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Title: Series of six congenital tumours of the neck: considered from a
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B. G. S. Leeds,

Series of Six Congenital Tumours of the Neck.

In presenting this subject of Congenital Tumours of the Neck I wish to begin by thanking Professor Leith, of Birmingham University, for permitting me to use the specimens, and Dr. Hewetson for his assistance with slides and photographs in connection with this thesis.

The first of the series I am taking is that of a Congenital Adenomatous Bronchocele.

The history of the mother of the child was given by Dr. Harvey of Birmingham and is as follows:-

There is no trace of congenital abnormality of the thyroid or thyroid enlargement, on either the maternal or the paternal ^{S'}side of the family: nor of new growth except in a great-grandmother.

Personal history. E. B., aged 26. Six years ago she underwent an operation for renal calculus. She was married $8\frac{1}{2}$ years ago. Her first child was still born at $7\frac{1}{2}$ months, her labour being prematurely induced by a fall. Her second was born at full term and is still alive.

^Her third is the specimen under consideration and was born between the 7th and 8th month of its intra-uterine life.

The labour being lingering Dr. Harvey applied short forceps, although the perineum and soft parts were quite dilatable. The child, a male, cried lustily on delivery. A large tri-lobed cystic tumour was seen in the neck, the left lobe being much the largest, and extending



from the angle of the jaw to the clavicle and causing extension of the head. The child lived two hours. The nurse who was present when it died, stated that it suddenly became convulsed and then expired.

The progress of the mother was satisfactory.

The foetus is a male weighing $5\frac{1}{2}$ lbs., well nourished, and not showing other abnormality than a large cervical tumour.

The tumour measures $4\frac{1}{2}$ " transversely, and 3" vertically. Two thirds of the tumour lies to the left of the neck. There is no well marked isthmus to the two lateral lobes. On the left side the tumour extends as high as the external auditory meatus and overlaps a part of the left lower jaw. On the right side the upper margin is limited by the inferior margin of the mandible.

The surface of the tumour is irregular, due to lobulation. Its consistence is soft and fluctuating, with hard masses scattered irregularly between the fluctuating areas.

The tumour is intimately associated with the trachea, but can be moved freely over the lower jaw, clavicle, sternum and ribs. A No.12 urethral bougie passes easily down the oesophagus ~~on dissection.~~

on dissection

The tumour was found to be perfectly encapsulated, and shelled out readily from all the structures of the neck except the larynx, trachea and oesophagus. It lay under the sterno-mastoid and sub-hyoidean muscles, and completely encircled the trachea.

The thymus gland which was normal in size and structure, was attached by loose fibrous tissue to the



posterior~~ly~~-inferior aspect of the mass.

The oesophagus was situated on the posterior aspect of the tumour and closely adherent to it. (See photograph No. 2). It showed a lateral curvature with its convexity to the left, and an antero-posterior curvature with its convexity backwards. Beyond an antero-posterior flattening the oesophagus showed no diminution of its lumen.

The trachea was intimately adherent to the posterior surface of the tumour, and showed considerable lateral compression, the lumen of the tube being diminished to about a half its normal capacity. It also showed an antero-posterior curvature, convexity backwards, and a lateral curvature, convexity to the left. There were no congenital fistulae visible in the walls of the pharynx or oesophagus.

The foetal heart was enormously distended with blood, more particularly the right side. The ductus arteriosus remaining patent. The lungs were markedly congested showing a condition similar to that seen in asphyxia.

Description of the tumour. The mass, when removed from the neck, with the tongue, larynx, trachea and oesophagus, weighed 220 grammes. It consisted of three masses, one entirely on the left side, a second, which would correspond to the pyramid of the thyroid gland and slightly to the left of the middle line, and a third, in front and to the right of the trachea. (See photograph No. 1). On the extreme right of the mass is a small portion of apparently healthy thyroid tissue representing a part

or the whole of the right thyroid lobe.

On section, the tumour is composed chiefly of cysts full of clear mucin-like substance. The cysts vary in size from a pins head to a tangerine orange. The remaining part of the tumour is solid, and gives the appearance of soft adenomatous tissue. The capsule of the mass is richly supplied with veins. Inside the general capsule there are masses of new growth which have separate capsules of their own. No colloid matter or derm exists. Section of the right lobe of the thyroid gland exhibits the naked eye appearance of foetal thyroid tissue.

MICROSCOPICALLY. Sections of various parts of the tumour were cut for examination and stained by the haematin and eosin, and ^{II}haematin and Van Gieson's stain.

Low power. The capsule consists of loose fibrous tissue in the meshes of which are numerous thin-walled veins and blood sinuses. From the deeper aspect of the capsule slender bands of similar fibrous tissue run into the substance of the tumour, separating the larger glandular spaces from each other. The tumour substance can be broadly divided into a connective tissue element and an epithelial element. The former, which presents a great variety of tissue, is almost certainly mesoblastic in origin, the latter probably hypoblastic. The connective tissue element of the tumour consists of cells and formed tissue. The cells are round, spindle and stellate, in fact, in large certain areas devoid of formed tissue one sees the exact appearance of lymphoid tissue. spindle celled sarcoma. and myxoma respectively.

Of the formed tissue elements there are (1) small masses of hyaline cartilage staining deeply with haematin and rounded ~~ro~~elongated in shape; (2) small moderately hard calcareous masses especially seen toward the centre. These, on being decalcified, consist of an uniformly dense matrix, staining bright red with Van Gieson's stain, and containing spaces in which are spindle or stellate cells; (3) long, loosely packed bundles of non-striated muscle are strewn about the section which are in places cut transversely.

The Acinus portion. The acini vary in size from that of a Lieberkuhn's gland to cysts the size of a tangerine orange. Many of the acini are apparently empty, whilst others contain a homogenous substance, and a third group contain a homogenous substance and cellular element. (see figure 3). A considerable number of the larger acini show intra-cystic growths. The tumour is moderately vascular, and in certain areas ^{shows} a certain amount of recent haemorrhage into both acini and stroma. Areas of brown pigmentation suggest old haemorrhages.

High power. The capsule and fibrous framework having been already described under the low power, I will describe the connective tissue portion. The cellular groundwork forms the bulk of the solid part of the tumour. The following variety of cells are seen. (See figure 4).

(1) Small round cells, with well defined, round, deeply stained nucleus: protoplasm stains moderately deeply. they may be arranged exactly like lymph follicles.

(2) Spindle cells, with an oval nucleus, with protoplasm that stains imperfectly. This is the most prominent

variety of cell.

(3) Stellate cells, with an oval or spherical nucleus, and nearly transparent protoplasm.

These cells are loosely packed, and the whole effect is typical of myxomatous tissue.

The cartilaginous masses are best formed toward the centre, gradually fading away at their margins into the cellular elements of the stroma.

The calcareous masses are never large and always form irregular spicules. Their structure and staining properties give the appearance of true ossifications rather than calcareous degenerations.

The muscular tissue consists of non-stripped fibres running in wavy bundles, with long, deeply staining nuclei. (See figure 5). They are generally seen in the neighbourhood of the cartilaginous masses.

The Acini are of three varieties.

(1) Those lined with a single layer of cubical epithelium, the nuclei and protoplasm of which stain readily. the larger cysts especially are lined with this epithelium. It is the type most usually seen in adenomatous bronchocœles of adults. (See figure 3). Intra-cystic growths, covered with similar cubical cells, are sometimes seen in these acini. The contents are either clear mucus, or mucous containing very large rounded cells with deeply staining nucleus and faintly staining protoplasm.

(2) Those lined with columnar epithelium. The nuclei of these cells are at their attached end, and stain deeply, and are surrounded by a small amount of well

stained protoplasm. The greater part of the cell, however, is semi-transparent and stains faintly. These large columnar or goblet shaped cells appear to possess open mouths similar to the chalice cells of the large intestine. Many alveoli are lined in part with ²columnar cells, and in part with cubical cells, and there is reason to think that the clear part of the goblet cell is shed, leaving the basal part to form a permanent cubical epithelium. (See figure 6). Nearly all of these columnar celled acini contain beautiful intra-cystic ~~g~~growths covered with the same type of epithelium. The contents of this variety are similar to No. 1.

(3) Those lined with stratified epithelium. Usually transitional columnar at the base, squamous towards the lumen, or it may be stratified columnar epithelium entirely. The acini of this class are small and in many their lumen almost closed. All these cells contain well defined nuclei and readily stained protoplasm.

These acini have no contents or intra-cystic growths.

Subjacent to the general capsule of the tumour a large number of normal foetal thyroid acini are found. They are identical with those found in the right lobe.

Sections through the tip of the right lobe have the following characters:-

Low power. The acini are small, irregular in shape, and lined with one or more layers of epithelium. Interspersed among the acini are thin-walled blood vessels.

High power. The acini contain one or more layers of rounded or spherical cells, containing well defined nuclei and protoplasm that stain fairly readily. The epithelium

is not arranged regularly around the alveolus, as in adult thyroid glands, but irregularly in the vicinity of the periphery of the alveolus. Sometimes alveoli are completely filled by those cells. No colloid matter is visible anywhere. The microscopical appearance is that of a normal foetal thyroid of a seven to seven and a half months foetus.

In discussing this tumour and the next of my series, it would be as well to devote a few lines to the study of the development of the thyroid gland.

