

Original Articles.

CHYLOUS ASCITES. REPORT OF A CASE DUE TO TOTAL OCCLUSION OF THE THORACIC DUCT.¹

BY PERLEY P. COMEY, M.D., WORCESTER, MASS.

PATHOLOGY

BY WM. W. MCKIBBEN, M.D., WORCESTER, MASS.

The patient, Mr. A. F. P., age sixty-one, retired manufacturer, family history excellent, well built, exceedingly healthy man. His illnesses had been very few indeed for a man of his years; had smallpox many years ago and a broken leg later. About four years ago he had an attack of renal colic due to calculi; otherwise well.

The history of the present trouble began the 18th of March, 1902. He had a chill, severe pain in the right groin and leg, high fever, ached all over, stomach disturbed, and the whole system seemed affected. In a day or so, the right limb began to swell, became reddened, and had a cakey feel. The inflammatory condition extended on to the abdomen and across to the other side; also across the back and loins, but not to the other limb. It resembled a general infection with localized cellulitis, and it seemed as though the process would go on to suppuration. My diagnosis was phlebitis.

In a few days the fever and all symptoms of inflammation began to subside and the patient was more comfortable, but the swelling and slight fever remained for perhaps a week. The patient continued to improve, was free from pain, had a good appetite and digestion; was confined to bed, practically because of the swelling of the limb.

On the night of the 5th of April, he had a sudden, severe attack of dyspnea, pain and distress in the region of the heart, and presented the symptoms of violent interference with the circulation which was relieved only by a hypodermic medication, and suggested to my mind that the trouble arose from the phlebitis, embolism, or thrombus. This passed off, however, the disturbance diminishing in severity for several days. His general condition improved, he was up and about the house, and by April 27 rode out about town considerably. The right leg remained swollen exceedingly, but with no other trouble to the patient than the inconvenience of its being so large and not easily handled.

About June 1 he had a second attack, practically the same as the one in March. Chills, fever, general condition, same extension of the cellulitis except that at this time it extended up to the left shoulder and down the arm to the elbow; also affected the left leg some. During this attack, he had one spell of dyspnea and heart failure. This attack did not last as long or seem as severe, and in a short time he was up and round the house again. Later he rode out and seemed to be doing well. Dr. S. B. Woodward saw him during this second attack.

About July 20 he had the third attack, and while it was not nearly as severe as the others, he grew worse, — the edema became general, his appetite

began to fail, he did not sit up much and was obliged to lie in one position. Dr. Homer Gage saw him in this attack.

He became more and more bloated, very uncomfortable, had hard nights, finally his breathing became very labored, the abdominal dropsy so extensive that I tapped him August 18, and to my surprise instead of the usual serous fluid that we expect to find, it seemed to be pure chyle, about seven quarts in amount.

I left the opening so that it might drain, which it did very freely, the nurse estimating that in this manner about four quarts escaped in the twenty-four hours. This discharged up to the time of his death, four weeks later, Sept. 14. Dr. Woodward saw him after the tapping.

During his illness, the urine was analyzed several times, but always proved normal, although the twenty-four amount was greatly diminished. A blood count was made with negative result. The chylous fluid drawn from the abdomen was thoroughly analyzed by Dr. McKibben. The patient died Sept. 14, having been ill six months. A postmortem was performed by Dr. McKibben; Dr. S. B. Woodward, Dr. Homer Gage and myself present. The result of the analysis of the fluid drawn from the abdomen, also the report of the autopsy, follows.

POSTMORTEM EXAMINATION.

Body that of a male of sixty-one years of age, with slender development of skeleton and poor general nutrition; skin sallow, elastic in places, edematous in other places, pitting markedly on pressure. This edema, with enlargement, was especially marked on the right leg and left arm; less so on the left leg. The right arm was greatly atrophied. Sero-sanguinous fluid was exuding from a small puncture below the umbilicus.

There was no hypostasis of blood nor diffusion of blood coloring matter; nor was there any greenish discoloration of abdomen. Postmortem rigidity very marked in the legs; less so in the other muscles; condition of the pupils and color of sclera normal.

The thorax presented nothing striking in size and shape. The abdomen was distended, and pitted on pressure. The penis showed no scar. The scrotum was glossy, edematous and enlarged.

