateral part of the costo-coracoid ligament on the lateral side of the first part of the axillary artery. It then passed behind the axillary artery and vein and wound round to their medial side, reaching the posterior fold of axilla where it ended by dividing into a number of fibrous strands which fused with the latissimus dorsi.

*Relations*.—Near the lateral side of the first part of axillary artery the abnormal muscle passed between the posterior and lateral cords of the brachial plexus. Then passing deep to the medial cord and axillary vessels, it came to lie along the medial side of axillary vein. Near the posterior fold of axilla the muscle deviated away from the axillary vessels to be inserted into the latissimus dorsi by means of a number of fibrous strands.

From above downward the muscle was lying on the serratus anterior, subscapularis and latissimus dorsi muscles separated by the nerve to serratus anterior, subscapular nerves, nerve to latissimus dorsi and subscapular vessels.

In its terminal part the muscle was on the medial side of the circumflex and radial nerves.

The superficial relations of the muscle were numerous. Close to the first part of axillary artery, clavipectoral fascia, structures piercing

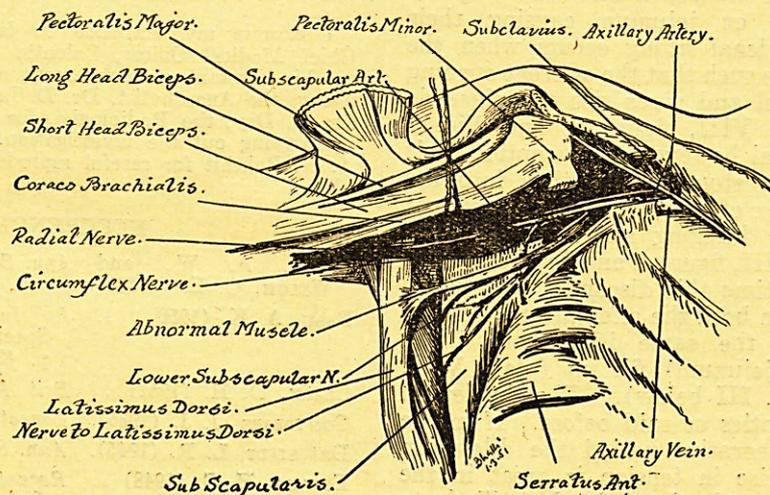


Fig. I

it and clavicular head of the pectoralis major were superficial.

Along second part of axillary artery, the structures which were superficial to it were the medial cord of brachial plexus, axillary vessels, pectoralis minor and pectoralis major.

In the rest of its course, it was only covered by superficial and deep fascia.

There was no corresponding muscle on the left side. Nerve supply: Derived from the nerve to latissimus dorsi muscle.

The following were the chief characteristics of this abnormal muscle:

1. The muscle passed through the cords and branches of brachial plexus which was not interfered in its formation and branching.

2. It passed deep to the axillary artery, pectoralis minor and major to reach the costo-coracoid ligament.

*Comment.*—A careful study of the literature has failed to throw light on the evolution of this muscle. Axillary arch, a derivative of panniculus carnosus of mammals, is comprehensively described. This voluntary muscular slip usually stretches across the base of the axilla from the latissimus dorsi to one of the following structures passing in front of the axillary artery: pectoralis major, coraco-brachialis, pectoralis minor or the coracoid process. Basu has described modified axillary arch which was passing from the latissimus dorsi transversely to the fibres of an abnormal pectoralis minor. Balbir Singh described an abnormal muscle arising from the tendon of latissimus dorsi and going to the capsule of the shoulder joint across posterior wall of axilla: other features of the muscle described by Singh are: (1) It was a muscle sheet 5 inches  $\times$  1 inch. (2) It reached the capsule of the shoulder joint. (3) There was an abnormal formation of the posterior cord of the brachial plexus. This muscle resembled the muscular anomaly described by the writers inasmuch as that it was passing deep to the axillary artery. In the opinion of the writers both these abnormal muscles are not the vestiges of panniculus carnosus. The nerve supply indicates that this muscle is derived from the latissimus dorsi musculature.

