CONGENITAL MEDIASTINAL CYSTS OF GASTROGENIC AND BRONCHOGENIC ORIGIN

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Mediastinal tumors are rarely encountered in childhood. In 1924 Smith and Stone [1] reported two cases from the Children's Hospital of Boston, one of which was a teratoma. They collected from the literature and summarized eight similar cases occurring in children under twelve years of age. Of one hundred and thirty-nine thoracic dermoids and teratomata collected by Kerr [2] in 1928, and including his personal case, only eleven occurred in the first decade of life. Recently, three cystic mediastinal tumors have come under our observation that are in a measure comparable to the dermoids, but differ from them histologically. The teratoma is an extremely complex tumor and is composed of tissues derived from all three germinal layers. The dermoid is of simpler structure arising from but two of the three primary embryonal layers. Whereas the dermoid is of ectodermal and mesodermal origin, the tumors we are describing are composed of endothelial and mesothelial derivatives. Two of these cysts are apparently of gastrogenic origin; the third is of bronchogenic derivation. Although the highly differentiated teratomata have been found to contain gastro-intestinal derivatives among other complex structures, we have failed to find mention, in the literature, of the occurrence of the gastrogenic type of cyst of the mediastinum.

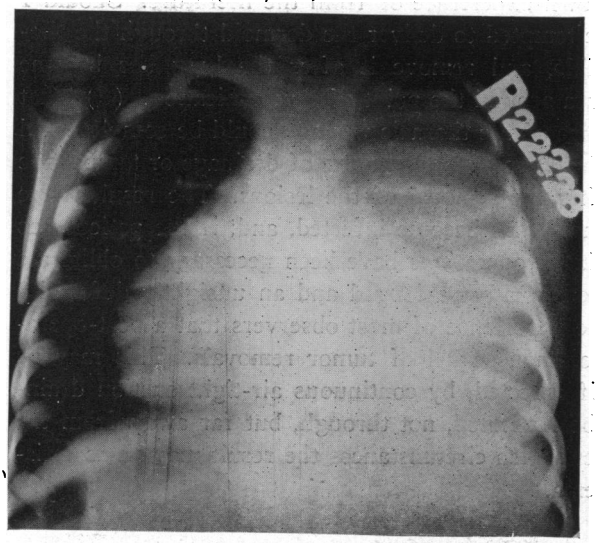

Fig. 1.—Case I. On admission. Diffuse clouding of right side of thorax suggesting pleural effusion.

Case I.—A white boy, twenty-two months of age, one of six children, was admitted to the Children's Hospital February 20, 1928. The family and past histories were without bearing on the present illness. He had always been well until two months before entry at which time he was supposed to have had a right-sided pneumonia with a high fever for four days. The temperature then returned to normal and after two weeks in bed the patient was allowed up. During his illness he lost considerable weight.

FIG. 2.—Case I. After aspiration. Shadow running obliquely from hilus to diaphragm on right.

FIG. 3.—Case I. Cyst injected after external drainage. Shrinkage of the cyst has begun.

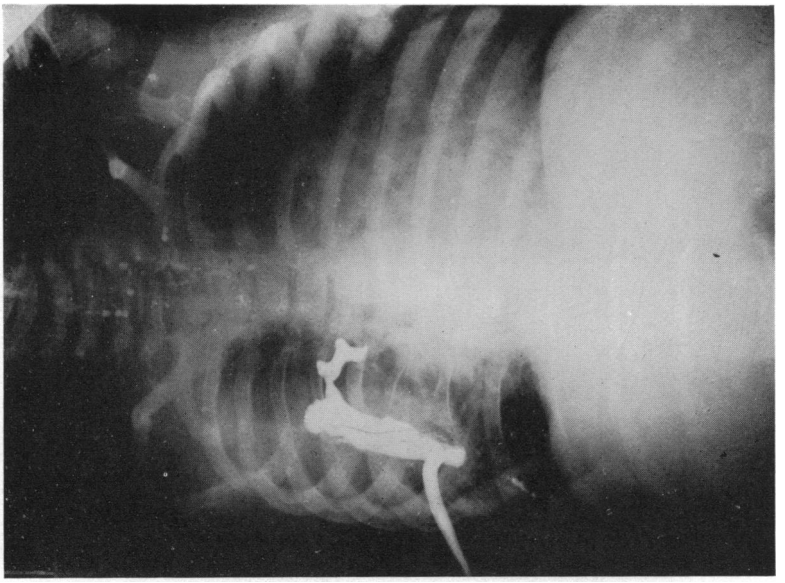

FIG. 5.—Case I. Four months after excision. Sinus injected. Iodide has flowed back onto chest wall, obscuring superficial portion of sinus.

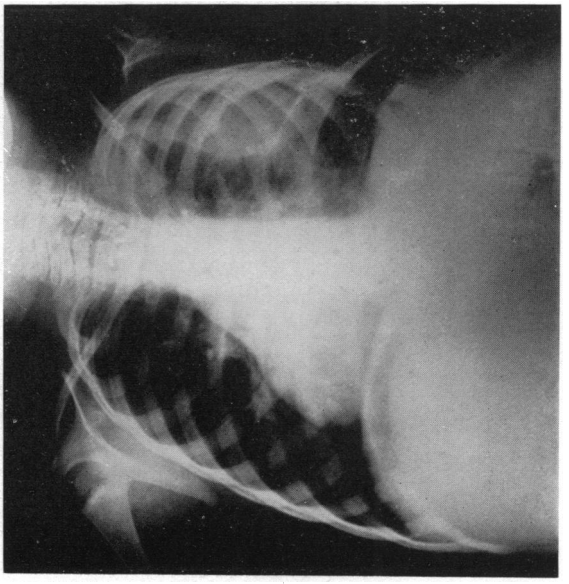

FIG. 4.—Case I. Two months after excision of cyst. Lung shows considerable expansion.