On opening the abdominal cavity, it was found to be about half full of bloody fluid, through which gas freely escaped from nicks in the bowels, made by the undertaker in drawing off the ascitic fluid. A half-dozen nicks were seen on the small intestine. Following the course of the intestinal tract up from the rectum, no evidence of malignant disease presented itself in the intestine, stomach or esophagus.

The renal and peritoneal lymph plexuses were enlarged, those of the intestines (including both large and small) being flexuous in their courses, constricted at intervals, and presenting a beaded or varicose appearance.

The appendix appeared normal, but contained four or five hard fecal concretions. The mesenteric lymph nodes were not enlarged. The diaphragm was pressed down by pleuritic fluid on the left to the sixth rib.

On opening the pleural cavity, the left was found

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completely filled with straw-colored fluid, and no lung could be seen. The lung was found collapsed and bound tightly to the upper and posterior wall by firm fibrous bands of adhesions, which could not be torn, but had to be cut.

The right lung was normally distended with air, and was adherent by small adhesions at both apex and base. This pleural cavity contained about a pint of straw-colored fluid. Cut sections of both lungs showed marked edema, frothy serum oozing freely.

The left lung also showed hypostatic congestion, while at its apex were about a half-dozen small nodules with centers of white powdered material and walls of denser fibrous tissue, mixed with lime salts (calcareous).

On opening the pericardium, it was found to be normal in color, smooth, and showed no adhesions. The sac contained about 75 cc. of clear, light-colored fluid.

The position, size and shape of the heart were normal. The right ventricle and both auricles were distended with blood clots. The left ventricle was contracted and empty. Each valve, examined in turn, showed nothing abnormal, nor did the coronary arteries. There was no abnormal deposit of adipose tissue.

Spleen.—Capsule, trabeculae, blood vessels, lymph nodules showed nothing abnormal. The pulp was soft and easily scraped off with a knife. The size was somewhat increased.

There was no distention nor contraction nor ulceration of the intestines; no injection of the blood vessels nor thickening of the wall; no adhesions nor exudations.

Cross sections of the pancreas showed nothing abnormal.

The liver weighed about 1,800 grms., was tawny yellow in color; the consistency was markedly increased. In sectioning, the knife met resistance, and gave a grating sensation. The cut surface showed multitudinous granules, the size of a pin head.

The kidneys were of about normal size and consistency. On section they were of a dull bluish red, with relative proportion of cortex to pyramids, and thickness of each, normal. On stripping off the capsules there was no adhesion. The surface showed two or three cysts, the size of a pea.

The adrenals appeared normal. The renal lymph plexuses were enlarged.

The thoracic duct was much enlarged, which made its discovery much less difficult than usual. It gave a feeling of induration to the fingers. The lymph glands and vessels failed to reveal the presence of parasites. The superficial lymphatics on being cut down upon showed very little thickening of their walls and induration of the surrounding cellular tissue macroscopically.

HISTOLOGICAL REPORT.

Post-mesenteric lymph glands; bronchial lymph glands.—Even macroscopically they show a marked deviation from the normal. When opened, the gland presents a dry, brownish colored substance which has no definite structure; crumbles easily and has the odor of feces. Microscopic examination of same shows necrosis and degeneration so com-

plete that no semblance of gland substance remains, making it absolutely functionless.

Thoracic duct.—Macroscopically the wall is much thickened; will not admit probe in any part. Receptaculum chyli prominent. Microscopic sections made at many different levels, cross and longitudinal, all of which showed a marked fibrous thickening of the wall, in many places the fibrous replacing the muscular tissue, and totally occluded the duct at almost all levels. Diagnosis of thoracic duct is chronic lymphangitis.

Lung.—Microscopically shows fibrous hepatization, so much change in the structure having taken place that no alveoli remain.

Spleen.—Chronic passive congestion.

Liver.—No cirrhosis, no increase in the interstitial tissue, but chronic passive congestion, and in some places had undergone fatty degeneration in areas.

Kidneys.—Show no pathological change of note.

This case is reported because of the interesting points revealed by the postmortem examination, the little knowledge on the subject, the small amount of literature in French, German or English, and the great rarity of the case, particularly from an etiological point of view.