### (II) Accessory omohyoid (figure 2)

In the neck of the same body, on the right side, another muscular abnormality was observed. A muscle was seen running parallel and immediately below the inferior belly of omohyoid. The muscle was  $3\frac{1}{2}$  inches long and  $\frac{1}{3}$ rd inch broad. It has a muscular tendinous origin from the lateral margin of lower part of sternohyoid muscle, about  $1\frac{1}{2}$  inches above the medial end of the right clavicle. It was inserted into the posterior border of clavicle at the junction of its lateral and middle thirds.

At its origin the muscle was under cover of the sternomastoid. It passed laterally superficial to the internal jugular vein, scalenus anterior, phrenic nerve, transverse cervical artery and middle and lower trunks of the brachial plexus. Its nerve supply was derived from the ansa hypo-glossi. There was no corresponding muscle on the left side.

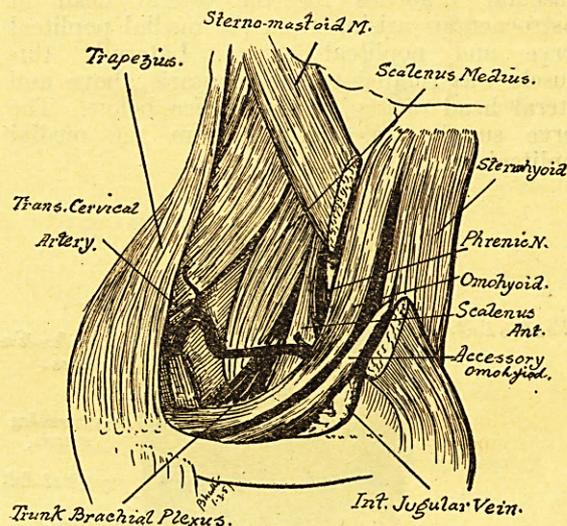


Fig. 2

*Comment.*—The muscle described above is accessory omohyoid. Le Double has found a muscular slip extending from the clavicle in 3 per cent of instances. Its upper attachment to the sternohyoid muscle is easily explained by the fact that both the sternohyoid and omohyoid have a common origin from the ventral portions of the ventrolateral divisions of the first three cervical myotomes. To begin with they represent a single muscle mass. The ventral sternohyoid portion obtains distal attachment to the sternum and medial end of the clavicle whereas dorsal omohyoid portion gets attached to the superior border of the scapula. The two parts thus get differentiated and separated in the lower part of the neck. The intervening muscular tissue retrogresses, becomes fibrous and forms the middle layer of cervical fascia which is attached above to the hyoid bone (like sternohyoid and superior belly of omohyoid) and distally to the posterior surface of sternum, clavicle and lower order of the inferior belly of omohyoid. This accessory omohyoid muscle is a persistent part of the original muscle mass between the sternohyoid and inferior belly of omohyoid.

### (III) Third head of gastrocnemius

In the left popliteal fossa, a muscle 3 inches in length and  $\frac{1}{4}$  inch in width was seen arising from the middle of the popliteal surface of the femur  $\frac{3}{4}$  inch above the intercondyler notch, where it was anterior to the popliteal vessels (figure 3).

The superior lateral genicular vessels passed laterally deep to the muscle near its origin. The muscle passed along the lateral side of the popliteal vessels and medial popliteal nerve into the interval between the medial and lateral heads of gastrocnemius where becoming aponeurotic it fused with the deep fascia of the leg. In its terminal part it passed superficial to the muscular branches for the lateral head of gastrocnemius arising from the medial popliteal nerve and popliteal artery. Laterally this muscle was related to the plantaris above and lateral head of the gastrocnemius below. The nerve supply was derived from the medial popliteal nerve.