Present Illness.—Four days before entry the patient became ill with fever, dyspnœa and vomiting. After the first day the fever subsided but the vomiting continued. The morning of entry the right ear began to discharge purulent material.

Physical Examination.—Temperature 101°, pulse 130, respirations 40–50, weight twenty-one pounds. The child was pale, undeveloped and malnourished, sick and irritable, and could lie only on his right side. He was dyspnœic with the alæ nasi dilating and breathed with an expiratory grunt. There was a frequent harsh, brassy cough. A purulent otitis media was present on the right side. The chest was barrel-shaped with marked costal retraction and with diminished expansion on the right. The right lung was flat, breath sounds were diminished over the greater part, and absent below the angle of the scapula. A few moist râles were present. Tactile fremitus was absent over the right lower back. Bronchial breathing was heard over the right upper chest anteriorly. The heart was displaced two and one-half centimetres outside the left nipple line. The abdomen was protuberant and both spleen and liver were palpable five centimetres below the costal margin. The fingers showed suggestive clubbing.

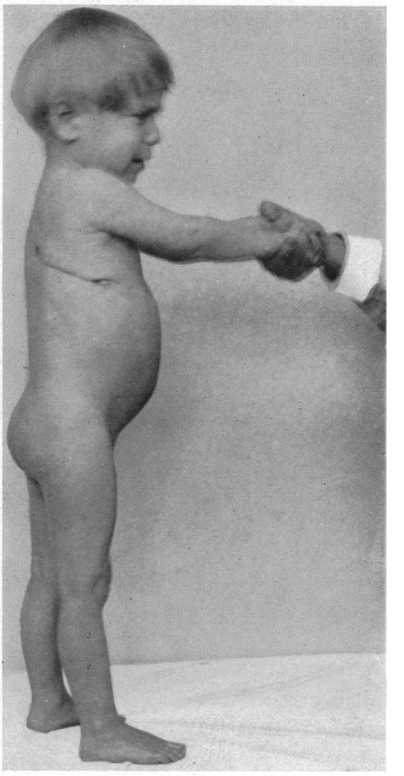

FIG. 6.—Case I. General condition six months after excision of cyst.

The X-ray examination suggested fluid, and a tentative diagnosis of empyema was made. Thoracentesis yielded 360 cubic centimetres of a milky, viscid opalescent fluid. The fluid was acid in reaction; its specific gravity 1.010; chloride 114 cubic centimetres neutralized 100 cubic centimetres N/10 NaOH; bicarbonate 34 vol. per cent.; 560 cells, 80 per cent. polymorphonuclears. The withdrawal of the fluid afforded temporary relief of the symptoms. The diffuse clouding of the right chest by X-ray was replaced by a clear lateral lung field and a large, dense shadow running obliquely downward and outward from the hilus. Intratracheal injection of lipiodol through the crico-thyroid membrane gave no diagnostic assistance, though the right upper bronchus failed to fill. The fluid rapidly reaccumulated and repeated tappings were necessary. The child continued to run a low-grade temperature. In view of the character of the fluid and the röntgenological findings, diagnosis of intrathoracic cyst was made.

Operation.—March 14. Gas-oxygen anæsthesia. Exploratory thoracotomy. The right upper lobe was atelectatic, rubbery and yellowish-red in color. The two lower lobes were only partially expanded and displaced forward by a large, tense, smooth-walled cyst extending from the diaphragm to the apex of the thorax and filling the spinal gutter. There were no adhesions within the pleural cavity. The cyst was estimated to fill two-thirds of the right thoracic cage. In front it was covered by the visceral pleura which was reflected laterally onto the thoracic wall and mesially along the mediastinum, posterior to the root of the lung. In diameter it appeared to be about two and three-quarter inches at its diaphragmatic attachment, which was retropleural. It was slightly smaller at the apical limit of the tumor which was covered by pleura. The condition of the child did not warrant enucleation at this time. The cyst was sutured to the chest wall and opened six days later and drained by catheter.

The latter procedure was followed by a very severe reaction with a high fever.

Four transfusions were given at intervals and there was gradual improvement. There were recurrent infections of the cyst cavity, however, with elevation of temperature. There was no gain in weight, but the brassy cough ceased. Repeated X-rays with lipiodol injection demonstrated considerable contraction of the cyst. There was a copious amount of clear white mucoid drainage.

Second Operation.—July 23. Gas-oxygen anæsthesia. The old incision was reopened. The seventh rib was excised. The cyst was found to be approximately one-half its former size. The wall was greatly thickened and fibrous. The condition of the three lobes of the lung remained the same as at the previous operation. The pleura was incised vertically over the surface of the cyst. No cleavage plane could be found and the cyst was freely opened and with a finger introduced into the cavity the cyst was excised by sharp dissection, including the overlying pleura that could not be detached. The greatest difficulty was encountered in excising the lower end of the tumor where a prolongation appeared to dip down into or through the diaphragm. This prolongation appeared to be about three-eighths inch in depth and three-fourths inch in diameter. There was relatively little hæmorrhage. A gauze drain was left at either end of the incision to control oozing and the wound was approximated closely about them.