From 1699 up to the present time, there have been collected just 47 cases, but in only 37 of these was the fluid strictly chyle. In the other ten the fluid more resembled a morbid exudation than an effusion of chyle. In three of these the ascites was ascribed to obstructed pulmonary circulation, one of which had suffered for a long time with chronic bronchitis, with "purulent expectoration containing tubercular concretions"; another suffered for several years with scrofular affections and died of pulmonary tuberculosis; and the third died of pulmonary and peritoneal tuberculosis. The puerperal and tuberculous cases with exudation, together with a chylous cyst of the mesentery and a case of chyle retention in the lymphatics of the mesentery being excluded, the cases of chylous ascites proper number 37. The rupture of some chyle-conveying vessels is clearly established in 25 of these cases.

Etiology.—Age, sex, climate, race, occupation and circumstances of life are without influence. According to Busey, heredity and acquired tendency to disease of the lymphatic system, and especially diseases of the walls of the thoracic duct and receptaculum, which are very rare and mainly limited to tuberculous infiltration and to ossific changes, demand mention as primary conditions which may facilitate the rupture of the walls of chyle-conveying vessels; syphilis may also. Primary rupture occurred in but seven of the cases. In one, the cause was an effort to raise a burden; in two, muscular effort; one, vomiting; three, violence inflicted upon the chest. Chronic alcoholism and overwork, according to Nancrede, certainly appears to favor the graver forms of lymphangitis.

Busey asserts that chylous ascites may be the secondary result of a variety of morbid conditions, which directly or remotely obstruct the flow of chyle through the lacteals, receptaculum or thoracic duct, impedes its exit into the left subclavian vein, right side of the heart, or lesser circulation. Such obstruction may be caused by anatomical defects and anomalies of position and distribution of the chyle

vessels; by dilatation or stenosis, and such diseases of the coats of the channels as would lessen their expansibility and tensile strength; by disease of the mesentery, hypertrophy, cavernous and fibroid transformation of its adipose tissue; by indurated, degenerated and impermeable mesentery glands, embolism and deposit of bony, fibrous, chalky, gelatinous and soapy material in the channels; compression by inflammatory adhesions, or by thoracic abdominal and aneurismal tumors. In one case it was ascribed to the presence of filaria.

Dilated chyloiferous lymphatics, as in Dr. Comey's case, are quite often observed in the mesentery. The usual cause, according to Zeigler, is obstruction due to inflammatory or neoplastic growths, located in the mesentery or thoracic duct. Sometimes the obstruction is due to lymph thrombosis. The dilated vessels look like straight cylindrical ridges, or convoluted, saccular or beaded cords; their contents are either white and limpid, or pulpy and caseous.

Clinical observations seem to have established the causal relation of interrupted blood current in the large veins near the heart to lymph stasis and effusion of chyle into the peritoneal cavity, and the experiments of Cooper, Morton, Dupreytren and others demonstrate that complete arrest or interruption of the current of the fluid in the thoracic duct, at or near its terminal extremity, will, if the anastomotic circulation is not speedily and sufficiently established, produce distention, dilatation and repletion sufficient to cause rupture, which most frequently takes place in the receptaculum or lacteals. Clinical and postmortem examinations are even more conclusive than experimentation, for they connect directly the process of gradual occlusion of the duct by disease with the concurrent development of the diffuse area of lymphangiectasis, which in some cases terminated in rupture and extravasation. In this connection may be cited the cases reported by Rokitansky, Ormerod, Morton, Hughes and Cayley.

According to the "American Textbook of Pathology," obstruction of the thoracic duct results from,—

- (a) Pressure on the duct from without by tumors, enlarged lymph glands or aneurisms.
- (b) The growth of tumors in the walls of the duct.
- (c) Inflammatory stricture. We regard this as the cause of obstruction in the case at hand.
- (d) The impaction of adult filaria.
- (e) Thrombosis of the left innominate vein or the duct itself.
- (f) The backward pressure of blood in the sub-clavian vein occasioned by tricuspid insufficiency.