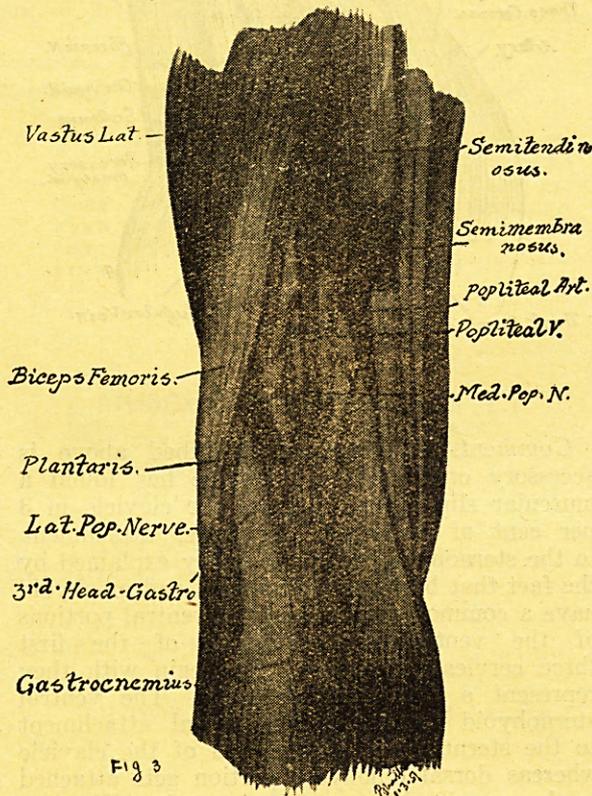


Fig 3

*Comment.*—This abnormal muscle appears to be a modification of the third head of gastrocnemius which is very rarely present in human beings. The difference between the third head of gastrocnemius and the abnormal muscle described is that in the former the insertion is into the gastrocnemius muscle. The tendo-calcaneus is often called triceps sural (being composed of 3 strong muscular bellies, i.e. labral and medial heads of gastrocnemius and soleus).

Plantaris is not taken into account in this nomenclature. An additional muscle, which may be (i) an extra head of gastrocnemius or (ii) accessory soleus or (iii) a muscular slip from biceps femoris or semimembranosus, sometimes joins the tendo-calcaneus and the tendon is then called quadriceps suræ. But this abnormal muscle was inserted not into the tendo-calcaneus

but into the deep fascia of the leg. Hence the tendon cannot be called quadriceps suræ.

The abnormal muscle is thus a modified third head of gastrocnemius.

#### (IV) An abnormal slip of muscle

A muscular slip about 6 inches long and  $\frac{1}{4}$  inch broad was taking origin from the posterior tubercle of the transverse process of the fourth cervical vertebra of the right side (figure 4). It was running immediately below the levator scapulæ whose origin was limited to the first three cervical transverse processes. The levator scapulæ was normally inserted into the medial border of the scapula from the superior angle to the root of the spine of the scapula. The abnormal slip passed deep to the rhomboids, and superficial to the serratus posterior superior and was inserted into the fascia covering the serratus anterior muscle by an aponeurotic sheet 2 inches  $\times$  1 inch near the lower third of the lateral border of the right scapula. Its nerve supply was derived from the nerve to the levator scapulæ.

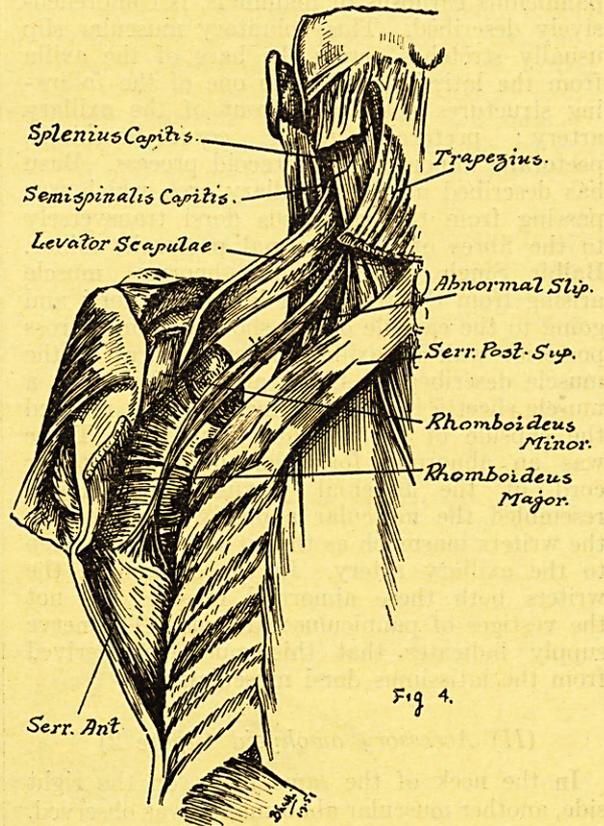


Fig 4.

*Comment.*—This abnormality can be explained by the fact that in lower mammals the levator scapula was primarily continuous with the serratus anterior. The lower portion of the muscle has retained the primitive relationship.