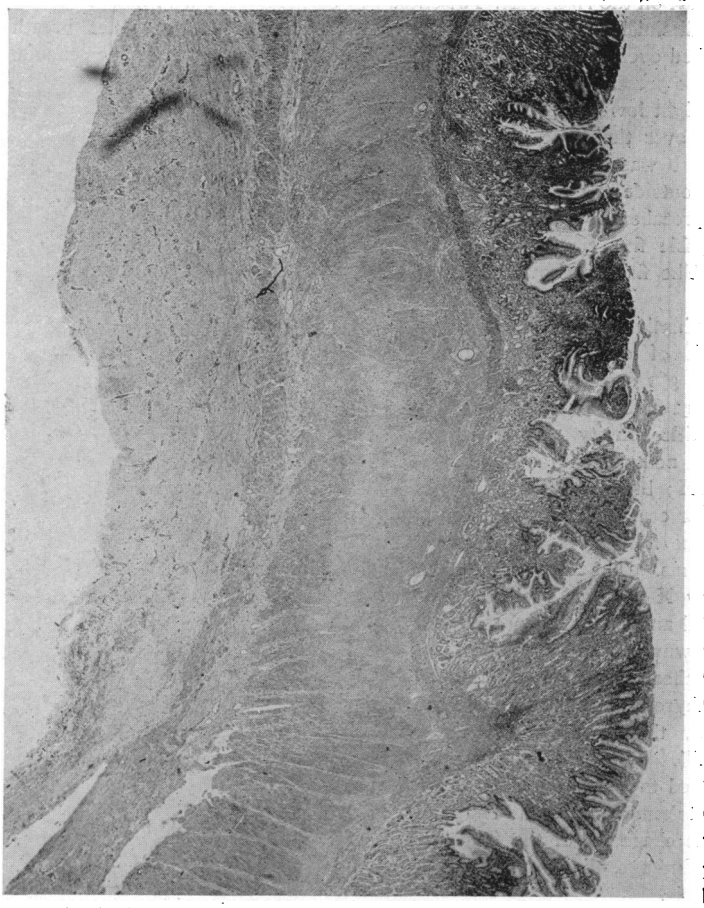

FIG. 7.—Case I. Low power. Mucous membrane, submucosa and two layers of smooth muscle fibres are present.

The child's condition was precarious at the end of operation. An intravenous injection of glucose was given, followed some hours later by the transfusion of 300 cubic centimetres of blood, following which the child picked up well and made a satisfactory convalescence.

He has been followed for eight months. The wound is now closed except for two small sinuses that discharge the original fluid, presumably from a portion of the cyst remaining. The general condition has shown remarkable improvement, the weight now being twenty-six and one-half pounds.

Pathological Report.—Cyst of mediastinum. Specimen consists of three large fragments of tissue and a number of small ones. The largest of these are 6 x 3 x 1 cm., 4 x 2 x 1 cm., and 2 x 1 x 1 cm. These are composed of very firm grayish-white tissue, with occasional areas which are somewhat nodular on palpation. The inner surface is partly covered by blood clot and grayish tissue which has some purulent material over some of the areas. In the largest fragment there is noted on the inner surface an elevated area which is a pinkish-gray color and is somewhat soft. This area is more or less circumscribed and has a definite margin. The appearance of this tissue is that of granulation tissue. In none of the fragments was one able to find gross evidence of hair.

Microscopic.—Six sections, two of which show what is histologically apparently stomach wall. They are lined on one side by gastric mucosa, with submucosa, muscularis, mucosa and muscular layers underlying. There are numerous Paneth's cells in the mucosa. The rugæ are present in some areas with strands of smooth muscle as seen in the normal stomach wall. The mucosa is destroyed in places by fibrous tissue, and scattered throughout there are areas of hæmorrhage and cellular infiltration, chiefly polymorphonuclears and plasma cells with many lymphocytes.

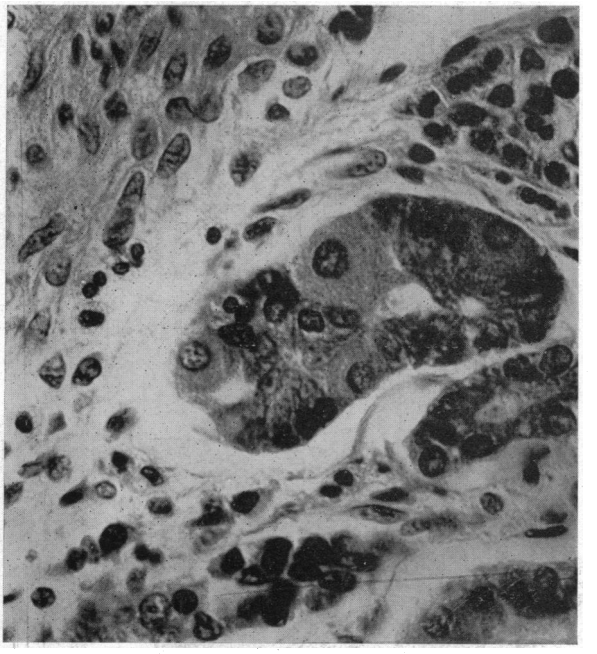

FIG. 8.—Case I. High power. Typical gastric glands, such as are seen in the fundus of the stomach, with chief and parietal cells present.

One section is through a very active lymph gland, showing many hyperplastic follicles and scattered areas of necrosis and perivascular infiltration. The remaining three sections show chiefly fibrous tissue with some smooth muscle and fat. There is one small area of striated muscle. There are scattered areas of necrosis and cellular infiltration and marked perivascular infiltration. There are nerve trunks of various sizes in all sections and a portion of a ganglion in one. *Diagnosis.*—Chronic inflammatory tissue. Smooth muscle and hyperplastic mucosa, histologically of stomach wall.

CASE II.—A white, male infant was admitted to the hospital September 14, 1927, at the age of seven weeks, because of distress, especially after nursing.

The family history was negative. The birth weight was nine and three-quarter pounds. From birth he cried a great deal. He was unable to nurse longer than five minutes when he would suddenly stop, double up the legs, throw back the head and cry as though in pain. The acute distress would continue for about a half hour and prevented the infant from obtaining an adequate amount of sleep. On physical examination he was found uncomfortable with paroxysms of crying as though in pain. The weight was six ounces more than at birth. There was no respiratory distress and the routine physical examination was negative. With the exception of a white blood count of 37,000, the laboratory studies were also negative. He was in the hospital two weeks and became much more comfortable, gained three ounces, and being breast fed was sent home.