The results of obstruction of the main lymphatic trunk are variable. In many instances, especially when the obstruction is in the lower part of the duct, the establishment of a collateral circulation averts serious consequences. If, for any reason, the latter fails to compensate, then extensive lymphangiectasis may follow or the chyle may escape either by transudation, as it did in Dr. Comey's case, or by actual rupture of the thoracic duct. The free chyle may infiltrate the tissues, or may collect in one of the serous sacs constituting, in the peritoneum, chylous ascites, or in the pleural sac, chylothorax.

In seven cases the fluid found in the peritoneal cavity was associated with tuberculosis. They were reported as cases of milky or oily ascites, and their clinical histories picture the ordinary symptomatology of either pulmonary or peritoneal tuberculosis.

Symptoms and diagnosis.—These depend upon the location and extent of the extravasation; thus, a patient of Krabbel died on the fifth day, from compression of the lung by an extensive chylothorax. Clinical reports furnish many cases which illustrate the direct relation as cause and effect which subsists between copious losses of lymph and chyle, and the marked depression, dullness and exhaustion which invariably follow abundant lymphorrhagiæ, and which likewise follow artificial occlusion of the thoracic duct, and so distinctly characterize the brief after-life of the animal, thus permanently deprived of nutritive material. With but rare exception, quoting Busey again, the cases of copious loss of lymph have been attended with great exhaustion. The latter class may by rest, arrest of the lymphorrhagiæ and proper alimentation, recuperate to suffer again, and perhaps many recurrences similar in course, duration and effect; but copious and continuous loss of chyle is inevitably fatal. It is not possible to establish any constant and direct relation between the appetite and the obliteration, perforation or rupture of the chyle-conveying vessels. It lacks uniformity, sometimes diminished, sometimes variable and again voracious, even in the same patient, but is uniformly associated with progressive emaciation, quite often with fever of the hectic type and gastro-intestinal disorder, with white and chalky stools. In the case reported by Poncy, from July 16, 1699, to March 4, 1700, the date of patient's death, 289 pints of fluid had been drawn in 22 tapplings. The evacuated fluid was always chylous, and frequently emitted the odor of articles of diet. In this patient there was progressive emaciation and waste of all the tissues of the body. In Eyer's case, 1891, where the chylous fluid flowed constantly from an abdominal fistula, there was inanition of four pounds a day, and his entire loss much exceeded one half his normal body weight. Death occurred in thirty-eight days from date of accident, of inanition, or twenty-two days from beginning of lymphorrhagia. It is estimated to take twenty to twenty-four days to starve an adult with all food withdrawn. The symptomatology of effusion of chyle into the peritoneal cavity is not sufficiently distinctive to differentiate such cases from those of ordinary ascites. Wounds of the chyle-conveying vessels might be diagnosed by the location and direction of a stab or puncture in connection with the escape of chyle into the peritoneal or pleural cavities, or externally through the aperture or its evacuation. As such effusion can only occur through transudation or solution of continuity, its escape externally or presence in either cavity must be essential for differential diagnosis. If no fluid escapes externally, then only symptoms of a fluid accumulation in the cavity are present, the character of which must be ascertained by evacuation and examination.

When there are symptoms of rapid accumulation of fluid in the peritoneal cavity, associated with sudden loss of appetite, acute emaciation and

anemia, rapid prostration, diminished secretion of urine, and the presence of such conditions as would suggest occlusion, stenosis or compression of the thoracic duct, or arrest of the exit of the chyle into the subclavian vein, then the diagnosis should be suggested. The gradual, partial and progressive compression of the thoracic duct has been frequently determined by the location of a tumor, associated with the evidence of blood impoverishment. In uncomplicated cases due to rupture the patient usually after exertion is suddenly seized with sharp localized pains followed by swelling of the abdomen, anuria, anorexia, nausea and possibly vomiting. In most cases the symptoms are complicated with those of the causative conditions, and a diagnosis is only possible by an examination of the evacuated fluid. In no instance has a diagnosis been made previous to the observation of the fluid.

Prognosis.—Of the 47 tabulated cases, 31 died, 11 recovered, and in five cases the result is not stated. There is no instance of the preservation of the life of an animal beyond a limited number of days, in which the communication of the lymphatic with the venous system had been completely and permanently obliterated.

The clinical details point to two conclusions: First, that a free and unobstructed channel of communication between the venous system and chyle-conveying vessels is essential to the proper nutrition of the body and to the preservation of life. Second, that death follows the partial or complete obliteration of this communication as the result of inanition.