#### (V) Abnormal sternothyroid muscle

The oblique line on the external surface of the thyroid cartilage gives attachment to the

thyrohyoid muscle, sternothyroid muscle and the inferior constrictor muscle (figure 5A).

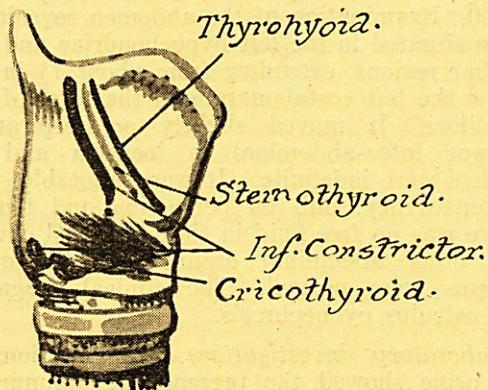


Fig 5A.

In one body, it was noted that the superficial fibres of the sternothyroid were passing uninterruptedly on to the surface of thyrohyoid. The deeper fibres of both muscles had normal attachment to the oblique line. In addition the posterior fibres of the sternothyroid became continuous with the upper fibres of the inferior constrictor (figure 5B).

*Comment.*—The continuity of the fibres of thyrohyoid and sternothyroid is easily explained, as they both are morphologically derived from the upper three cervical myotomes. This continuity is found in a fair percentage of bodies. The continuity of the inferior constrictor, which has a different origin and nerve supply, is difficult to explain.

(VI) Abnormal slip from brachialis

A muscular slip about 3½ inches long and ¼rd of an inch thick was seen arising from

the lateral part of brachialis and the lateral intermuscular septum above the entrance of radial nerve through the intermuscular septum into the anterior compartment of the arm. This muscular slip was found joining the brachioradialis at the level of the elbow joint. The main origin of the brachio-radialis from the lateral supracondylar line was normal (figure 6).

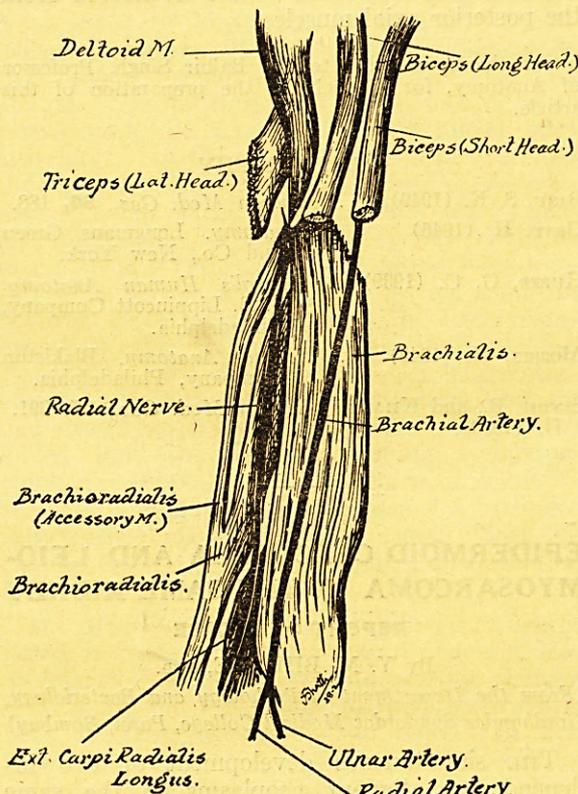


Fig. 6 (diagramatic)

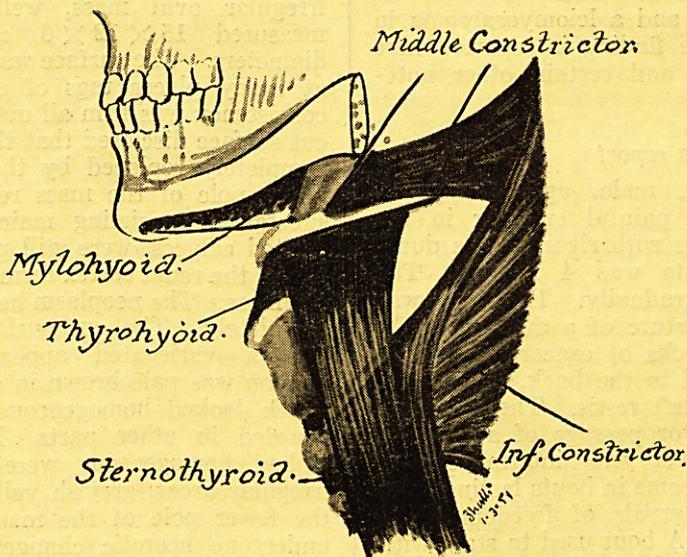


Fig 5B.