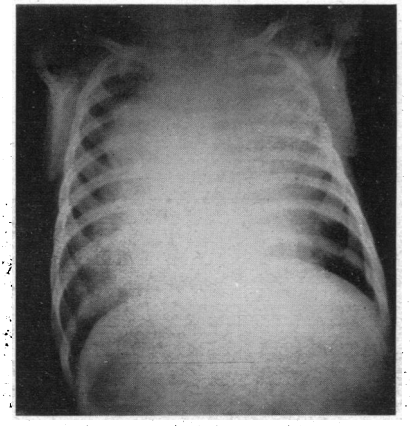

FIG. 9.—Case II. Before aspiration. Diffuse clouding right upper chest extending across to left of median line.

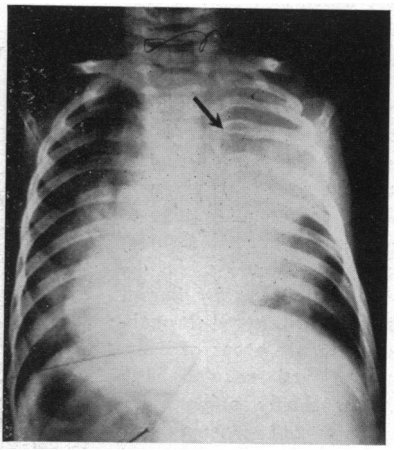

FIG. 10.—Case II. After aspiration. Arrow points to erosion of rib from pressure of cyst.

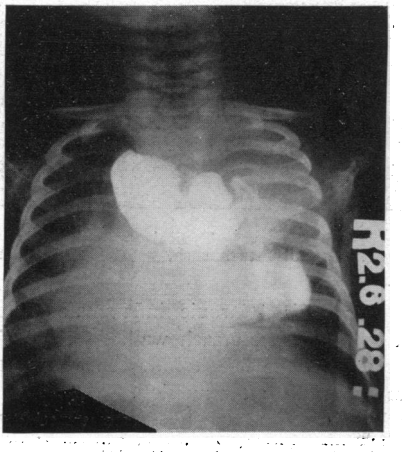

FIG. 11.—Case II. Cyst injected following aspiration. Anteroposterior view.

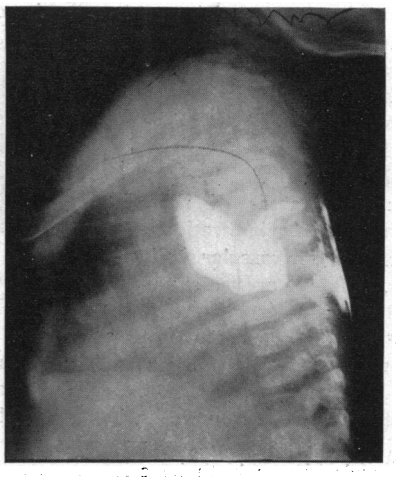

FIG. 12.—Case II. Cyst injected following aspiration. Lateral view.

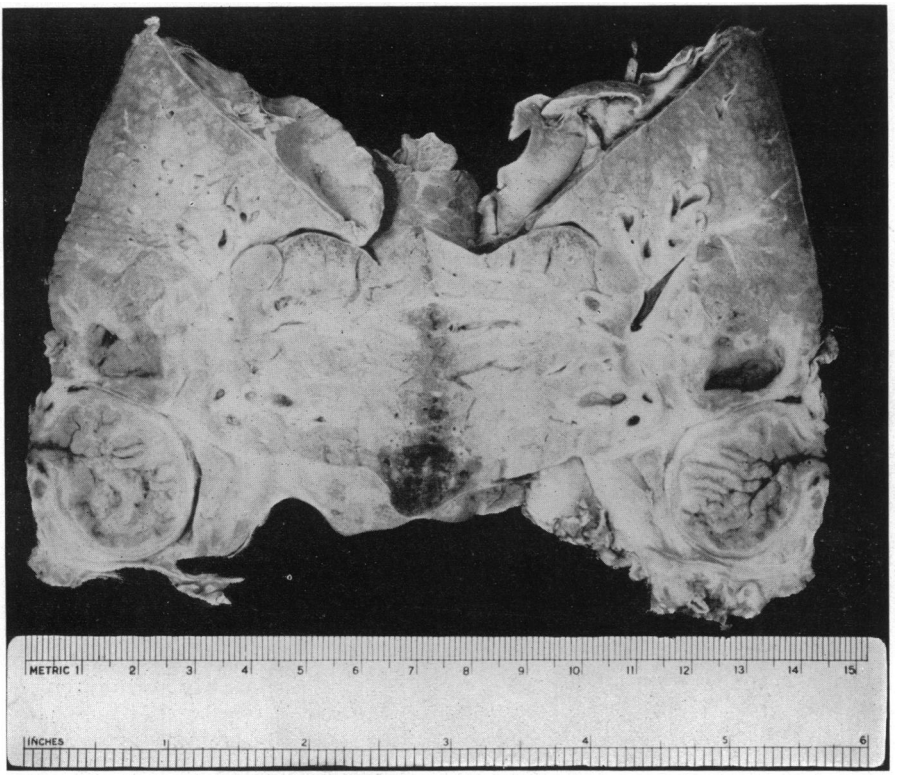

FIG. 13.—Case II. Gross specimen obtained at autopsy. Cyst opened, showing mucosa thrown into folds.