Nature of the effused fluid.—In most of the cases of effusion into the pleural and peritoneal cavities the fluid was chyle, which had escaped from chyle-conveying channels. In the cases of milk-like, fatty and oily fluid, found in the peritoneal cavity, the character of the fluid was the result of co-existing degenerative processes.

The fluid may contain blood, cholesterin, more or less of the common serous exudations, and some inflammatory products. The chylous effusions are rich in solid matter, albumen, fatty matters, sodium chloride, and sometimes contain bile, sugar, phosphoric acid, lime and other undetermined substances; also pus and blood.

Widal and Merklen in *La Presse Médicale*, 1900, say: "The particular point of this article is that leucocytes with a single nucleus is the only characteristic of lymph." These were noted in the specimens submitted by Dr. Comey, Aug. 19, and had very pronounced ameboid movement. A few oil drops could be seen on the protoplasm of the chyle corpuscles; an occasional normal blood globule was also noted. The base of this milky fluid, under the microscope, appeared as extremely minute granules, so minute that they could not be recognized as fatty globules. This granular matter could be dissolved in ether, and on evaporating the ether, drops of oil remained. No filaria were present; nor were there any present in fresh or stained specimens of blood taken at night. Blood serum, agar and bouillon inoculated with the ascitic fluid gave no growths.

A complete chemical analysis of one liter of chylous ascitic fluid:—

Reaction.	Neutral.
Specific gravity,	1010.
Dry extract,	21 grms.
Total albuminoids,	9.75.
Fibrinogen,	Absent.
Mucin or nucleo alb.,	Absent.
Peptones,	Present.
Sugar,	Present.
Uric Acid,	Absent.
Urea,	1.28.
Total min. matter,	8.
Fat,	1.45.

Blood examination showed no leucocytosis, but a diminution in the number of reds and in the hemoglobin. No filaria were found in the urine examined April 8, it being normal in color, acid, specific gravity 1014, no sediment, 28 grms. urea to 14 oz. urine, Diazo negative. May 10, Dr. Comey submitted another specimen: Color normal; specific gravity 1020; odor urinous; chlorine diminished, albumen and sugar absent; bile, pigment absent, sediment; calcium oxalate crystals.

Treatment of chylous ascites.—Tapping was the treatment resorted to in most of the reported cases and was sometimes repeated. Seven cases recovered. In two cases laparotomy was resorted to, with recovery of both patients. One was a case of an intact retention cyst, and the other was probably a ruptured cyst. In the case of congenital cyst, recovery took place after several tapplings. In one of the cases of recovery, rupture of the umbilicus occurred with spontaneous evacuation of the fluid. The frequent resort to paracentesis was manifestly due to a mistaken diagnosis. As a medical resource, Buscy considers its value as questionable. He regards the peritoneum as an enormous absorbing surface, which, in cases of moderate effusion, unaccompanied with tension of the abdominal walls, might prove adequate for the reabsorption of the effused chyle and lymph. In cases of large accumulation, with its consecutive disturbances of the circulation and respiration, relief of the distention by the evacuation of the fluid would be imperative, as it was in the present case, but it does not seem wise to empty the cavity completely of the nutritive fluid absorbable through such a vast area of lymphatic apparatus. The fluid should not all be withdrawn, and the operation should be repeated only when made necessary by the distention.

The treatment has mainly been directed to the prolongation of life, and Murphy suggests that in cases due to rupture of the chyle duct, it should be rest in bed with light diet of such foods as are digested and absorbed by the stomach, given in small quantities, at short intervals, and a restricted quantity of water and other liquids, the object being to prevent distention of the ruptured ends of the lacteals and the formation of a coagulum. This, together with a general tonic plan of treatment, has apparently proved successful in at least two cases and has certainly prolonged life in other cases. In the case of cyst and benign tumors, surgical procedure might offer a prospect of cure. In filarial cases, death of the adult worm is the only hope of permanent relief; this happens occasionally, but cannot be brought about by treatment.

Résumé.—Knowing as we do that acute and

CASES OF EFFUSION AND ACCUMULATION OF CHYLE AND CHYLELIKE MILKY, FATTY AND OILY FLUIDS IN THE ABDOMINAL CAVITY.