It is developed partly as a median diverticulum of the pharyngeal hypoblast opposite the ventral ends of the second visceral arches; and partly as a diverticulum of the posterior wall of the fourth visceral cleft. The median diverticulum in most animals early becomes separated from the pharyngeal hypoblast, and is thus converted into an island of epithelium imbedded in mesoblast. In the human embryo, as His has shown, it remains for some time in the form of a hollow bifid vesicle, which is connected with the upper surface of the tongue by the thyreoglossal duct; subsequently the vesicle becomes solid, and the duct is obliterated and disappears, with the exception of a small portion near the orifice, which becomes converted into the foramen coecum of Morgagni.

The bilateral diverticula which assist in the formation of the thyroid body, spring from the fourth visceral cleft. They have at first the appearance of simple saccular glands partially encircling the developing larynx. In front of this they come into connection

with the median rudiment, and eventually blend with it. Like that rudiment, they become entirely separated from the hypoblastic surface from which they have taken origin, their cavity disappears, and they are converted into ramifying and anastomosing cell-cylinders, between which vascular connective tissue becomes developed. The cell-cylinders subsequently become hollowed out, and finally are subdivided by growth of the connective tissue into small vesicles, which gradually become larger from accumulation of colloid in their interior. *

In reviewing the microscopical characters of this tumour, we are struck with the remarkable complexity of its histological structure. As in the great majority of antenatal tumours of other regions, its stroma is very cellular, a fact which led many microscopists in the past to regard them as containing both sarcomatous and adenomatous elements. There seems to be no clinical evidence to support this view, and regard this rich cellular stroma as peculiar to benign foetal neoplasms that have arisen in all probability, from a group of cells derived from one or more of the layers of the trilaminar blastoderm, and which, by some developmental error, have abnormally located in the body. This tumour seems to have been derived entirely from the mesoblastic and hypoblastic elements. There is not remnant of epiblast.

In comparing this foetal ~~goutre~~ with the adult, we see in the adult the type of acinus is practically always the cubical celled variety, many of which containing colloid matter, clear fluid or blood.

The absence of colloid matter in this tumour is

accounted for by the fact that there is generally none in normal foetal thyroids up to about the seven and a half months of intra-uterine life.

Intra-cystic growths are not common in adult thyroid adenomata, and the occurrence of cartilage and spicules of bone and non-stripped muscle fibres are extremely rare. As we have seen above the median hypoblastic tube divides into two prolongations which fuse with the lateral masses at about the fifth week. The greater part of the right lobe of this child's thyroid is normal. In the left half of the tumour, situated just subjacent to the capsule are numerous acini that are perfectly normal.

Foetal thyroid acini. These are remnants, in all probability, of a left lobe which has been pressed out against the capsule by the rapidly growing tumour. The epithelium normally situated in the region of the foramen caecum is stratified squamous with numerous crypts and mucous glands many of which open into the foramen caecum or thyroglossal duct. Comparing this with the hypoblastic elements of our tumour, it is not difficult to see that the columnar-celled acini resemble the mucous glands at the base of the tongue, that the acini lined with stratified epithelium of the same origin, and that the cubical-celled acini are excessive developments of ordinary thyroidal hypoblast.

The lymphoid tissue and muscular fibres are identical with that found in the alimentary canal around the foramen caecum.

The presence of cartilage is explained by the fact

that the ventral ends of the visceral arches are so closely situated to the original thyroidal hypoblastic thickening.

In the down growth a little of the cartilage forming mesoblast may have been carried, and ⁱⁿ that foetal cartilage has such an inherent potentiality *to* ossify, it is not surprising that spicules of bone are present.

Taking into consideration the histological character of this tumour, its situation and relation to the thyroid lobes, I think that it is, in all probability, an excessive development of hypoblast and mesoblast, taking its origin in and around the primitive median lobe of the thyroid rather than of the left lateral lobe of that gland.
gland.



Figure 1. The tumour removed from the body. Anterior aspect, showing tip of tongue above trachea and oesophagus below.



Figure 2. Posterior aspect of tumour, showing the healthy right thyroid lobe clasping the trachea, the lateral curvatures in trachea and oesophagus, also glottis and back of tongue.



Figure 3. Shows mass of cartilage, acini of No. 1 variety showing clear mucus or mucus and round cells, acinus showing columnar cells to the right.

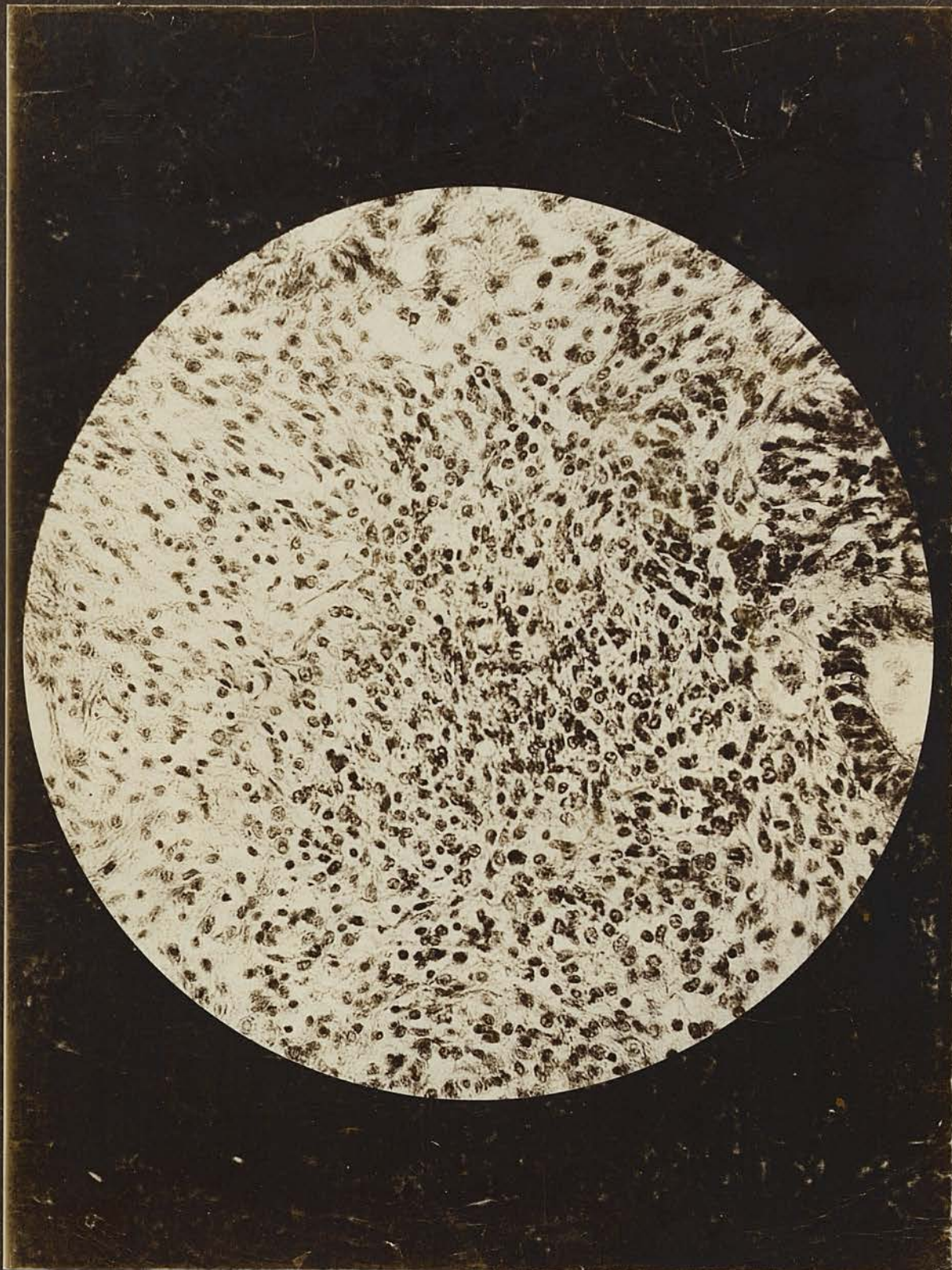


Figure 4. Shows cellular stroma, round and spindle cells, mixed; small acinus to right of field.

