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A STUDY OF CASES OF ASCITES IN THE WARDS OF THE CANTON HOSPITAL, CHINA.

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A visitor to the medical wards of the Canton Hospital is always impressed with the large number of patients suffering from ascites. While the majority of patients admitted to the hospital are surgical, yet we find that during thirteen months from March, 1914, to April, 1915, 3.95 per cent. of all admissions were cases of ascites. This was out of a total of 2250 admissions. Excluding all general surgical cases and eye, ear, nose, throat, and neurological patients, in whom there were no cases of ascites, we have left 452 patients admitted to the medical wards during a period of eight months. Of these 70, or 17.69 per cent., were suffering from ascites.

It must be borne in mind that the prevalence of any disease among the Chinese cannot be determined by hospital statistics. A large proportion of medical cases are never sent to an institution but are treated at home by an old-style Chinese physician. Surgery being an unknown art to these, a much larger percentage of surgical cases are sent to the practitioner of western medicine. The Chinese doctor stands helpless before a case of advanced ascites, while he believes that his decoctions will have a beneficial effect upon other medical conditions.

Nevertheless, it is our belief that those pathological processes which lead to the accumulation of free fluid in the abdomen are unusually prevalent among the Chinese of Canton and its environs, and it was with this in view that the present study was undertaken.

At the start it should be made clear that our data were collected under many difficulties. The histories are not always complete. Blood and urine examinations were omitted in some cases, and the modern procedures of electrocardiography and renal function tests could not be employed at all. A physical examination was made, however, in every patient, and upon this alone the diagnosis must rest in some. We are assured that free ascitic fluid was present in all the cases reported.

The present paper is based on data obtained from 80 patients, all of whom had ascites from some cause. Several were admitted to the hospital two or three times, and the period of residence varied from a few hours to several months. These 80 cases have been classified under eight heads, in accordance with the dominant pathological lesion, so far as it could be determined, without an autopsy. These eight groups are as follows:

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Predominant lesion.	Cases.	Percentage.
Hepatic disease	22	27.5
Splenomegaly	13	16.25
Hepatic disease and splenomegaly	5	6.25
Nephritis	21	26.25
Heart disease	10	12.5
Nephritis and heart disease	3	3.75
Tuberculous peritonitis	4	5.0
Abdominal tumors	2	2.5
Total	80	100.0

The nationality of all these cases was Chinese. Only patients who were admitted to the wards are considered. For the present we shall confine our attention to the first six groups, leaving the tuberculous cases and the abdominal tumors for later study.

DIFFERENTIAL DIAGNOSIS. Of the 22 cases of hepatic disease there was definite clinical evidence of some pathological process in the liver in only 6, in which there was marked enlargement, local tenderness, or jaundice. The remaining cases were classified as hepatic disease, probably atrophic cirrhosis, because of the absence of definite signs of lesions in other organs that might produce ascites.

In 13 cases there was marked enlargement of the spleen without signs of liver involvement.

In 5 cases both spleen and liver were enlarged or there was splenomegaly with jaundice. Some of this group might fairly be classified as Banti's disease.

The 21 cases of nephritis were characterized by albuminuria or other signs suggesting chronic interstitial nephritis.

In 10 cases there was no definite abnormality in the urine, but there were present signs of endocarditis or myocarditis.

In 3 patients there was marked albuminuria associated with organic heart disease. Enlargement of the liver or spleen when it occurred in the cases classed as cardiac appeared to be the result of chronic passive congestion.

Age.

	Under 20 years.	20 to 39 years.	40 to 60 years.
Hepatic	2	10	10
Splenomegaly	0	9	4
Hepatic and splenic	0	4	1
Nephritis	2	15	4
Cardiac	0	5	5
Cardiac nephritis	0	3	0

All of the cases were between the ages of nineteen and sixty years except one child of three, with acute nephritis. The hepatic and cardiac cases showed about equal numbers before and after the fortieth year. There were more than four times as many cases of nephritis under forty years of age as over, indicating that this condition is more prone to affect young adults. Splenomegaly was also more common in the third and fourth decades than in the fifth

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and sixth. Our series indicates that ascites is rarely found in the Chinese under nineteen years of age unless it be caused by tuberculous peritonitis.