No.	Reporter.	Date.	Where Published.	Sex.	Age.	Causative Conditions.	Treatment.	Result.
1	Poncey, Jr.	1699	Saviard Observations in Surgery, p. 247	F	Girl	Obstruction of lymphatic glands and vessels	Medicines & tapping	Died
2	R. Morton	1705	Morton's Phthisiologia	M	2 yrs	Compression of duct near subclavian vein by large tumor, producing rupture of lacteals	Tapping	"
3	Chomel	1728	Mem. de l'Académie Royale des Sciences	F	24 yrs	Childbed, rupture at omt., 5 pts. milky fluid escaped	Counter opening	Recovery
4	J. G. Scherbr	1729	Haller, Dissertation Abmorb. borum, III, p. 237	M	39 yrs	Calculus in Receptaculum Chyli	Tapping	Died
5	Donald Monroe	1765	Essay on Dropsy	F	Girl	Effort to raise a burden.	"	Not stated
6	Bossu	1770	Journ. de Med. Chir. Pharm. xxxiv, p. 283	F		Met. of mammary secretion during first week of puerperium	Medicines & tapping	Recovery
7	Martin	1770	Journ. de Med. Chir. Pharm. xxxiv, p. 555	F		Metrorrhagia, miscarriage, unusual exercise	Tapping	"
8	Milleret	1774	Journ. de Med. Chir. Pharm. xlii, p. 237	F	39 yrs	Arrest of secretion of milk from mammary glands and intestinal canal	Discharge at omt.; tonics	"
9	Ed. Sandifort	1781	Observ. Anat. Pathology, judg. Bat. iv, 1-21, 3 Pl.	F		Premature birth of twins	Found at autopsy	Died
10	Perclval	1788	Essays Med. Physiol. and Exp., II, p. 177	F	8 yrs	Rupture of lacteal vessels, protracted illness	Tapping	Recovery
11	Weaver	1814	Med. Surg. & Pharm. Rep. pos., II, p. 377	M		Supposed to be liver disease	Medicines	Died
12	Truman, Abell	1833	Bost. Med. & Surg. Journ., vii, p. 13	F		Abdominal tumor following pregnancy with twins	Rupture at navel	"
13	Hughes	1841	Guy's Hospital Reports, v, p. 297	M	20 yrs	Tumor of mesenteric glands, lacteals large and tortuous	Not stated	"
14	Van Camp	1842	Ann. Soc. de Med. de Anvers, III, 86	M	59 yrs	Chronic bronchitis, asthma, tuberculosis	"	"
15	J. Popham	1854	Dublin Quart. Journ. Med., xviii, p. 467	F	28 yrs	Chronic peritonitis with fat in effusion, fatty degen. liver, fat free in blood	"	"
16	M. Loraln	1859	Compt. Rend. Soc. de Biol., Par. 2, s. v., 162	F	8 yrs	Symptoms of T. B. peritonitis, numerous tubercles in lungs	"	"
17	T. Stevenson	1860	Guy's Hospital Reports, 3, s. xvii, p. 231			Milky fluid obtained from abdomen	"	Not stated
18	Rokitansky	1861	Pathological Anatomy, Bd. II, s. 388	F	62 yrs	Occlusion of thoracic duct with soapy material	"	Died
19	Ormerod	1866	Trans. Path. Society of London, xvii, p. 165	M	19 yrs	Partial obstruction of duct near its termination	"	"
20	W. Coyley	1868	Trans. Path. Society of London, xix, p. 199	M	24 yrs	Left subclavian vein plugged with ragged clot	Tapping	"