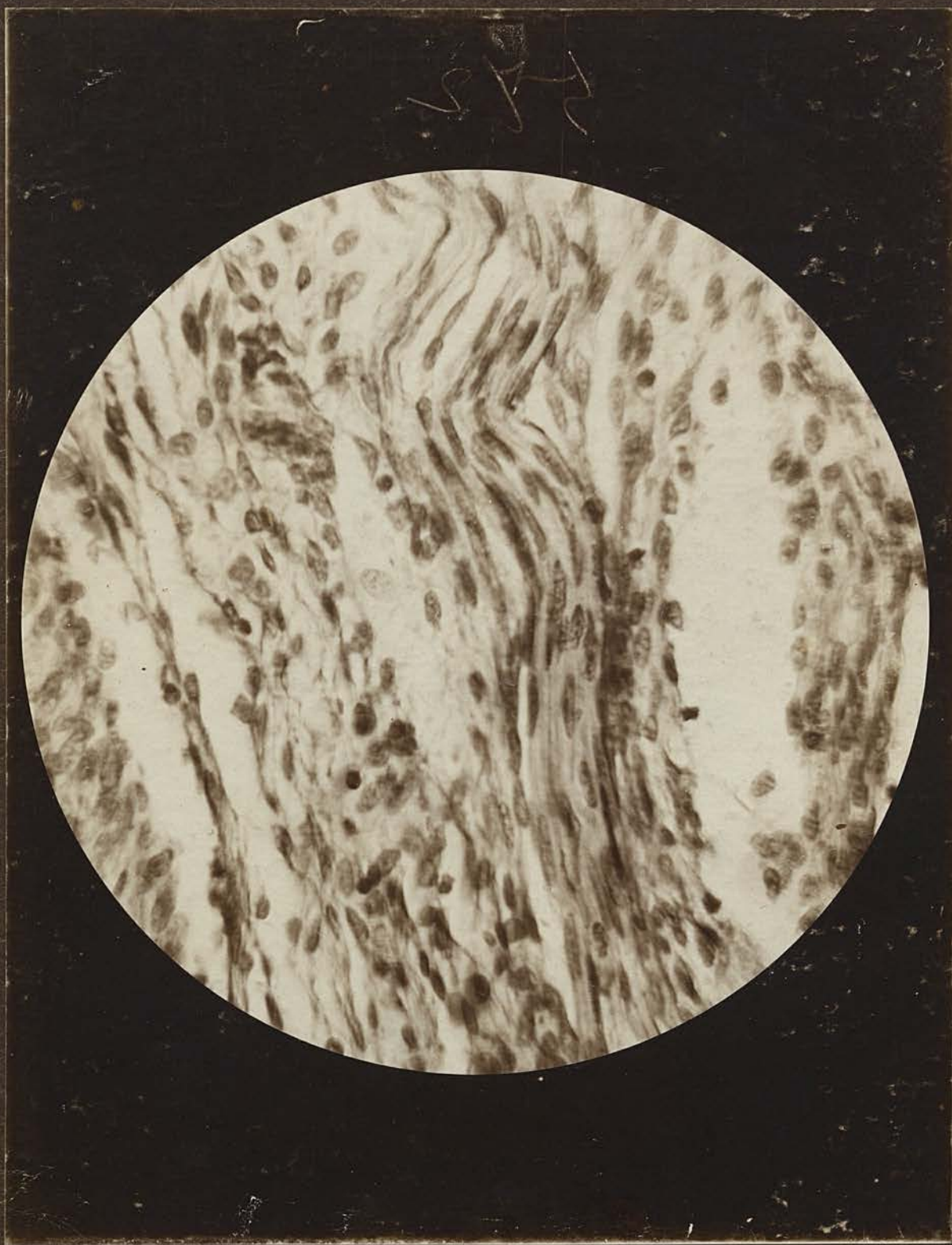


Figure 5. Shows spindle cells of stroma and a bundle of non-striated muscle running across the field.





Figure 6. Shows both columnar cells and cubical cells lining the same acinus, also intracystic growths.

Congenital Goitre.

This specimen, the second of my series, was sent to the Museum of the University in 1903, and shows a contrasting type to the first case. It will be seen on description to belong to the vascular type of congenital goitre.

There is often a marked hereditary history in congenital goitre.

History of the case is as follows:-

Mrs. X. aged 32. The wife of a working man, has been married six years. During that time she has given birth to six premature children excluding the child under discussion. (She has subsequently given birth to another child at nine months). The first was born dead at the fourth month. The second lived a few hours, and was a seven months child. The third about the third month, the fourth a still-born child at the end of the seventh month. The fifth at the end of the third month. (placenta calcareous). The sixth at the end of the tenth week. The seventh child, which finishes this specimen of congenital goitre, was born at the end of the seventh month. "The labour came on unexpectedly. I saw her within an hour of the commencement of her pains, and found the os fully dilated. A tense bag of membranes presented, but no foetus could be felt per vaginam. On the membranes being ruptured the liquor amnii escaped with great force, and nearly a chamberful was collected besides what escaped on the bed and floor.

The foetal head at once descended into the pelvis, and was born with a few pains. The child cried strongly when born and continued to do so while the cord was being *tied*. It was then lifted by the nurse, rolled in flannel and placed on the bed. On examining it later it was found to be dead. The placenta looked healthy, no degenerative patches anywhere. The mother made a good recovery." Dr. Gibb.

There was no history of syphilitis obtainable and there was nothing in the condition of the uterus discoverable which could account for the premature births.

The mother never had any antisyphilitic treatment during any of her pregnancies until the last. About the fourth week of her seventh pregnancy, Dr. Gibb prescribed for her 12 grs of potassium chlorate, and 9 grs potassium iodide daily. This amount was slightly reduced when the child became viable; but was continued up to the day when labour set in. There is no history of goitre upon either side of the family. None of the six previous foetuses showed any sign of goitre, nor did the child born subsequently to the case we are considering show signs of goitre. In this case also the mother was given no potassium chlorate. The placenta was, however, markedly diseased.

Description of Tumour.

The child is a ~~male~~ foetus, ^{of the} male sex, with no other apparent abnormality than a bronchocele.

The neck presents a distinct tumour, identical in appearance with an enlarged thyroid gland.

It reaches as high as the lobule of the ear laterally, and entirely fills up the space bounded by the lower jaw above and the sternum and clavicle below. The isthmus between the two lobes extends from the sternum to the level of the hyoid bone. The tumour is bilobed, and appears similar to an ordinary enlarged goitre in the adult. Figure 1 shows a cast made from the child.

The tumour is movable, smooth on the surface, not nodular, no fluctuation, but is fairly firm.

The right lobe is slightly larger than the left.

On passing a soft bougee down the oesophagus, it is arrested at a point 3 inches from the gums but with some force a No. 6 urethral bougee was made to pass.

On dissection. The tumour consisted of two lobes of which the right was the larger. It showed a general enlargement of the thyroid gland, smooth on the surface white, and firm to the touch.

The capsule was very vascular and surrounded by a network of large veins. The vessels were enlarged considerably.

The posterior surface showed the two lobes to be almost touching each other, with distinct nodular outgrowths from the surface. One of these nodules growing from the right lobe constricted the lumen of the oesophagus very considerably. Figure ii.

From the upper margin of the lobes just in the position where the body of the tumour joined the isthmus, which was entirely absent, sprung two peduncles

which passed upwards in front of the thyroid cartilage and became united in a small glandular mass about the size of a hazel nut, the top of which lay in front of the hyoid bone, and was adherent to it.

This pyramid was arranged in a foliated manner, and formed the only bond of union between the two enlarged lobes of the thyroid. The trachea was entirely surrounded by the tumour, and suffered only slight lateral compression. The oesophagus, however, was firmly compressed between the posterior and upper extremities of the two lobes so that a No. 8 urethral bongeé could only be passed after considerable force.

The carotid arteries and jugular veins were pushed outwards, but not compressed. The vagus and sympathetic were also displaced but not pressed upon.

The lower extremity of each lobe was below the level of the upper margin of the sternum, and firmly attached to it was the upper extremity of a large thymus gland which passed downwards into the superior mediastinum.

On section. The goitre appeared white and solid, showing a few open mouths of blood-vessels.

Microscope. Low power. Is seen an irregular and delicate meshwork of fibrous tissue in the spaces of which are cells irregularly scattered. Fully developed arteries and veins were seen as well as large blood sinuses.

High power. Shows a delicate stroma arranged in irregular meshes, and the acini are not so regular in shape and arrangement as the usual adult thyroid.

The meshes representing acini vary greatly in size, though none are very large. They are irregular in shape and are lined by small round cells or cubical cells, generally in several layers. Frequently, however, the cells seem to be irregularly scattered in the meshes especially towards the periphery of the acini.

The acini may be completely filled with cells and form solid columns. Some cells are sometimes indistinct and appear to be undergoing degeneration. The acini are very distinct and stain very well.

There is no colloid matter to be seen.

Large blood sinuses are seen throughout the section and are lined by a single layer of endothelium and are filled with blood. There is practically no extravasation of blood into the acini.

Numerous well formed blood-vessels with distinct muscular coats are also present.

In the character of alveoli it resembles very closely exophthalmic goitre.

Remarks. In contradistinction to the previous case, which showed cystic formation, I should say this belongs to the vascular type of congenital goitre. As we should expect, there is no colloid matter, as that is not seen until some time after intra-uterine life.

A peculiarity in this case which was seen in the cases reported by Sir J. Y. Simpson (Monthly Journal of Medical Science, Part i, p. 181.), is that they are all born of non-goitrous multiparous mothers who had not borne goitrous children previously and who had

taken potassium chlorate as treatment for numerous premature children.

It is remarkable in this case also that of all the premature children of this woman the only one showing goitrous enlargement was the one treated by potassium chlorate, including the child born subsequently to our specimen.

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Figure 1.

A plaster cast of the foetus shows the enlarged thyroid gland.



Figure 2.

Shows the anterior surface of the tumour
with thymus gland attached.



Figure 3.

Posterior surface of same.



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Figure 4.

Microscopical appearance of normal foetal
thyroid tissue.

Branchial Carcinoma.

The history of the patient was as follows:-

R. M. aged 48, a welder by occupation, the father of eight children. Was admitted to the Queen's Hospital, Birmingham, on March 18th. 1897, under Mr. Marsh.