Sex. Only 18 of the 80 cases were female. Of these 4 had tuberculous peritonitis or abdominal tumors, 1 splenomegaly, 4 cirrhosis of liver, 4 nephritis, 4 heart disease, and 1 cardiorenal disease. Excluding the cases of tuberculous peritonitis and abdominal tumors, 81 per cent. of the patients were males and 19 per cent. were females.

Place of Birth. Many patients came from towns and villages at a distance from Canton, but all but 6 came from the province of Kwangtung.

Nineteen men and four women were recorded as unmarried.

OCCUPATION OF SEVENTY CASES.

Occupation.	Hepatic.	Splenic.	Hepatic-splenic.	Nephritic.	Cardiac.	Cardio-renal.	Totals.
Printer	..	..	..	..	1	..	1
Student	..	..	..	1	..	..	1
Farmer	8	3	2	1	1	2	17
Shopkeeper	4	1	..	4	2	..	11
Sailor	1	2	..	..	..	..	3
Soldier	1	1	..	3	1	..	6
Teacher	..	..	..	1	2	..	3
Gambler	..	..	1	..	..	..	1
Laborer	3	4	1	6	1	1	16
Clerk	..	..	..	2	..	..	2
Housework	2	..	..	1	..	..	3
Dressmaker	..	..	..	..	2	..	2
Painter	1	..	..	..	..	..	1
Weaver	..	..	1	..	..	..	1
Cook	..	1	..	..	..	..	1
Child (3 years)	..	..	..	1	..	..	1

The list of occupations throws but little light on the etiology of ascites. The great majority of patients admitted to the hospital are farmers, laborers, or shopkeepers. It is striking that most of the patients lived in the country and had spent but a few years at most in the city.

Family History. The family history was often unreliable and the causes of death of parents or other relatives were difficult to ascertain. One case of cirrhosis of the liver reported that his father died of dropsy. Of the splenomegaly cases the father of one died of edema and the sister of another died from the same cause. In a patient with enlarged spleen and liver the mother was reported to have died of heart disease. Four of the twenty-one nephritics reported a suggestive family history, and one of the cardiac cases stated that his mother died of edema. Thus in only 9 of the 74 patients could any definite family history bearing on the present disease be obtained.

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Previous Disease. These records are not complete in regard to previous history. There were 9 who reported attacks of chills and fever, 4 had had dysentery. There is no doubt that malaria is an important factor in the causation of many cases of splenomegaly, but more especially cases not complicated with ascites. Dysentery was more frequently an initial symptom than a previous illness. The nephritis cases showed a tendency to relapse. Four had had previous attacks, each followed by temporary recovery. We have personally observed patients suffering from marked parenchymatous nephritis of the chronic type, in which all signs of disease, including albuminuria, have entirely disappeared. Twenty-nine out of 40 cases denied venereal infection, but a Wassermann test was not made, and undoubtedly more were infected.

ALCOHOL AND OPIUM. ALCOHOLISM IN 47 CASES OF ASCITES.

	Hepatic.	Hepatic-splenic.	Splenomegaly.	Nephritis.	Cardiac.	Cardio-renal.
Total abstainer	0	0	1	1	1	1
Takes less than 500 c.c. daily	9	4	3	9	3	2
Takes more than 500 c.c. daily	4	0	2	2	5	0
Percentage of cases using alcohol	100.0	100.0	83.3	91.6	88.8	66.6

Alcohol is drunk as rice wine generally. This may vary in strength from 4 per cent. up. Drunkenness is rare, but drinking is practised pretty generally. Though we have no data on this subject in a number of cases studied, yet our table indicates that in cirrhosis of the liver, with ascites at least, alcohol is probably an etiological factor.

Only 5 of the patients were opium smokers. We cannot assign therefore any great importance to the use of this drug.