21	Hopper-Seyler	1873	Arch. Gesamte Phys., vii, p. 407			Rupture of chyle vessels from pressure of a tumor	Not stated	"
22	Bergeret	1873	Journ. d'Anatomie, T. ix, p. 586	F	27 yrs	Scrofula, pulmonary tubercle, oily ascites	"	"
23	Wilhelm	1875	Corres. Blat. der Aerzt. Verein Rhen., No. 14, s. 13		2 mos	Abdominal tumor, causing rupture of thoracic duct	Tapping	"
24	Quincke	1875	Archiv. f. klin. Med., Bd. xvi, s. 128	F	30 yrs	Obst. of duct due to inf. thickening of ureters, adipose changes to C. T.	"	"
25	"	1875	Ibid., s. 121	M	50 yrs	Traumatic rupture of duct, effusion into peritoneal and pleural cavities	"	"
26	Ballman	1876	Centralbl. f. d. Med. Wissenschaft, xiv, s. 275	F		Chylous fluid vomited found in peritoneal and pleural cavities	"	Recovery
27	Pelletier	1876	Journ. de Med. Chir. Pharm. lxxvii, p. 496	F	39 yrs	Peritoneum studded closely with tubercles	"	Died
28	F. Winckel	1876	Archiv. f. klin. Med., Bd. xvii, s. 303	F	39 yrs	Puncture of chyle vessels by parasites	"	Not stated
29	Wintwarter	1877	Jahrbuch d. Kinderheilkunde, vol. xi, Nos. 2-3	F	Birth	Rupture of cong. chylous cyst	"	Recovery
30	H. Smedt	1880-1	Zeitschrift klin. Med., p. 199	M	11 yrs	Ascites following infectious diseases	"	Died
31	Kohn	1880-1	Mem. Soc. de Med. de Strassburg, xix	F	50 yrs	Rupture of mesenteric and lymphatic lacteals	"	Not stated
32	Veil	1882	Paris Theses, No. 21, 1882	F	25 yrs	Syphilis	"	Died
33	Letulle	1884	Rev. de Med., iv, p. 723	M	8 yrs	Rheumatism in heart	"	"
34	F. Nickerson	1884	Mass. Med. Soc., June, 1884	M	55 yrs	Chylous cyst, hard labor	"	Recovery
35	Letulle	1885	Rev. de Med., p. 950	M	3 mos	Chron. peritonitis, cong. cartil. opacity	"	"
36	Whitlo	1885	British Med. Journ., vi	M	13 yrs	Pul. tuberculosis, tub. peritonitis	"	Died
37	M. I. Straus	1886	Archiv. de Physiologie, Norm. et Path., xvii, p. 367	M	61 yrs	General exhaustion	"	"
38	P. I. Murray	1886	Monograph	F	19 yrs	Violence, long walks & dancing	Laparotomy	Recovery
39	N. B. Carson	1888	Med. News, iv, p. 52	M	39 yrs	Chylous cyst of mes.	Autopsy	Died
40	Weichselbaum	18-	Virch. Archiv., lxiiv, p. 145	M	80 yrs	Stasis caused by interposed adipose tissue	"	"
41	M. E. Gaucher			M	47 yrs	Alcoholism	Tapping	Not stated
42				M	39 yrs	Alcoholism, cirrhosis	"	"
43				Child	11 yrs	Sarcoma of omentum	Not stated	Died
44	Alvin Eyer	1891	N. Y. Med. Rec., xl, 122-124	M	28 yrs	Traumatic rupture of receptaculum chyle	Tapped	"
45	H. Senator	1895	Charete Ann. Ber., xx, 263-74			Carcinoma thoracic duct	"	"
46	H. Groom	1900	Lancet, London, June 30, March 31	F	30 yrs	Carcinoma of mes. glands	"	"
47	Comey and McKibben	1903	Boston Med. & Surg. Journ.	M	61 yrs	Ch. lymphangitis thoracic duct	"	"