He complained of a lump on the left side of the neck which had been present two years.

Personal history. He had been a healthy man previously and weighed 15 stones at the time of his admission.

About two and a half years prior to admission he began to complain of soreness of the throat, and a slight stiffness of the neck. About two years ago a small lump formed on the left side of the neck, just below the angle of the jaw, at first about the size of a marble and gradually increased in size. About a year previous to the operation he began to have pain in the neck, radiating into the left ear, temple and face. Six months prior to admission he commenced to suffer from vomiting in the morning after getting out of bed. This passed off after breakfast, and he experienced no further trouble for the rest of the day.

A month previous to admission he vomited about half a pint of bright-red blood.

He appear to have had no difficulty in breathing or swallowing.

State on admission. The patient was a healthy, robust looking man, a total abstainer, and of respectable

appearance. On the left side of the neck was a large rounded swelling, extending from the angle of the jaw to one inch from the clavicle.

It had a vertical diameter of three inches. It was of a soft elastic consistence, slightly irregular in outline and lay deep in the tissues of the neck, below the sterno mastoid. More than one half projected into the posterior triangle of the neck. The tumour was movable to a certain extent. There was no evidence of general infiltration of the tissues around it, and no glandular involvement. It was quite distinct from the parotid submaxillary or thyroid glands.

The patient had no difficulty in swallowing or breathing, nor was there any facial or other nerve paralysis. The head had a slight deviation to the left. His other organs were healthy.

Operation, March 22nd. 1897. By a long incision down the posterior border of the sterno mastoid the growth was exposed. It was found to be an oval circumscribed tumour lying deep on the tissues of the neck, below the sterno mastoid and the great vessels of the neck. It shelled out without much difficulty, although the haemorrhage was very considerable. It was peeled off the sheath of the great vessels and the side of the oesophagus. The sympathetic cord was lying exposed in the bed of the tumour.

Mr. Marsh regarded the case after removal as one of sarcoma of the neck, and sent it up to the University Pathological museum as such.

The weight of the tumour when removed was $1\frac{3}{4}$ lbs.
After history. The wound healed up satisfactorily, and the patient was discharged on April 24th. 1897.

He continued to work until October of the same year, when a tumour began to form rapidly in the old scar.

He was re-admitted to the Queen's hospital about the end of October, when another attempt was made to remove it. It was noticed that the patient had become thinner although still a muscular man. The mass was about as large as it was on the first occasion, but was much more fixed and gave rise to great pain.

Second operation. This was a very difficult one owing to the dense matting, and although most of the growth was removed it was felt at the time that complete ~~excision~~ excision was impossible owing to the severe haemorrhage and the important structures involved in the growth.

At the second operation about 1lb 3 ounces of growth were ~~excised~~ excised.

He left hospital on November 26th. 1897, with his wound still discharging pus and blood.

The patient rapidly became emaciated. He suffered from intense pain in the neck radiating to the chest, head and face. The tumour re-appeared directly after leaving hospital, and at the time of his death in February, 1898, it was as large as a good sized ~~coconut~~ coconut.

The wound never healed after the second operation, and for a few weeks before his death some of his fluid ~~food~~ food came through the wound after swallowing, showing

that the growth had invaded and ruptured into the oesophagus. He died about the end of February emaciated to a skeleton, cachectic, and in great misery.

There was no opportunity of determining whether he suffered from secondary growths or not.

Naked eye appearances. The tumour consists of two lobes with several subsidiary smaller ones adherent to it. The upper lobe measures 5 cms. in its vertical diameter, (saggital) and 3.5 cms. in its transverse diameter, The lower lobe measures 4 cms. in its vertical diameter and 3 cms. in its transverse. The outer surface is lobulated with papillary growths on its surface.

The capsule varies in thickness from 1 to 5 mm. and is of a hyaline cartilagenous appearance. (See figure 1)
On section. The contents consist of a soft material, homagenious in character which cuts with the consistency of cheese, and is, in fact, blood-clot. (See figure 2)

Microscopically. The wall of the cyst is composed of dense lamellae of fibro muscular tissue which run parallel to the surface of the cyst, many, however, run at right angles to each other. Amongst the fibrous tissue are large numbers of blood-vessels with enormously hypertrophied walls running for the most part a tortuous course. (See figure 3 and 4). There are, besides, a considerable number of smaller vessels with their walls engorged with blood.

Lying embedded in the fibrous wall at many points in the section, are stellate lumenae lined by a single

layer of beautiful cubical epithelium which, as far as can be seen, have no connection with the interior of the main cyst. (See figure 5).

The external surface of the cyst in many parts is lined by loose areolar tissue which represents the bed from which the tumour was shelled.

There are other areas, however, which show large tracts of epithelium consisting of columnar cells with a distinct nucleus situated near the base, and a clearer portion towards the exterior.

At various points upon this epithelial surface beautiful low papillary growths arise, lined by similar epithelium. These papillary growths are enormously engorged with blood. (See figure 6).

The interior of the cyst is everywhere lined by columnar cells with a basal nucleus and a clearer peripheral portion. Projecting into the interior of the cyst is along delicate fibro-areolar stroma, rich in blood vessels enormously engorged with blood, (See figures 7,8) and lined by columnar epithelium similar to the interior of the cyst.

The contents of the cyst consist of broken down granular matter in which a few erythrocytes and numerous leucocytes can be recognised, together with large quantities of epithelial cells shed off from the lining, and degenerate papillae cut off from their base.

In view of this history and the morbid appearance of the tumour, we must conclude that the growth was a

papillomatous adeno carcinoma, and in view of its situation, almost certainly arising in connection with unobliterated remnants of the left branchial clefts. It is probably an example of that rare pathological condition, a Branchial Carcinoma, i.e. carcinoma occurring in a branchial dermoid cyst.

Branchial cysts arise in the following way:-

The human embryo has five branchial arches and four branchial clefts, three of which latter usually become obliterated. Occasionally one or more of the clefts persist and are then spoken of as cervical fistulae. These fistulae are found in various stages.

1. Persisting throughout from the pharyngeal end to the neck.
2. Closed at either end.
3. Closed at both ends.

From these fistulae cysts arise owing to proliferation of the epithelium lining the fistulae ^{and} secretion from their surface.

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Figure 7.

Shows columnar epithelium with basal nucleus and delicate fibro areolar stroma on the inner surface of tumour.



Figure 8.

Shows the same more highly magnified.

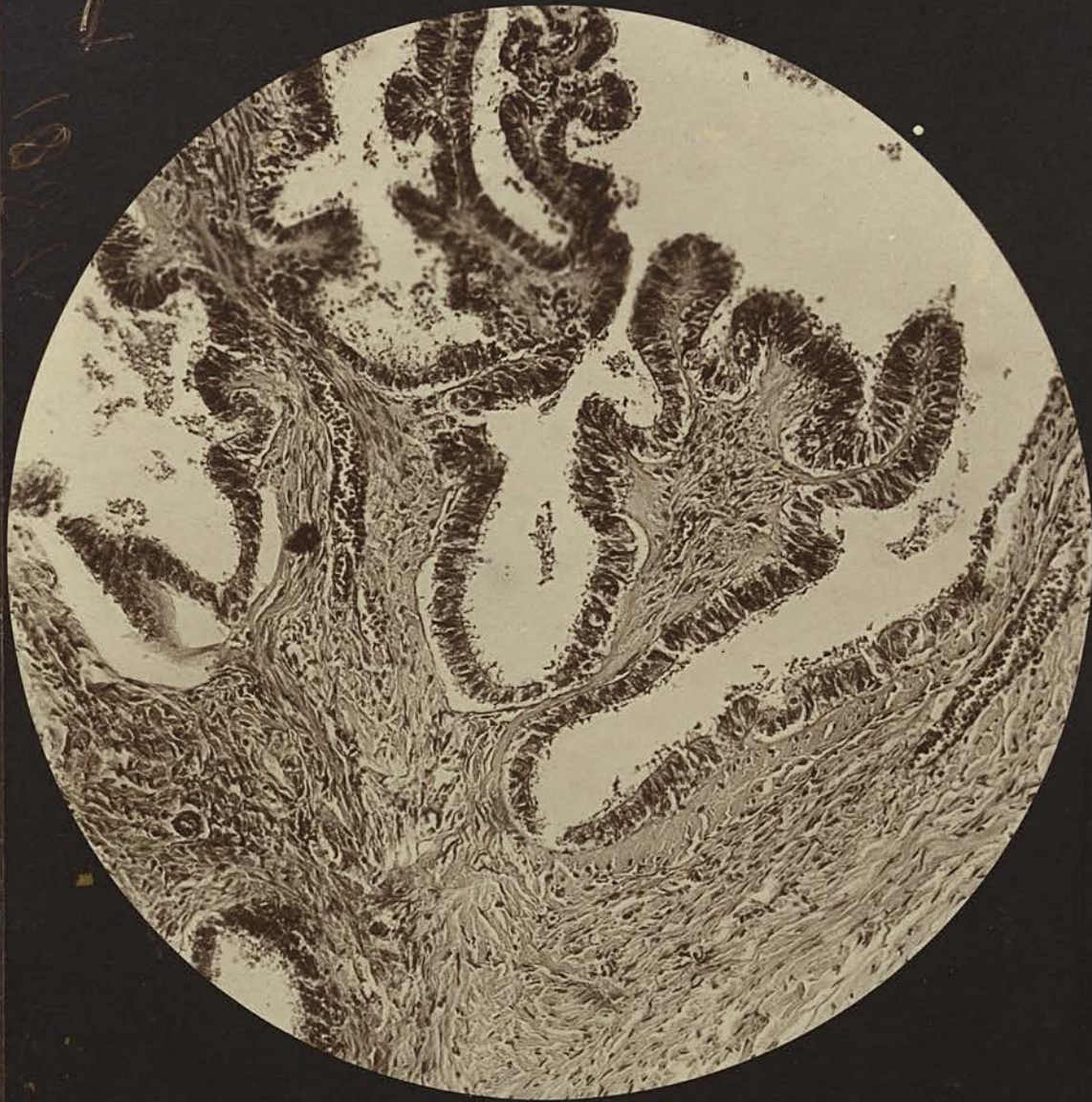


Figure 6.