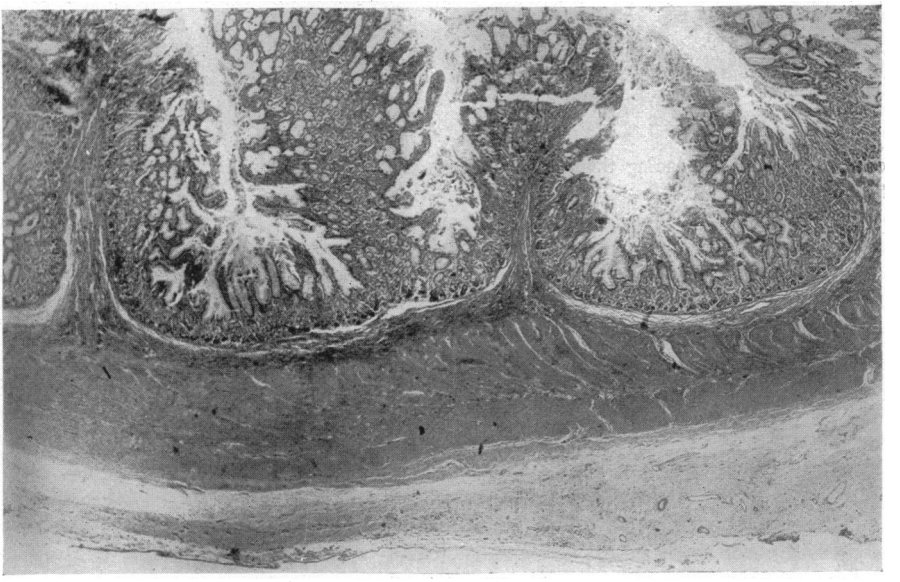

FIG. 14.—Case II. Low power. Mucosa, submucosa, two layers of smooth muscle and serosa are present.

One week later he was readmitted with persistence of the original symptoms. The weight was now eleven pounds. Temperature 100.6°, red blood count 3,600,000, hæmoglobin 60 per cent., white blood count 21,500, 74 per cent. polymorphonuclears. The spinal fluid Wassermann reaction was negative. There was a palpable spleen. Pathology was suspected in the chest and an X-ray showed a "pneumonia of unusual distribution—tuberculosis to be considered." Tuberculin 1-25 was negative. The respirations became more difficult, and the patient began to hold the head retracted. Dulness and bronchial breathing appeared over the right upper chest and X-ray showed an extension of the process and malignant disease was suggested. A barium meal showed that there was no œsophageal obstruction. An area of pressure erosion was found in the region of the angle of the fourth and fifth ribs posteriorly, and thoracentesis was attempted in this area. After penetrating about an inch, a cyst was punctured and fluid under pressure nearly shot the plunger out of the syringe. The fluid was thick, viscid, mucoid, and contained 700 cells, mostly red blood cells, with a moderate number of lymphocytes. No organisms, hairs or epithelial cells were seen. Having demonstrated a cystic cavity, a second tap was attempted and thirty-five cubic centimetres of similar fluid under pressure was removed, the last five cubic centimetres of which was mixed with old blood, and eight cubic centimetres of lipiodol was injected. The X-ray showed a large multilocular cystic cavity posterior to the trachea and œsophagus, and displacing them forward and extending laterally behind the lung toward both apices.

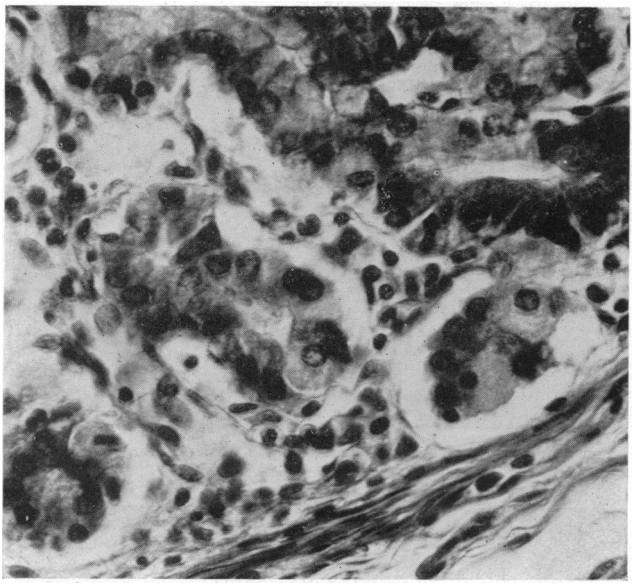

FIG. 15.—Case II. High power. Typical gastric gland structure present with chief and parietal cells.

At seven months his weight was the same as at birth. He had developed a very loose, brassy cough and on several occasions coughed up considerable amounts of blood. A month later an unsuccessful attempt to find the cyst surgically was made, and two weeks later a second attempt to approach the cyst surgically failed. The patient's general condition seemed stationary and he was sent home June 4, 1928, at the age of ten months, weighing ten and one-half pounds.

Three months later he was readmitted for the third time, in the hope that the cyst had filled up to the point where it could be enucleated surgically. His weight was now eleven pounds and the general symptoms were the same as before. The head was held in marked retraction; the fingers now were definitely clubbed. A thoracentesis failed to enter the cyst and so no further surgical exploration was attempted.

The patient was in the hospital four months, failed to gain, had several exacerbations of a chronic pneumonia and finally died of bronchopneumonia at the age of sixteen months, weighing ten and one-quarter pounds.

The findings at post-mortem were as follows:

The tumor mass was found attached in part to the apex of the right lung by fibrous tissue, while the remaining tumor mass was separated from the lung by a serous membrane which covers part of the lung and wall of the cyst, forming a definite serous cavity. The entire tumor mass was found to be five centimetres in diameter and was composed of two portions, one of which at this time was a thin, fibrous, cystic mass which extended into a cavity which had been formed by the erosion of the bodies of the vertebræ and in part involved a portion of the adjacent ribs. The second portion of this cavity communicated with the previously-mentioned portion of the cyst by two small openings. The second portion of the cyst was composed of what in the gross appears to be a portion of gastro-intestinal tract, the mucosa of which has numerous folds, a definite submucosa, several layers of smooth muscle and a serosa, the latter covering a portion of the second lobule of the cystic mass. These cystic structures do not appear to be associated or directly connected with the trachea, œsophagus or bronchi, it appearing as an isolated structure, partially attached to the apex of the lung.