The mode of onset of the disease was determined by careful questioning in most cases. When disease of the liver or spleen was the underlying cause, abdominal enlargement was usually the first marked sign. In affections of the heart and kidney edema of the legs was generally the first thing noted. In 6 cases the disease was ushered in by an intitial attack of diarrhea or dysentery.

DURATION AND RESULT OF DISEASE.

	Duration of illness before admission to hospital in 71 cases.						Time spent in hospital in 74 cases.					Result in 73 cases.				
	Under 1 mo.	1 to 2 mos.	2 to 6 mos.	6 mos. to 1 yr.	1 to 2 yrs.	2 to 15 yrs.	1 to 7 days	7 to 14 days.	2 to 3 wks.	3 to 4 wks.	1 to 2 mos.	2 to 4 mos.	Recovered.	Much improved	Improved.	Unimproved.	Death.
Hepatic	8	4	4	2	0	3	7	5	2	7	0	1	2	5	8	2	4
Splenic	2	4	2	1	2	2	2	3	0	4	4	0	0	7	4	0	2
Hepatic-splenic	0	2	1	0	0	2	1	0	2	1	1	0	0	1	2	1	1
Renal	2	5	5	6	1	1	5	3	0	5	8	0	0	9	9	0	3
Cardiac	2	2	4	1	0	0	2	4	1	2	0	1	1	4	2	0	3
Cardiorenal	1	1	0	0	1	0	1	0	0	0	2	0	0	1	0	0	2

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It will be noted by examining the above table that many cases had been suffering for weeks or months before admission to the hospital. A few cases died a few days after admission, but the majority remained for one or more weeks, giving sufficient time for study and diagnosis. It may not be correct to speak of recovery in patients with ascites. However, 2 of the hepatic cases and 1 heart case left the hospital free of symptoms. The most satisfactory results were obtained in the renal cases. There was less tendency for the ascitic fluid to recur, although albuminuria generally persisted.

Unfortunately, no autopsies could be performed, but the cause of death was usually quite evident. Two of the hepatic cases that died were not tapped. One had a terminal enteritis and the other showed marked jaundice, and delirium. Another patient died of a probable abscess of the liver. Two with splenomegaly died. One of these became delirious soon after aspirating the fluid, and remained in this condition until death. The other, a young woman, from whom 15,000 c.c. of fluid were removed, died twelve hours later in collapse.

There were 2 cases of cirrhosis, or enlargement of the liver and splenomegaly, who died. In 1 case there was an abscess of the liver which ruptured into the lung. The other died shortly after leaving the hospital with symptoms of cerebral embolism which followed aspiration.

One of the cases of nephritis became uremic after the second aspiration and died.

Of the patients with heart disease 1 died with signs of cerebral embolism which came on soon after tapping the abdomen. One who was not tapped showed signs of beriberi. The third heart case, who had aortic incompetency, died soon after aspiration.

Two patients with advanced heart and kidney disease died. One showed marked jaundice and toxemia and the other died of advanced mitral disease with decompensation.

Temperature. A normal or subnormal temperature was usual. There were 18 cases in whom the thermometer reached as high as 100°. In 7 cases it reached 101°. In 4 cases it rose to 102° or above.

Twenty-six of the case histories gave no record of the condition of the heart. It may be assumed that in these there was no heart disease or at most a functional impairment.

In 3 of the patients with splenomegaly a mitral systolic murmur was heard, probably functional. In 5 of the patients with nephritis there were signs of heart disease, but the renal symptoms were decidedly predominant.

There were 10 cases, however, in which the ascites was considered as a complication of organic heart disease. Seven of these showed mitral regurgitation, 2 aortic regurgitation, and 1 evidence of myocarditis.

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THE CIRCULATION.