Shows papillary growths on external surface of cyst engorged with blood.



Figure 5.

Shows stellate lumina with cubical
epithelium.

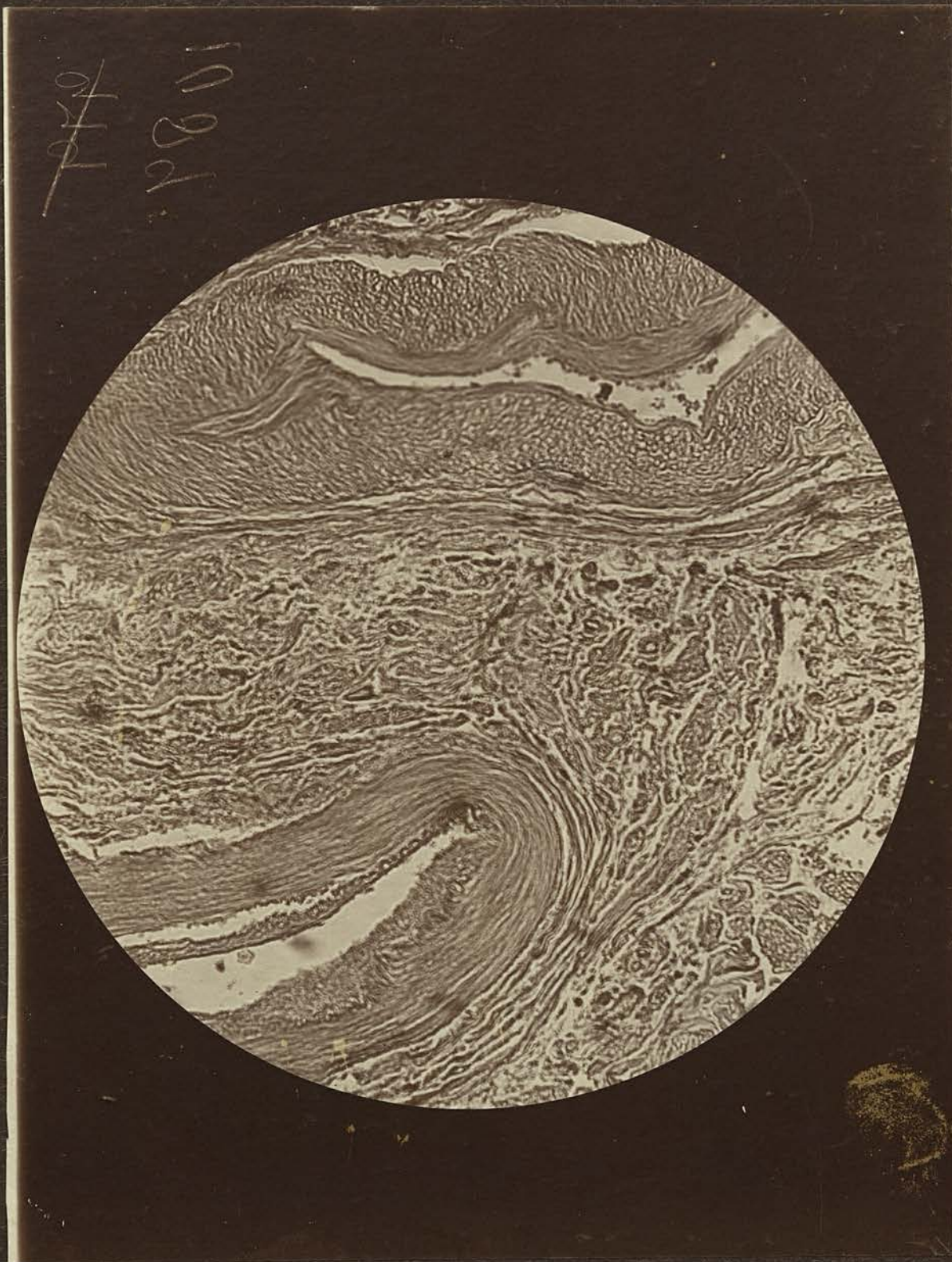


Figure 3.

Shows the great thickness of the walls of the bloodvessels, and dense lamellae of fibro-muscular tissue.



Figure 4.

Shows the great thickness of the walls of the blood vessels, and dense lamellae of fibro-muscular tissue.

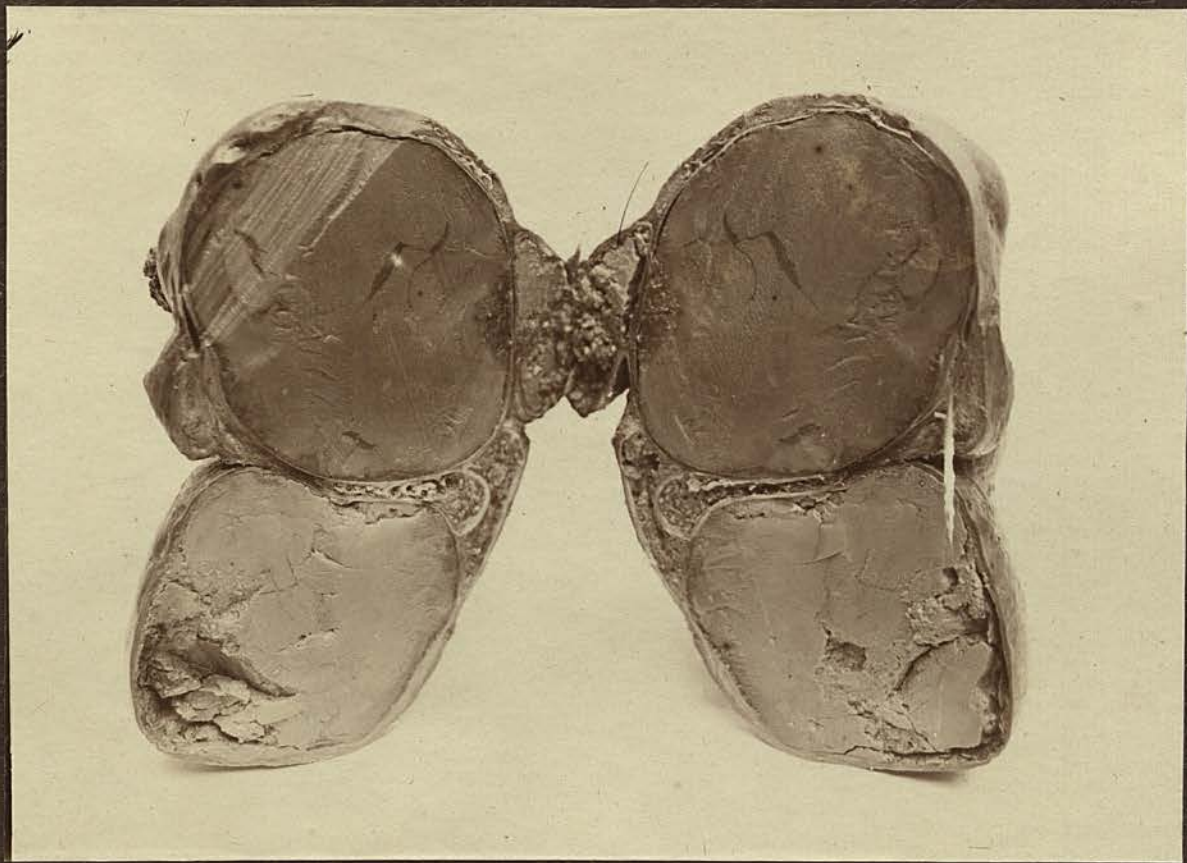


Figure 2.

Section of tumour shows homogenous
character of contents.



Figure 1.

Anterior view, shows tumour divided into two lobes with papillary growths on the surface.