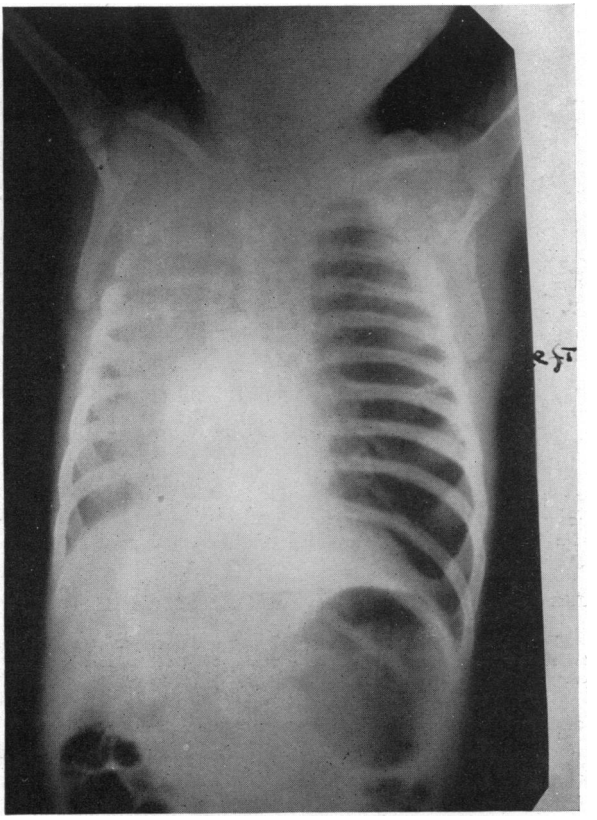

FIG. 16.—Case III. Displacement of heart and mediastinum to the right by valve type of obstruction to left primary bronchus. Expiratory bloc causes emphysema of left lung and absence of normal pulmonary markings.

Microscopically. — The mucosa lining the second portion of the cyst is composed of deep branching glands, the cells of which are of a mixed type, being composed of parietal and chief cells. The smooth muscle assumes an orderly arrangement and there is present a serosa such as one finds in a normal gastro-intestinal tract.

CASE III.—A white female, three months of age, was admitted May 27, 1927, with the history of cyanotic attacks for two months.

The family history was negative. The birth weight was eight pounds. There was no convulsion or cyanosis immediately following birth.

Present Illness.—From birth the baby breathed with a distinct wheezing sound which had become more noticeable. At one month attacks of cyanosis set in, lasting a minute or so. These increased in frequency, five attacks having occurred the day before entry. They appeared to be induced by crying or eating.

Physical Examination.—A well-developed and nourished child crying in distress, and extremely dyspnœic. The dyspnœa was of the expiratory type as though there was a valve closure after inspiration. The breathing sounded asthmatic. There was an extreme expiratory grunt. The pharynx and upper respiratory passages were clear.

Examination of the chest showed the right lung to be less resonant than the left, there being hyperresonance on the latter side. The heart and mediastinum were displaced to the right; otherwise the examination was negative. The temperature remained normal for six days except for a terminal rise to 102° on the day of death.

The X-ray showed the left lung to be less dense than normal and the diaphragm to be low and practically immobile with the heart and mediastinum greatly displaced to the right, indicating an obstruction to expiration on the left.

The dyspnœa and cyanosis became more pronounced, the child was desperately ill, and it was felt that a non-opaque foreign body might be a plausible explanation. On bronchoscopic examination the left bronchus was found compressed to about one millimetre by pressure from without; the right bronchus was normal. There was no foreign body. The condition of the baby grew rapidly worse and respirations ceased a few hours later.

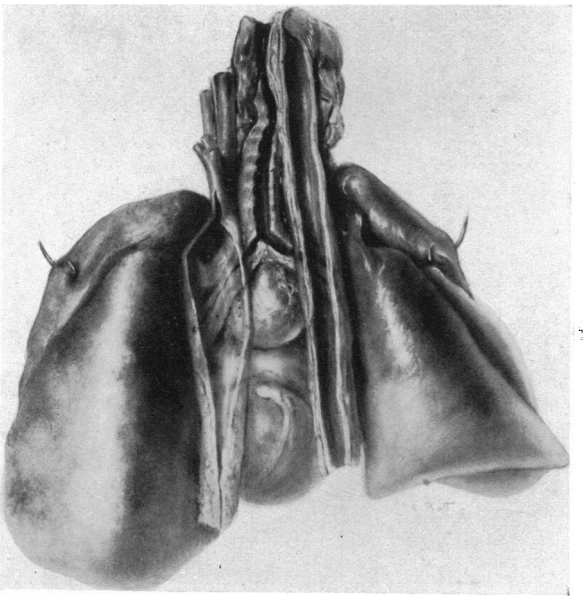

FIG. 17.—Case III. Drawing of post-mortem specimen. Posterior aspect. Cyst lies at bifurcation of trachea and causes compression of left primary bronchus.

Autopsy revealed a cyst of the mediastinum with compression of the left primary bronchus. There was emphysema of the left lung and pneumonia. The heart and mediastinum were displaced to the right. There was a patent ductus arteriosus and foramen ovale. The left lung was enlarged and almost entirely covered the heart and encroached on the right pleural cavity to the costochondral junction of the ribs. he right lung was compressed somewhat by the mediastinum.