	Condition of heart.									Rate of pulse.											Blood-pressure (systolic).												
	Normal.	Mitral diastolic.	Mitral systolic.	Aortic diastolic.	Tricuspid systolic.	Hemic murmur.	Accentuation of 2d aortic.	Feeble.	No record.	120	110	100	95	90	80	75	70	65	55	No record.	225–238	200	180	170	150	130	120	115	110	100	80	60	No record.
Hepatic	7	0	0	0	0	0	0	0	15	3	..	4	..	3	7	2	0	..	..	3	..	..	..	..	..	..	2	..	2	1	..	..	17
Splenic	5	0	3	0	0	0	0	1	4	..	..	..	..	..	6	1	1	..	1	4	..	..	..	..	..	2	..	2	1	..	..	..	8
Hepatic and splenic	4	0	1	0	0	0	0	0	0	..	..	1	..	..	3	..	1	..	..	0	..	..	..	..	..	..	1	..	1	2	..	..	1
Renal	7	1	3	0	1	0	1	1	7	..	..	2	1	5	7	..	1	1	..	4	..	1	1	2	1	1	1	2	..	..	..	2	10
Cardiac	0	0	7	2	0	0	0	1	0	..	1	..	..	2	5	..	1	..	..	1	1	..	..	..	1	2	2	..	..	2	1	..	1
Cardiorenal	0	0	2	0	0	1	0	0	0	..	..	1	..	..	..	..	0	..	..	2	..	..	..	..	..	..	1	1	..	..	..	..	1

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Out of 452 patients admitted to the medical wards of the hospital in 1914, 19 were diagnosed as heart disease, and 5 of these, or 26.3 per cent., had ascites.

The pulse-rate was not generally increased above 80. Excessive accumulation of ascitic fluid caused embarrassment of the heart and a consequent acceleration of the pulse.

The systolic blood-pressure was estimated in several cases. The Nicholson apparatus was used. The highest reading was found in a case of aortic regurgitation.

In general, aspiration of fluid has no appreciable effect on high pressure. There might be a temporary fall, but the next day it returned to the original reading; except in one instance of aortic regurgitation the higher readings were found in cases of nephritis.

HEMOGLOBIN IN THIRTY-FOUR CASES.

	90 to 100 per cent.	80 to 89 per cent.	70 to 79 per cent.	60 to 69 per cent.	50 to 59 per cent.	20 to 29 per cent.
Hepatic	..	1	2	1		
Splenic	..	2	3			
Hepatic and splenic	1	3				
Renal	1	2	3	4	2	1
Cardial	..	2	3	1		
Cardiorenal	..	2				

Anemia is especially marked in the nephritic cases, more than half of which were below 70 per cent.

Respiratory System. The records of the lungs and respiratory organs were not complete. There was no case of pneumonia. In the majority of patients there was marked dyspnea on admission because of the intra-abdominal pressure. This usually soon disappeared after aspiration. In only 4 was there evidence of pleural effusion: three on the left and one on the right side. The effusions were moderate and did not require tapping.

Liver. Enlargement of the liver was noted in 7 cases. In 2 there was tenderness, but in only 1 was an abscess demonstrated. In this last case the pus discharged into the lungs. There was a marked infection of clonorchis sinensis. In several instances it was not definitely stated whether the liver was enlarged or not. It is probable that in most of these it was of normal size or reduced.

Spleen. The spleen was noted as enlarged in 19 cases, in 1 of which the enlargement was apparently caused by passive congestion. Excluding this there were only 18 cases, or 24 per cent., with splenomegaly; 4 of these cases appeared to be Banti's disease. Among the others 1 was diagnosed cancer of the spleen, in 3 there was a history of malaria, and in 1 of excessive alcoholism. The spleen did not average as large as in many cases of splenomegaly without ascites.

Digestive System. Pressure of the fluid on the stomach and intestines always caused marked digestive disturbance. Severe

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enteritis was a frequent complication. In 1 patient with nephritis and marked albuminuria, suppression of urine was difficult to overcome until a violent acute enteritis developed, when the urinary output was markedly increased.

OVA OF INTESTINAL PARASITES.