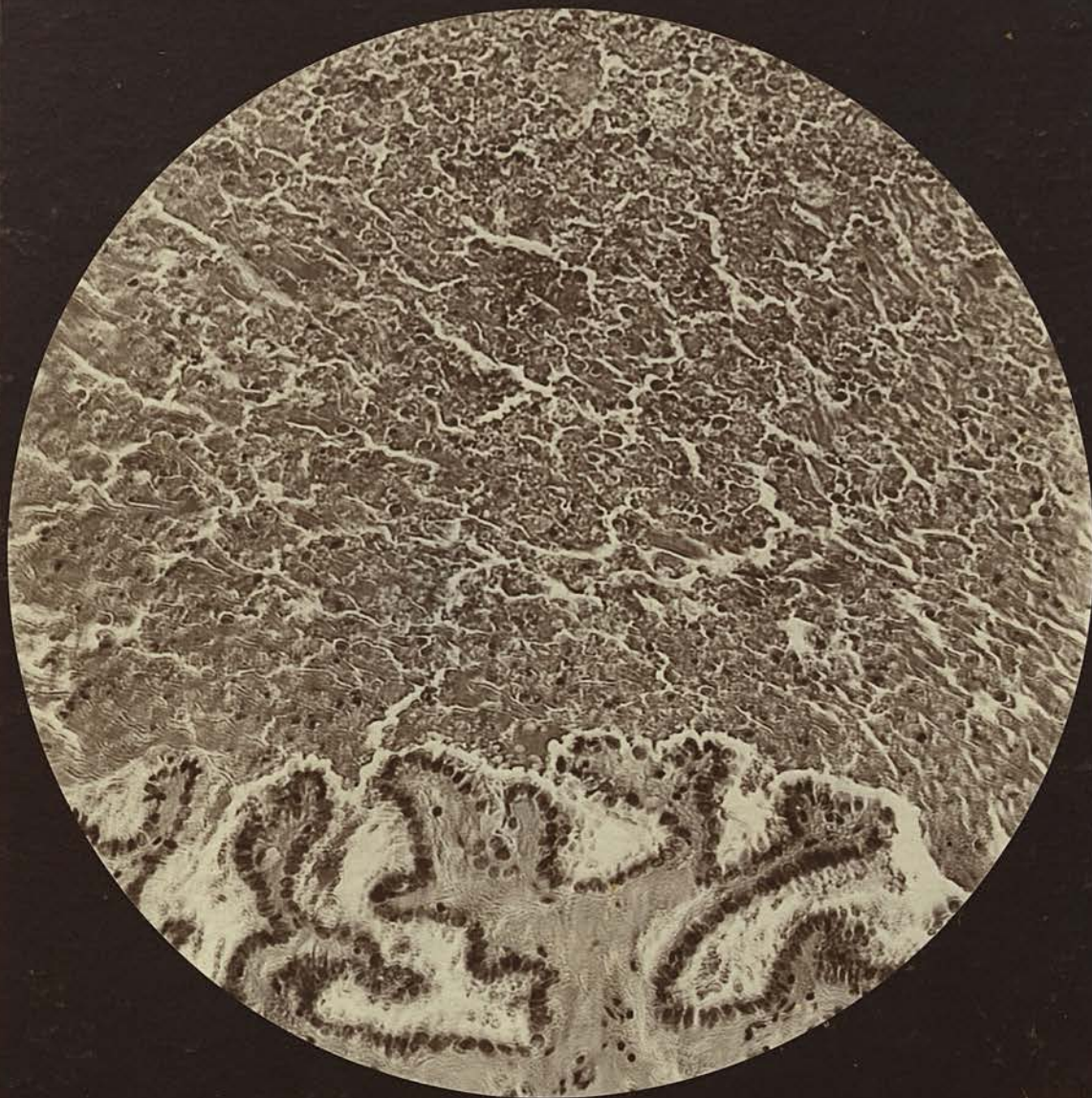


Figure 9.

Shows contents with papillary growth projecting in.

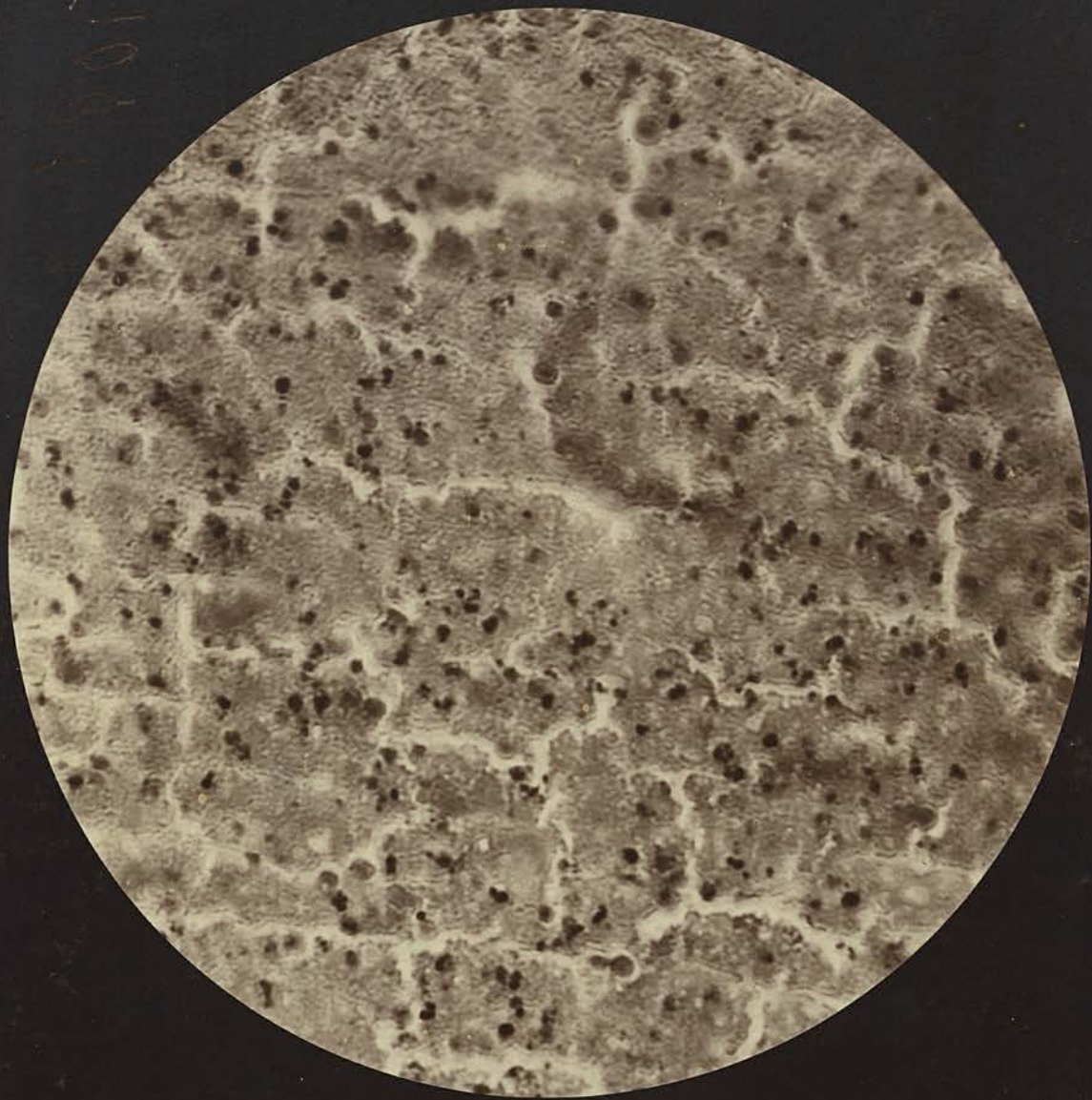


Figure 10.

Shows contents broken down granular matter and large numbers of leucocytes.

Lingual Dermoid or Thyreoglossal Cyst.

This specimen, ~~of~~ the fourth of my series of congenital tumours of the neck is in the Pathological department of the Birmingham University.

Thyreoglossal cysts are rare, and I have been fortunate in obtaining Professor Leith's permission to describe this specimen.

The history of the patient from whom this specimen was obtained is as follows:—

G. B. aged 52, a dipper by trade, and the father of 8 children. Applied at the out-patient department of the General Hospital for treatment on the 9th of November, 1902.

He complained of swelling of the feet and stomach, breathlessness, and palpitation. Duration, 7 weeks. Until August he was perfectly well, never having had any illness of any kind.

Present condition. There was a marked oedema of both legs and enlargement of the liver. The urine contained a considerable amount of albumen.

The heart was hypertrophied, reaching as high as the 2nd rib on the left side. Apex was displaced outwards and downwards an inch and a half below, and half an inch external to the nipple line. The right border extended to half an inch external to the right sternal border. There was a loud rough systolic murmur heard over the mitral and tricuspid areas. A well marked

venous pulse was seen in the neck. Pulse rate, 160 per minute.

The man never had rheumatic fever, but was a confirmed alcoholic, and his arteries showed well marked arterio sclerosis . A tumour was noticed below the chin, and on being asked about it stated that he felt something there the greater part of his life. In 1887 he suffered from a sore throat, and the lump below his tongue increased in size three or four times its previous bulk. Since then it has ~~been~~ very gradually gone on growing. It never gave him any pain or discomfort beyond a feeling of fulness.

One peculiarity, however, noticed by his wife and daughters, was that frequently, whilst talking, a spurt of clear saliva would be projected from below his tongue from a small hole like "a small fountain". This was evidently from Wharton's duct, and had been pent up in the duct by pressure of the dermoid below the tongue.

The swelling appeared as a round circumscribed mass about the size of a tangerine orange, situated in the submental space, partly projecting into the floor of the mouth. It was soft and cystic in consistence, freely moveable when the tissues were lax.