chronic inflammations of the lymphatic vessels are almost never a primary disease but always result from inflammation of the surrounding tissues or parts drained by the affected vessels, some cause outside of the thoracic duct must be found to explain the case at hand. This cause is attributed to the old tubercular focus at the left apex, where a half dozen nodules were found which had undergone caseous and calcareous degeneration, and were surrounded by thick fibrous walls. This fibrous tissue had so developed in the surrounding pulmonary tissue that no semblance of alveoli were to be found. The process had not stopped here, but the two lobes, compressed so that together they were no larger than the two fists, were so tightly bound down to the upper and posterior pleural wall by firm fibrous adhesions that the lung could not be torn out, but had to be cut, this producing a loud grating noise. The thoracic duct winds directly around the left apex as it comes from behind the esophagus at the seventh cervical vertebra, and comes outward to empty into the left subclavian vein. What an enormous process this fibroid degeneration was can be recognized by the sections taken at a dozen different levels where it is seen that the densest fibroid deposit is in the lumen of the duct as well as in the walls themselves, where occasionally, when a few muscular fibers are left, as one section shows very prettily, the fibrous tissue is seen deposited in between these fibers.

The "American Textbook of Pathology," after describing acute lymphangitis as swelling of the intima, proliferation and desquamation of the endothelial cells and an infiltration of the walls, and often of the surrounding tissues, — perilymphangitis, — with round cells, speaks of the coagulation of lymph with a formation of a thrombus as of frequent occurrence; that slight attacks often end in resolution, but that in severe septic cases the thrombus softens, the vessel ruptures, and the neighboring parts become infiltrated with pus. Then it adds: "Occasionally the process ends in fibroid thickening of the coats of the vessel with partial or complete obliteration of its lumen. This is called chronic lymphangitis."

This condition of chronic lymphangitis involved a whole foot and a half of ductus thoracicus in Dr. Comey's case. The dozen sections show fibrous occlusion of the lumen in them all.

The German writers make mention of the fact that pulmonary tuberculosis begins at some period in life in about 50% of all individuals; in most cases without the knowledge of the individual himself. One is struck on seeing a large number of autopsies by the fact that the visceral pleura is adherent to the parietal pleura in such a large number of the cases, and without any previous history of pleurisy.

"At the present day there is no longer doubt that a tubercular process may be brought to a standstill for many years and also even completely healed by the tubercular focus being surrounded by indurated connective tissue, making the spread of the tubercle bacilli more difficult. If the disease has started in the lungs, the extension first follows in the lymph channels, and in this way after a time without exception the peribronchial lymph glands, and frequently the visceral pleura, become involved.

From the latter the costal pleura can become infected. If an eruption takes place of miliary nodules formed by reabsorption, the process is called miliary tubercular lymphangitis." — Ziegler.

The extension of tuberculosis from the primary focus of infection is usually affected through the lymph channel, and in some instances the vessels themselves are involved in transmitting the disease. In tubercular ulceration of the intestines, miliary tubercles are frequently found in the serous coat along the lymphatics, which run to the nearest mesenteric glands. Tubercular lesions of the skin and subcutaneous tissue are sometimes associated with tubercular lymphangitis. The invasion of the thoracic duct by tubercles may lead to a general infection.

It is an interesting fact that all the parts drained by the thoracic duct were filled with fluid, edematous, pitting markedly on pressure. This was so of both legs, abdominal cavity, left thorax and left arm, while the parts drained by the right lymphatic duct were not so affected, the right arm being greatly atrophied. It was not surprising that last spring there should have been acute lymphangitis of the lymphatics of both legs, due to backing up and disturbance of the lymphatic circulation, when lymph thrombi were formed. This acute lymphangitis very closely resembles phlebitis, according to Widal.

LESIONS OF THE TIBIAL TUBERCLE OCCURRING DURING ADOLESCENCE.

BY ROBERT B. OSGOOD, M.D., BOSTON.

(1) INTRODUCTION.

FRACTURES of the tubercle of the tibia have for many years been recognized and have been considered almost as curiosities. The reported cases are nearly all those of fracture and marked separation, and are undoubtedly rare. There are, however, other lesions representing less severe forms of injury to the tubercle. These are interesting because they have apparently been seldom recognized and because of their comparatively frequent occurrence; because of the old difficulty of diagnosis and our present simple and accurate means, and because of their relation to the development of the tubercle.

(2) DEVELOPMENT OF THE TUBERCLE.

The tubercle of the tibia develops ordinarily from the upper epiphysis of the tibia by the ossification of a tongue-like process extending downwards over the anterior surface of the diaphysis. Rarely there is a separate center of ossification for the tubercle which then develops as a separate epiphysis uniting with the upper epiphysis during the latter portion of adolescence.

Henke describes a cartilaginous plate, existing in the newborn and throughout early life, lying in front of the epiphysis and diaphysis of the upper end of the tibia. In a dissection of the knee of the newborn I have found this plate apparently a part of the cartilage of the upper epiphysis. Prof. Thomas Dwight of the Harvard Medical School has allowed me to study his specimens of human fetuses prepared by Dr. E. B. Young after a Ger-