Nerve supply was derived from the radial nerve at its entrance into the anterior compartment.

*Comment.*—Brachialis is a composite muscle, the major portion of which is derived from the pre-axial muscle sheet, while the lateral portion of it comes from the posterior axial sheet. This lateral portion may separate from the rest of the muscle and end like the other posterior axial muscles. In this case the muscle was terminating into the brachioradialis which is derived from the posterior axial muscles.

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## EPIDERMOID CARCINOMA AND LEIOMYOSARCOMA IN THE SAME KIDNEY

### REPORT OF A CASE

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THE simultaneous development of two independent malignant neoplasms in the same organ is rare. During a re-study of the malignant renal neoplasms received so far was encountered a specimen which showed an epidermoid carcinoma and a leiomyosarcoma in the same organ. This finding is reported here because of its rarity and certain other noteworthy features.

#### Case report

*Clinical history.*—A male, aged 35 years, complained of (1) a painful swelling in the abdomen and (2) fever with rigors. The duration of his complaints was 4 months. The swelling had grown gradually. The pain was constant and of the nature of a dull ache. At times, there were attacks of exacerbations and then the pain radiated to the back, on the left side, and also to the left testis. There was no history of hæmaturia or passage of a calculus per urethra. The fever was intermittent in character and used to come in bouts lasting from 3 to 7 days with intervals of freedom for a few days in between. A bout used to start with a rigor and during some bouts there was a daily rigor.

Examination showed a well-developed man. There was marked emaciation. Temperature 99; pulse 105; respiration 26; blood pressure 90/60. Examination of the abdomen revealed a lump situated in the left hypochondriac and left lumbar regions, extending from about 1½ inches below the left costal margin to the level of the umbilicus. It moved slightly on respiration. It was intra-abdominal in location and its borders were indefinite. It was ballotable, firm in consistency, dull on percussion and tender. There was no free fluid in the peritoneal cavity. The other abdominal organs and the other systems were normal. The clinical diagnosis was calculus pyonephrosis.

*Laboratory investigations.*—Examination of the urine showed the presence of albumin in traces; microscopically a few red cells and pus cells were detected. Examination of the blood gave the following results: hæmoglobin 8.5 gm., erythrocytes 4.2 millions, leucocytes 12,400; differential count, neutrophils 65 per cent, eosinophils 3 per cent, monocytes 6 per cent and lymphocytes 26 per cent; N.P.N. 30 mg.; urea 22 mg.; Kahn test negative. Examination of the fæces revealed the presence of ankylostome ova.

*Roentgenological examination.*—A plain roentgenogram did not show any calculi in the renal regions. A roentgenogram, after uroselectan, disclosed that the right kidney was functioning but (?) hydronephrotic and that the left kidney was not functioning at all.

*Findings at the operation.*—The left kidney was markedly enlarged. The lesion appeared to be neoplastic in nature. The other abdominal organs were normal. The left kidney with its neoplasm was excised. The convalescence was uneventful. There was no follow-up.

*Specimen* (plate VIII, figure 1).—This was an irregular oval mass, well circumscribed and measured 15 × 12 × 6 cm. in the longest diameters. The surface was nodular and showed at many places tags of adipose tissue. The consistency was firm all over. Inspection of the cut surface disclosed that the kidney was almost completely replaced by the neoplasm. At the upper pole of the mass remnants of the renal substance, consisting mainly of half a dozen dilated calyces, were still present and a narrow rim of the renal cortex formed the right border of the mass. The neoplasm had distorted the organ completely. The cut surface of the neoplasm had a variegated appearance. The greater portion was pale brown in colour with a surface which looked homogeneous in some parts and whorled in other parts. In the portion that looked homogeneous were also present small irregular areas, greyish yellow and opaque. At the lower pole of the mass the neoplasm had undergone necrotic changes; here, was seen a cavity filled with small polypoidal nodules and necrotic debris. Near the left border of the