It moved slightly when the tongue was projected and was evidently adherent to it. There was no tenderness. On lifting up the tongue the opening of each Wharton's duct could be seen distinctly dilated; and from time to time about half a tea-spoonful of clear saliva was ejected. The tumour occupied a central position and

extended from the chin to a little below the pomum Adami.

The patient was admitted under Dr. Simon on December 20th 1902. His cardiac condition, however, never responded to treatment. He had 44 ounces of fluid drawn from the chest on January 1st, 1903, and 58 ounces on February 10th. He died four days later.

On P. M. there was seen to be no regurgitation at the Mitral Tricusped and Aortic valves.

The tongue and larynx together with the tumour were removed en mass.

Description of the tumour. On dissection it presents an almost spherical appearance, measuring 4 c.m's. in its vertical diameter, and with a circumference of 15 c.m's.

The tumour is attached loosely to the inferior aspect of the tongue by a broad peduncle (see figure 1) two centimetres from its anterior border and extending back as far as the hyoid bone to which it is attached.

The lowest part of the tumour reaches to the level of the pomum adami. The capsule surrounding it is as thin as wafer paper and strips easily. The tumour burrows into the tongue for a distance of two centimetres, but can be shelled completely out of its bed.

A probe passed down the foramen coecum goes to a depth of $1\frac{1}{2}$ centimetres, but does not reach the cavity of the bed in which the tumour lies.

There is only a layer of mucous membrane separating it from the cavity of the mouth.

The tumour consists of a smooth fibrous capsule with small blood-vessels. On a section it is filled with granular ~~derm~~ ^{ten} at considerable ~~extension~~, yellowish in colour, containing small spicules of white matter scattered through the substance of the derm. There is no sign of any structures produced by the epiblastic layer, such as hair or teeth or other solid matter. Microscopically. The outside of the cyst is composed of loose areolar tissue containing a few large blood-vessels and lined by an attenuated layer of stratified squamous epithelium. There ~~are~~ no papillae, sebaceous or sweat glands to be observed. *Fig I*

The tumour is most probably a thyreoglossal cyst or lingual dermoid, from the fact that a probe can be passed down the foramen coecum through the duct to the tumour. The mode of formation of these cysts is simple. It is due to the failure of some part of the duct to become obliterated.

In foetal life the thyreoglossal duct leads from the foramen coecum in the tongue to the front of the trachea, anterior to the larynx. The lower portion of this duct forms the isthmus of the thyroid gland.

The upper portion is obliterated, except the small portion known as the foramen coecum. There is no remnant of the duct left after birth.

In the formation of a thyreoglossal cyst the duct becomes obliterated above and below a certain segment. In this segment the epithelial cells which persist, and line its walls, secrete a substance which increases, and so a globular shaped cyst is formed.

The duct is formed before the hyoid bone. When this latter is developed it divides the duct into an upper or lingual duct and a lower or thyroid duct. Cysts springing from the latter are called accessory thyroid, and from the former lingual dermoid.

In distinguishing between *ranulae* and lingual dermoids, we should bear in mind that the former cannot be felt below the jaw, whereas the latter project into this region more than into the floor of the mouth.

The most usual time for cysts of the thyroglossal duct to appear is early adult life. These cysts occur in the middle line.

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Figure 1.

Shows the tongue with tumour attached to its lower surface.



Figure 2.

Shows loose areolar tissue with large
blood vessel and capsule of the tumour.

Congenital Lymphatic Cyst of the Neck.

The specimen under consideration was presented to the Birmingham Pathological Museum by Mr. W. E. Bennett. Dr. J. T. Hewetson, who saw the child during life, gave me the following history.

She was a female child that had survived birth for eight days, despite the fact that no food could be swallowed because of the enormous size of the tongue. The tumour was quite double the size of the child's head. She could breathe freely. The tumour was warm, non-pulsatile, and could not be reduced to any extent by firm pressure.

It moved freely over the deep structures of the neck, but was firmly fixed to the jaw. The tongue was of enormous dimensions, quite filling the mouth and dilating the pillars of the fauces. The tongue was of a bluish colour, very soft to the touch, and projected beyond the lips.

The diagnosis lay between some congenital development in the thyroid gland and cystic hygroma.

The presence of such a large tongue with a bilateral tumour connected with the jaw, strongly suggested hygroma.

The question of treatment was discussed and the conclusion come to was operative measures were quite hopeless.

The parents, who had four other children, were of

the working class, showed no congenital malformations either on the paternal or maternal side. The other children were all healthy.

Postmortem. The child weighed 5lb. 8ozs. The head and face were very much congested and head was extended. A large bilateral tumour existed on the anterior aspect of the neck. The tongue was enlarged and projecting from the mouth. The umbilical cord was all but separated. No other deformities were visible. (See figure 11).

The tumour presented the following characters.

It was bilateral, the left half being slightly the larger. Vertical diameter was $5\frac{1}{2}$ inches, transverse, $4\frac{1}{4}$ inches, and antero-posterior 4 inches.

The upper limit extended as high as the lobes of the ears, and the infra-orbital margins. Inferiorly it overhung from its base in the neck as low as the xiphisternum. Laterally it extended to 1 inch behind the tip of the mastoid process.

The tumour was fixed by a broad base to the front and lateral aspects of the neck, and spread upwards over the lower jaw. On palpitation the mass was soft and fluctuating in every part, no solid masses being felt anywhere.

On dissection. The vessels of the cranium were greatly enlarged with blood, due to pressure on the jugulars. There was no meningocele from either the cranial cavity or the spinal canal.

The right lung was much congested as a result of the child's position. The ductus arteriosus was patent, admitting a No. 4 urethral bougie.

The lymphatics over the body were apparently normal. Relations of the Tumour. It was situated entirely below the deep cervical fascia. The sterno-mastoid muscles passed upwards behind the mass. The infra-hyoid and digastric were behind, as were also the large vessels of the neck.

The lower margin of the mass was rounded, well defined, and hanging over the front of the chest. The upper boundaries were less definite, and appeared to infiltrate the muscles and structures around the jaw and forming the floor of the mouth.

The tumour entirely encircled the lower jaw, spreading over its anterior and lateral aspects, whilst at the posterior margin of the mylohyoid muscle it became continuous with a smaller cystic mass involving the base of the tongue and the floor of the mouth.

The tongue itself fills up the entire mouth, the palate and pillars of the fauces being tightly stretched over the dorsum of the tongue.

The posterior surface of the cystic mass could be readily separated from the front of the trachea and oesophagus. (See figure 3). There was no undue compression of any of the deep structures of the neck except the veins.

The thymus, thyroid, submaxillary, and parotid glands were normal; and there was no evidence of fistulae in the oesophagus or pharynx.

The arterial supply was from the external carotid, and the venous return passed into the internal and external jugular veins.

The cystic mass, when removed from the neck, together with the tongue, lower jaw, larynx, trachea, and oesophagus, weighed 508 grammes. Its vertical length was 5 inches, breadth $4\frac{1}{2}$ inches, and antero-posterior depth $3\frac{1}{2}$ inches.

Several sections were made in it, and it was found to consist of smooth-lined cysts, varying in size from an orange to a pins head.

The larger cysts contained a brownish watery fluid of alkaline reaction, specific gravity 1,023, with red and white blood corpuscles. Many of the cysts were filled with coagulated blood-clot, and a few contained clear serum.

The walls of the cysts were soft and fibrous. (See figure 4).

The tongue on section was found to contain a large number of cysts, varying in size from a hazel nut downwards, full of blood-clot, and resembling to the naked eye a section of a cavernous angioma. There was no direct continuity from the lumen of any of the large blood-vessels supplying the tumour with any of the cysts.

Microscopical appearances. Sections were made from various parts of the tumour, and they all agreed in one particular-- namely, that they showed everywhere spaces lined by a single layer of flattened endothelium. The spaces in the part of the tumour below the jaw contained either clear contents or a varying quantity of blood cells.

The spaces in the region of the tongue were almost

invariably full of leucocytes and erythrocytes and was similar to those seen in a cavernous angioma. (See figure 5). The muscular bundles of the tongue are seen scattered irregularly amongst the cavernous spaces.

Each cyst is supported by longitudinal layers of loose fibrous tissue, upon which the endothelial lining is placed. (See figure 6). This connective tissue frame-work is very vascular.

I will now describe the next specimen of a similar pathological condition before remarking on the first.

SECOND CASE.

It is that of a female child weighing $8\frac{1}{2}$ pounds, possessing a cystic tumour on the left side of its neck.

There was little or no difficulty attending the confinement of the mother. The child cried loudly after birth. In about a quarter of an hour it became cyanosed and ceased to breathe. The head was flexed and pushed to the right. (See figures 1, 2, 3). There was no other abnormality beyond the cervical tumour. The tumour was situated in the left postero-lateral quadrant of the neck. It was oval in shape, measuring 3 inches vertically and two inches in its antero-posterior diameter.

Anteriorly it reaches to a line dropped vertically from the angle of the jaw. Posteriorly to a point $\frac{1}{2}$ an inch from the mid dorsal line. Superiorly as high as the middle of the pinna of the ear, and inferiorly as low as the clavicle.

Its consistence was soft and diffluent in the

centre, and somewhat firmer around its base. It was firmly fixed to the tissues of the neck, and could not be emptied by pressure.