	No record.	No ova.	Ankylostoma.	Ascaris.	Trichocephalus.	Ascaris, ankylostoma, trichocephalus.	Ascaris, clonorchis sinensis.	Clonorchis sinensis.	Clonorchis trichocephalus.	Clonorchis ankylostoma.
Hepatic	16	4	..	1	1					
Splenomegaly	6	3	2	1	..	..	1			
Hepatic and splenomegaly	1	1	..	..	1	..	..	..	..	
Renal	9	4	1	3	2	..	..	1	1	2
Cardiac	2	7	..	..	..	..	1			
Cardiorenal	..	..	1	..	1	1				

It is to be regretted that the feces were not examined in all of the patients. There were 40, however, in whom ova were looked for and there was evidence of parasites in about one-half of these. Ankylostoma and clonorchis sinensis by their own pathological processes producing either a profound anemia on the one hand or extensive disease of the liver on the other, may be directly responsible for the ascites. Hookworms were present in 7 cases while clonorchis was found in 6. In 2 of the latter there was great abundance of ova in the feces, and there was marked tenderness over the liver.

The Urine. In all patients in whom albuminuria was marked a diagnosis of nephritis was made. In 2 cases there were signs of chronic interstitial nephritis, but no albumin was found in the urine. In 15 cases with nephritis there was a heavy precipitate of albumin, the amounts varying from 0.5 gm. to 10 gms. excreted per 1000 c.c. of urine. Granular and hyaline casts were generally found in these cases.

Ascites resulting from Bright's disease is almost always associated with marked albuminuria. The urine is often very scanty, only 100 c.c. to 500 c.c. being voided in the twenty-four hours. It was observed that in favorable cases the disease appeared to remain stationary for a time until a crisis, so to speak, occurred, when the urine increased in quantity and ascitic fluid ceased to accumulate in the abdomen. This critical change was brought about in some cases after the first or second tapping, in other instances the improvement took place some days or weeks after removing the ascitic fluid. In unfavorable cases retention of urine and symptoms of uremia followed soon after the aspiration of the abdominal fluid.

In the hospital report for 1914 there appear but 32 cases of nephritis, and according to our series 21 of these showed more or less ascitic fluid.

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EDEMA RECORDED IN SIXTY CASES.

	None.	Legs and feet only.	Feet and scrotum.	Face and feet.	General anasarca.
Hepatic	3	9	2	..	1
Splenomegaly	5	4	0		
Hepatic and splenomegaly	2	2	0		
Renal	..	3	3	1	12
Cardiac	..	6	..	..	4
Cardiorenal	1	1	1		

It is very evident from the above table that in cases of nephritis ascites is likely to be part of a general anasarca. When edema appeared in cases of cirrhosis of the liver or splenomegaly it was usually caused by pressure on the lower extremities and was soon relieved by removing the cause.

In the heart and kidney cases this was not so generally the case. If a free flow of urine was not established by tapping the edema persisted or quickly returned.

If the edema disappeared in renal cases after aspirating the abdomen a favorable prognosis was justifiable, but if the edema persisted there was little prospect of recovery.

The frequent occurrence of edema in cases of nephritis among the Chinese is of special interest because of recent studies of the effect of sodium chloride on this disease. It is well known that the best method of treating the edema of Bright's disease is by giving a diet free of salt. Now, salt among the Chinese is a luxury seldom indulged in by the lower classes. Rice, the main diet, is cooked and eaten without any salt. Meat is eaten in very minute portions by the laborer, and vegetables are likewise prepared without salt. We have, therefore, to do with a people who rarely eat salt and whose diet is almost purely vegetarian, and yet afflicted with a severe form of nephritis frequently accompanied by local edema, ascites, or general anasarca. In this connection it is also of interest to note that the dairy products—milk, butter, and cheese—do not form part of the dietary of the average Chinese.

Ascites caused by disease of the heart and kidneys is often relieved by appropriate treatment of these organs and the fluid does not have to be withdrawn so often as in patients suffering from cirrhosis of the liver or splenic enlargement. In 2 of the hepatic cases in whom the fluid was not withdrawn there was a large amount present, but the patients being *in extremis* no operative procedure was ventured upon. The largest amount of fluid was found in 2 cases of cirrhosis, in 1 of which 20 liters and in the other 16½ liters were removed at the first tapping. It was generally found necessary to aspirate when the fluid reached between 5 and 10 liters. Less than this amount caused comparatively slight discomfort, and more produced much oppression with nausea and vomiting.