Pathological Report.—In the mediastinum there is found a small cyst measuring about one and one-half centimetres in diameter. On the posterior surface of the cyst just under the bifurcation of the trachea, is a small mass about two millimetres in diameter, of the consistency of cartilage. This cyst appears to contain transparent fluid when held up to the light. Anterior to the cyst is the left auricle and left pulmonary artery. Superior to the cyst is the patent ductus arteriosus and the arch of the aorta. The cyst is located at the bifurcation of the trachea, and is placed slightly more to the left than to the right. Posterior to the cyst is the left bronchus, on which it appears to be causing pressure, and the descending part of the thoracic aorta. The vagus nerve theoretically is found medially to the cyst and almost posterior, but is not seen during dissection. The œsophagus is also found medially and posteriorly to the cyst. Lateral to the cyst is the right bronchus. The ascending arch of the aorta is anterior to the cyst. This cyst has caused the left bronchus to be compressed so that its lumen is distinctly smaller than usual.

Microscopically.—This cyst is composed of fibrous tissue covered by an epithelium which in part is composed of pseudostratified, columnar, ciliated cells and a low cuboidal epithelium. This in addition covers a small mass of cartilaginous tissue. The major

portion of the wall, however, is composed of fibrous tissue in which there is apparently but a very small amount of smooth muscle.

COMMENT

The symptoms of cystic tumors of the mediastinum are chiefly caused by pressure. Paroxysmal cough of a brassy character, dyspnœa, and at times difficulty in deglutition or dysphagia are salient features. Pain has been frequently noted in the adult cases and hemoptysis may occur. The severity of

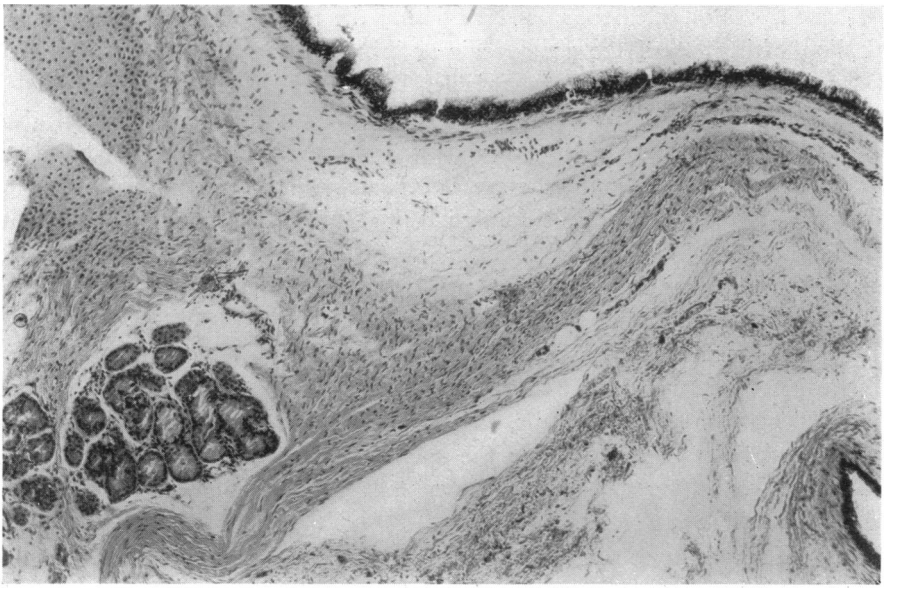

FIG. 18.—Case III. Low power. Field shows cyst lining of ciliated epithelium, mucous glands, smooth muscle and cartilage.

the symptoms does not depend on the size of the tumor. In Case III of this series, a small tumor was the cause of death from direct pressure on the left primary bronchus. The course of the disease has been divided into a latent and an active period. An intrathoracic cyst may develop slowly and insidiously to great size, and the latent period may persist throughout life without occasioning symptoms, the tumor being accidentally found at autopsy. At other times the latent period is succeeded by an active stage in which an acceleration in the progress of the disease may be provoked by an intercurrent infection such as a pneumonia. Possibly chemical changes may occur in the contents of the cyst which stimulate an increase in the rate of growth similar to the rapid tumefaction that occurs in an inflamed wen. The transition from the latent to the active stage is illustrated by Case I in our series. In other instances the latent period is absent and symptoms are manifest at birth as occurred in Case II.

The physical signs are not characteristic and may suggest empyema or unresolved pneumonia. Bulging of the chest on the affected side may be

present and there is frequently lack of expansion. There is absence of tactile and vocal fremitus over the tumor and the breath sounds are distant or absent. The heart is frequently displaced, usually by direct pressure of the tumor or secondarily, as occurred in one of our cases, by emphysema and extreme distention of the lung, due to an expiratory bloc. Emaciation or cachexia is not unusual.

In the röntgenological study of intrathoracic dermoids the visualization of a circumscribed tumor is not uncommon. In teratomata the identification of bone, teeth or calcareous deposits within the tumor is pathognomonic. In dealing with cysts of the gastrogenic or bronchogenic type, the X-ray is of less assistance. The evidence is variable. In the large tumors the film revealed a diffuse clouding of the affected side of the chest suggesting a pleural effusion. Where pressure on the bronchus from a small tumor produced an expiratory bloc, the findings were not incompatible with occlusion of the bronchus from a non-opaque foreign body. Radiographic study was of little help in the differential diagnosis. Its value lay in the definition of the size, shape and position of the cyst after aspiration of the fluid and injection of the opaque medium.

The character of the aspirated fluid assists in differentiating the dermoid from the entodermal cyst. If the material is oily yellow and contains cholesterin crystals or squamous cells, it is strongly indicative of a dermoid. The finding of hairs in the fluid or the sputum establishes the diagnosis. The secretion from the entodermal cysts was milky, mucoid and viscid. No characteristic cells were seen.

It is fascinating to speculate on the genesis of these tumors. Referring to dermoids irrespective of location, Ewing [3] states that "a single origin through one-sided development of teratomata cannot be excluded for the entire group." The complex dermoids are probably imperfectly developed teratomata. He believes, however, that the importance of "budding" of originally simple embryonal tissues as a source of complex teratomata has probably been underestimated. Mediastinal and retroperitoneal dermoids may be of comparatively simple structure, but it is usually difficult to refer such growths to a local origin.