Post mortem. There was nothing abnormal in the other regions of the body.

On dissection the tumour was deeply situated in the neck, being under cover of the sterno-mastoid. Its anterior margin passed beneath the carotid sheath, and its posterior limit lay on the longus colli muscle.

It was easily shelled out from its bed, except its anterior aspect, which lay close to the trachea.

The blood supply was from the external carotid, the veins passed into the internal jugular.

There was no undue pressure upon important structure ~~of~~ the neck.

On section. The mass consisted of a large number of cysts varying in size from a walnut to a pins head. All the cysts had a smooth inner lining. Their contents varying, some containing blood-stained serum, others clear serum, whilst others were filled with coagulated blood.

There was no direct continuity between the blood-vessels supplying the mass and the interior of the cysts.

Microscopically. The spaces vary considerably in size. All have a smooth inner lining consisting of flattened endothelium. Each space is supported by a loose layer of fibrous tissue external to the endothelial layer.

The individual cysts are bound together by an external open-meshed type of areolar tissue, which is everywhere supplied by engorged bloodvessels with

extremely thin walls, as in figure 4. The loose areolar tissue is frequently crowded with small round cells that suggest an inflammatory reaction.

In discussing these two cases, which are undoubtedly rare conditions, I shall begin by quoting from Dr. Ballantyne's book on "Antenatal Pathology", in which he says "Cystic hygroma of the neck differs in several aspects from the true branchial cysts..... I have seen only one case in 327 instances of antenatal morbid states, They are often deep seated and even when apparently superficial are apt to have diverticula passing far in among the important vessels and muscles of the neck. They are often large enough at birth to cause serious delay in labour" (In neither of these two cases, however, was there any history of difficult labour. This is probably due to the fact that in the first case where the tumour was in a position to cause extension of the head, the foetus was small). "and may fill up all the space between the angle of the jaw and the chin above, and the upper end of the sternum below", as seen in case 1.

"They have usually a quite irregular outline and an elastic consistence; and they are made up of several cyst cavities. The lining membrane is an endothelium like that of a lymphatic vessel, and their contents are generally clear serum, which may sometimes be brownish in colour, as the result of haemorrhage into the cyst. In all these respects the hygroma colli differs from the branchial cyst", (~~the next in my series~~).

With regard to its origin various opinions have

been advanced. It cannot always be associated either with the salivary glands or the inter-carotid ganglion, for it may be situated far from both these structures. There are no sufficient reasons for looking upon it as of the nature of angioma, and the only satisfactory theory is that it is due to an anomaly of the lymphatic system It is, then, in all probability to be considered as a lymph angioma; and it is therefore related to the foetal disease known as cystic elephantiasis."

From the foregoing description by Dr. Ballantyne, there does not seem to be much doubt that both these cases are congenital lymphatic cysts.

The pathological condition of these two apparently different conditions ~~are~~^{is} very similar. They both show multiple cysts varying greatly in size. In both the contents vary from clear serum to solid blood-clot. In both the loose connective tissue framework is everywhere extremely vascular, and shews areas of round celled infiltration indicative of inflammatory reaction. Even in those cysts that are filled with blood the leucocytes are very much more numerous proportionately than the erythrocytes. Each tumour tends to infiltrate the tissues in which it is located.

Some consider that hygroma are due to an obstruction in the main lymphatics leading to dilatation of those behind, but it is not supported by any evidence.

Dr. Hewetson draws attention to the fact (in Treatment, vol. viii. Oct. 1904.) that by far the commonest sites for these lymphatic cysts are in the cervical

region, and more especially the submaxillary and lateral cervical regions. He goes on to say "We know from the work of His, that in the human embryo of three weeks there are five pairs of primitive vascular arches corresponding to the branchial bars, and that very soon these undergo a process of rearrangement and partial obliteration. The obliteration is most marked in the first and second primitive arches, corresponding to the mandibular and hyoid branchial bars. It is not unlikely that in this complicated natural process of obliteration of the vascular system, and of the establishment of a new supply, some of these primitive blood spaces still retain patent lumina. Around these channels a new vascular supply is established, and serum is readily poured into these blind tubes from the young blood-vessels, and in this way lymphatic cysts are produced and maintained.

The way in which the lower jaw is surrounded by cysts in the first case makes it certain that if such a development does arise in relation to the primitive arches, the first or mandibular arch is chiefly involved in this case.

The second case would similarly be explained as a development in connection with the dorsal part of the second primitive arch.....

These two specimens tend to throw some light upon the question of spontaneous cure, which is such a marked feature of lymphatic cysts.

Haemorrhage occurring into the interior of a cyst

would tend to set up inflammatory reaction in the walls of the cyst leading to migration of leucocytes and later fibrosis.

Clinically, it is observed that they become warmer to the touch, due to inflammatory reaction.

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Figure 1. Anterior view of Case 1 previous to dissection, shows relative size of tumour and its relation to the body. Tongue is seen protruding.

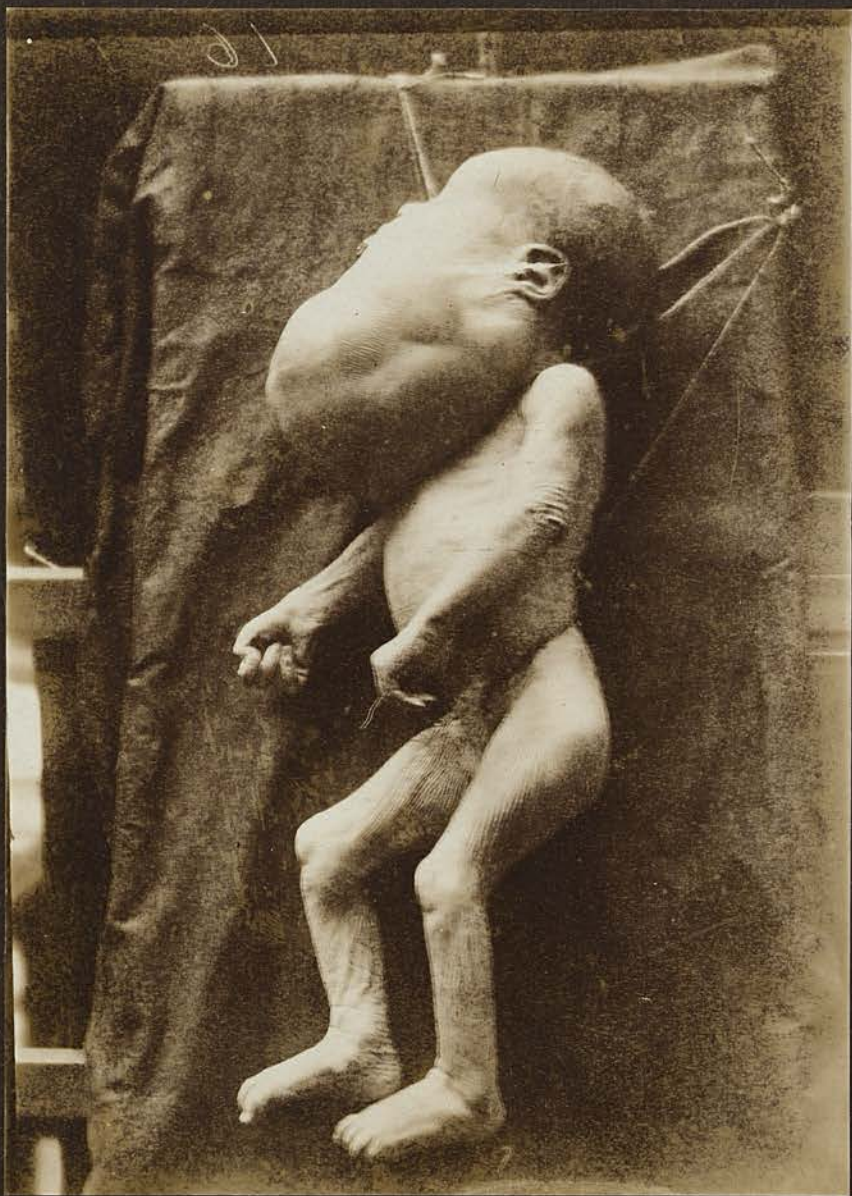


Figure 2. Lateral view of above.



Figure 3.A Lateral view of tumour when removed
showing the trachea



Figure 3. Postero-lateral view of tumour when removed, showing the 1 trachea, 2 thyroid gland, 3 oesophagus, 4 infrahyoid muscle.

1. To the right with thyroid gland above it.
3. Oesophagus to the left.
Infrahyoid muscle to right of trachea.



Figure 4. Shows large size of some of the cysts. Tip of tongue is visible on the top of the tumour.



Figure 6. Section through the base of tongue showing large well defined spaces full of leucocytes and erythrocytes, muscular bundles scattered irregularly amongst the connective tissue framework.



Figure 7. Section across the septum between adjacent cysts showing the loose fibrous tissue of the septum and the endothelial lining of the cysts.



CASE TWO

Figure 1. An anterior view showing the profile of the tumour as seen from this aspect and the antero right lateral inclination of the head.



Figure 2. Lateral aspect of the tumour.



Figure 3. Section through two adjacent cysts showing the loose areolar tissue between the cysts and the marked vascularity of the connective tissue framework.