Many cases are reported as being tapped but once, but in some cases there was a gradual reaccumulation of fluid. In only 4 was there no tendency to recurrence after tapping. In 9 the fluid was

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DATA REGARDING ASCITIC FLUID IN SEVENTY-FOUR PATIENTS.

	Not aspirated.	Spontaneous disappearance.	No tendency to recur after tapping.	Number of times aspirated.								Average amount of fluid when tapped more than once.			Maximum amount of fluid drawn at one time.						
				Once.	Twice.	Three times.	Four times.	Five times.	Six times.	Times not recorded.	5000 c.c. or less.	5000 to 10,000 c.c.	10,000 to 20,000 c.c.	Under 1000 c.c.	2000 c.c.	3000 c.c.	4000 c.c.	5000 to 10,000 c.c.	10,000 to 15,000 c.c.	15,000 to 20,000 c.c.
Splenomegaly	2	2	..	5	3	2	..	..	..	1	..	4	..	..	..	..	..	1	6	2	..
Hepatic and splenomegaly	..	..	..	3	..	..	..	..	1	1	..	1	..	..	1	..	1	1	..	..	..
Renal	5	4	1	6	7	1	1	..	..	1	1	5	1	..	1	1	..	8	3	..	..
Cardiac	4	3	2	4	1	..	1	..	..	2	..	2	..	1	..	1	1	2	1	..	..
Cardiorenal	..	..	..	1	..	..	..	2	..	1	1	1	..	..	..	1	2	1	..	..	..
Hepatic	3	..	2	8	4	..	1	..	..	6	1	1	2	..	..	..	3	2	2	2	2

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gradually absorbed, but in these there was at no time a very large amount.

TREATMENT. Diuretic drugs had little effect. When large amounts of ascitic fluid were present no relief was obtained until this was drawn off. The urinary output then increased and edema rapidly disappeared. Compound jalap powder proved to be the most satisfactory purgative. Little benefit was derived from hot sweat baths. Unfortunately due attention was not paid to the dietetic treatment of these cases.

TUBERCULOUS CASES. There were 4 patients with tuberculous peritonitis and ascites. Two were in children aged about fourteen, a boy and a girl, and two in adults, a man aged twenty-three and a woman forty-three. In three the abdominal distention was the primary condition with chills and fever. The woman gave a history of a long-standing pulmonary lesion. Abdominal section was performed in two. One, a child, was improved. The man of twenty-three was operated upon because of the very rapid accumulation of fluid. Only temporary relief was afforded, and he died on the sixteenth day after admission. All of these 4 cases ran a febrile course with rapid pulse. In the two adults tubercle bacilli were found in the sputum. Edema was absent or very slight.

PELVIC TUMORS. In two women ascites was associated with tumors of the genitalia. From one 4000 c.c. of clear fluid were aspirated before the diagnosis was made. The liver was enlarged. Operation was refused. The other case was a widow, aged forty-one years. On admission 10 liters of dark brown fluid were withdrawn, containing many cholesterin crystals. Upon abdominal section, later, an extensive carcinomatous growth was found, involving tubes, ovaries, and the peritoneum. A panhysterectomy was performed. Patient made a good recovery and was discharged from the hospital well after four months.

CONCLUSIONS. 1. Ascites is a common condition in the medical wards of a hospital in Canton.

2. This condition is most frequently associated with cirrhosis of the liver or chronic nephritis, but splenomegaly, heart disease, tuberculous peritonitis, and abdominal tumors are also causative factors.

3. The male sex is more prone to this form of disease than the female, and most cases occur between the twentieth and sixtieth years.

4. The majority of cases with ascites give an alcoholic history.

5. Although the Chinese are largely vegetarian in their diet, and seldom eat salt, nephritis associated with edema is by no means uncommon.

6. Ascitic fluid tends to recur after tapping, especially in cases of cirrhosis of the liver and splenomegaly. The best results were obtained when the ascites was caused by heart or kidney disease.

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