In the case of the gastrogenic and bronchogenic cysts under consideration it would seem that an explanation based on the embryological development would be adequate. In the four-millimetre embryo the "lungs and trachea appear as pear-shaped masses attached to the ventral border of the œsophagus. The lower portion of the mass which bulges to each side represents the division of the trachea into bronchi. Its cavity is still in free communication with the œsophagus. The trachea will become separated from the œsophagus by downward growth of the lung buds and upward extension of the notch between the lung buds and the œsophagus." [4] The fusion of the lateral walls to form the tracheo-œsophageal septum begins from below.

It would seem that at this embryonic stage, the pinching off of an outbud or diverticulum of foregut containing entoderm and mesoderm, and destined to become a portion of the stomach might well occur. This could be carried along by the downward growing lung bud and lodge in the mediastinum or on the surface of the lung. The cysts of bronchial origin might arise in a similar manner by the pinching off of a diverticulum of entoderm and mesoderm from the foregut in the region of the tracheal bud or by a secondary budding from the tracheal bud itself. The formation of these cysts takes place at a late stage of germinal differentiation while the dermoid is formed at an earlier period and the teratoma represents a primitive type of cell inclusion.

In a recently published report by Swanson[5] and others an intrathoracic cyst in an infant is described that is of interest in this connection. The aspirated fluid was limpid, viscid and comparable to white of egg. It contained no fat or blood. The radiographic picture of the injected cyst in the right thoracic cavity is identical with that in Case I of this series. The cyst was drained and dakinized and later formalin was injected. The histological examination of the specimen obtained at autopsy showed that the lining of the cyst was considerably disintegrated, as the result of treatment, but numerous mucous glands were identified. A submucosa, a circular and a longitudinal layer of smooth muscle and a large amount of fibrous tissue in which osteogenetic tissue was invading cartilage, were present. The presence of cartilage definitely proves it to be of bronchogenic origin, though in other respects, save for the disintegrated cyst lining, it resembles the gastrogenic cyst reported above in every particular as to its position, and gross and histological aspects. Two tumors so exactly similar though of different embryological origin could be best explained by arising through the same developmental error. The pinching off of a diverticulum at the time of the formation of the lung buds in the early embryo satisfies this requirement.

The duration is usually from one to five years following the onset of the active stage of the disease and it is obvious that surgery offers the only hope of cure in this group of intrathoracic tumors. Complete extirpation is necessarily accompanied by a high mortality and may only be accomplished after a number of stages. Many patients are in such poor condition before surgery is attempted that immediate removal of the tumor is contraindicated and drainage must be resorted to as a primary measure. This has the advantage that in large cystic tumors drainage permits the sac to shrink. On the other hand secondary infection produces a dense fibrosis, lines of cleavage are obliterated and the tumor can only be removed by sharp dissection with a greatly increased danger of injury to important structures. Beye[6] advocates an exploratory thoracotomy in preference to aspiration in cases of suspected dermoid. It would seem, however, that in doubtful cases aspiration was advisable to establish a diagnosis, and also to gain the information that injection of the cavity followed by X-ray will furnish, if the tumor should be cystic. Where the patient's condition permits, a complete extirpation at one sitting should be attempted in preference to preliminary drainage. In

the eight cases of dermoid cyst reported, that were treated by this procedure, there was only one death.[1] Drainage or removal of the tumor was carried out in fifty-seven of the cases collected by Beye, with a mortality of 22 per cent. Recovery took place in 37 per cent., improvement in 30 per cent. and in 10 per cent. the result was not stated. Though the mortality is high, it should not be a deterrent to operation in a condition in which there is otherwise no means of palliation or cure.

SUMMARY

Three entodermal cysts of the mediastinum are reported: two of gastrogenic origin and one of bronchogenic origin.

The symptoms and physical findings are similar to those encountered in intrathoracic dermoid and teratomatous growths in the same location.

The fluid aspirated from these cysts is white, viscid and semitransparent.

Histologically the two gastrogenic cysts present a typical section of the stomach wall. There is a mucosa with glands containing chief and parietal cells, a submucosa, two layers of smooth muscle, one circular, the other longitudinal, and in one specimen a serosa and sympathetic nerve cells.

The wall of the bronchogenic cyst is composed of fibrous tissue lined by epithelium in part ciliated. Incorporated in the fibrous tissue is a small amount of cartilage and some smooth muscle.

The genesis of these tumors may be from a pinching off of an out-bud from the foregut at the time of the development of the lung buds in the four-millimetre embryo.

The treatment of cysts of the mediastinum is preferably extirpation in one stage. Preliminary drainage may be indicated. Though the mortality is necessarily high, it should not be a deterrent in these otherwise hopeless cases.

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[4] Keibel and Mall: Embryology, vol. ii, p. 312, 1912.
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[6] Beye: ANNALS OF SURGERY, vol. lxxxiii, p. 577, 1926.

DISCUSSION: DR. CARL A. HEDBLOM of Chicago, Ill., remarked upon the importance of the differential diagnosis between such tumors and carcinoma of the lung than that of other organs. The special practical importance of the differentiation lies in the operability of the benign growths.

Dermoids of the mediastinum may simulate a variety of other conditions. He had personally observed four cases. In two cases the findings were those of chronic empyæma, in one that of a large encapsulated effusion and in one that of a pulmonary abscess. The fourth was repeatedly drained as

for abscess. Later, wide open thoracotomy was performed to determine the reason for the persistent drainage. Stratified epithelium was found in the wall of the abscess and hair in the cavity.

DR. CHARLES G. MIXTER (closing the discussion) said, in regard to mortality and the statistics as previously published, that in the cases reported last year by Kerr eight instances of primary extirpation of tumor were reported with one death. Some years before fifty-eight operated cases had been reported with a recovery of 37 per cent.; another 30 per cent. of cases improved. In other words, these cases should offer a fairly hopeful field for radical surgery.