

Observations on some cases of
Liver Abscess.

Being the Thesis for the degree of M.D. Glasg. University
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Observations on some cases of Liver Abscess.

The following observations and remarks are based on six cases of Liver Abscess, four of which occurred in patients who had never been out of England, while the remaining two had been invalided home from India after 5 and 20 years residence there respectively. They afford a few examples of the progress and termination of such cases. The clinical reports are as brief as is consistent with an accurate and consecutive record, and history not bearing directly on the case is omitted or very briefly alluded to.

The plan adopted has been generally as follows:-

- I The Clinical histories of the cases, with general and comparative remarks on each, and a reference to special treatment.
 - II The Diagnosis and Prognosis of Liver Abscess, and remarks on cases simulating Liver Abscess.
 - III The Etiology and
 - IV The Pathology, macro- and microscopic.
- The Etiology and Pathology are so intimately connected in the study of L. Abscess that they must of necessity in some parts be considered together.
- V The Treatment. General or Constitutional and Local.

Clinical histories

The first four cases here recorded are of the non-tropical variety, and occurred in patients who had never been out of England.

Case 1. "Abscess of right lobe, opening into transverse colon, partial recovery, recurrence involving nearly the whole of the liver substance, death, necropsy."

The patient, now, aet. 34, was first seen in October, 1856 by Dr. E. Haydon of Newton Abbot, to whom I am indebted for the earlier history of the case. Previous to this illness she had enjoyed good health and never had suffered from any bowel or liver trouble. She was complaining of pain in the bowels more or less constant, swelling, and diarrhoea with much straining, there was more or less fever usually greater in the evening, though never falling very much in the morning, varying between 100°f to the highest at the end of noct., 103°f. These symptoms with loss of flesh and profuse nocturnal sweats at first suggested, and then Tubercular mischief, the liver not being considered the seat of the disease in the first instance on account of the absence of local signs or of

• Symptoms

Symptoms 7

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Jaundice. Gradually she complained of pain in the region of the liver in front of the right axillary line where the pain became localized, intercostal spaces became obliterated, local oedema of skin appeared and there was slight enlargement of the external superficial veins. Abscess of the R lobe was diagnosed. It was proposed to operate, but the friends strongly objected, and would not even allow her to be removed to hospital. The swelling gradually extended towards the middle line, diarrhoea subsided, tympanites subsided, diarrhoea less marked, but wasting and hectic symptoms progressively worse. During the last week in hours, 6 weeks from first being seen, and about 2 months from the onset of diarrhoea, she experienced acute pain in the region of the epigastrium, extending downwards. She became collapsed, and soon after passed per anum a large quantity of mucus of fineium pus. The discharge assumed the form of diarrhoea and continued for 3 days with lack motion, and occasionally for 10 days after that, mixed to a slight extent with feculent matter. The pus was thin, foul smelling, of a dirty yellow color, and

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and
microscopically was found to consist of
degenerated and disintegrated pus and
tissue cells, some strands of fibrous tissue,
no red blood corpuscles and no luteo.
Coincident with the discharge of pus from
the bowel the swelling in the region of
the R lobe disappeared so that instead
of the dulness extending to 8" in the axillary
and 7" in the right nipple line, and 4"
in the middle line the measurements were
respectively 6", 5" and 3" in these situations,
and what had been a rounded smooth
and fluctuating tumour projecting beyond
the margin of the ribs, was now gone.
Pain disappeared, temperature fell to normal,
diarrhoea quite ceased, while the
appetite improved, general health distinctly
better, and she seemed on the fair
road towards recovery. On examination on
Dec. 26th there was no tenderness on pressure
over the liver, no tympanitis or diarrhoea,
bowels regular but the percussion note
was not clear for the epigastrium, and the
lower border of the liver could not be
well defined. A feeling of boginess was
imparted to the hand on palpation.
Heart, lungs, and kidneys apparently normal.

Appetite good, and patient declared she felt as well as she did before her illness. On July 2nd 1887 she had a rigor followed by fever, temperature reaching 103.6°f in the evening, pain returned in the R.M. line at the lower margin of ribs, but no diarrhoea resulted. Pain & swelling increased until by the end of January the whole liver was enlarged, its place being taken by a large soft painful and fluctuant swelling. The temperature supported suppuration, but after the first rigor it did not rise at any time to over 100°f. The pulse was extremely feeble, ^{weak} and the ratio altered. She became now exhausted and died on March 10th 1887, her illness having lasted for over six months.

P. M.

Body much emaciated, skin of a yellowish tint, but not jaundiced. The abdomen in the epigastric region distended, lower ribs on the right side projecting, remainder of abdomen retracted. Lungs dark colored, oedematous, at bases, small quantity of serous fluid in both pleural cavities, adhesions at the right base. Several small abscesses about the size of a pea in the lung tissue, no evidence of tubercular mischief. Heart pale, flabby, no

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valvular disease. Liver adherent to diaphragm
and to bowel and omentum in the neigh-
borhood, enlarged, soft and pale. Capsule
thickened. The capsule ruptured on attempt-
ing to remove the organ, and a quantity,
about 2 quarts of foetid pus escaped from
the opening. This opening led into
a large cavity lined anteriorly by a
somewhat dense fibrous membrane,
while posteriorly the cavity was bounded
by ragged liver tissue and fibrous shreds,
without any attempt at the formation of
a sac. This cavity occupied nearly the whole
of the right lobe of the liver, and behind
it communicated with the left lobe by
a narrow opening, about $\frac{1}{2}$ " in diameter,
the left lobe being subdivided into 2
smaller cavities freely communicating
with each other. These cavities were
without sac walls the boundaries con-
sisting of more or less irregular liver
tissue in some places so thin, as to
be formed of not much more than
the thickened capsule and adhesions,
without which the pus must have
escaped into the abdominal cavity.
Had the patient lived long enough the

abscess would most likely have burst through the ant: abdominal wall in the middle line in the epigastrium, as at this point there was only about $\frac{1}{8}$ " of tissue between the abscess and the external surface.

The pus was most offensive, of a dirty yellow color, thin, and did not present any trace of bile, either to inspection, or chemical tests. Microscopically it consisted of the fatty debris of liver cells, pus cells, more or less fatty, some fibrous shreds, and a slightly colored serous fluid. No amebae were detected, and no stainings were made.

The stomach was nearly empty; no ulceration but mucous surface congested, and serous surface adherent posteriorly, and on its upper surface to the liver, and partly to the transverse colon. The bowels are more or less matted from recent inflammatory exudation. The small intestine adherent and matted but no anastomoses detected. Mucous surface congested, in some parts ulcerated, but only one small area evidently recent, and from this situation and distribution most likely due to affection of the solitary glands. The ileum at its lower portion was most involved

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and showed evidence of older lesions than higher up. The transverse colon in its first part was closely adherent to the under surface & margin of the liver, and on carefully dissecting it out, the creation of a communication between the liver and bowel was found, no doubt the point at which the pus escaped from the liver into the bowel, and so was discharged at the end of nose. The large intestine, especially in the caecum and first part of the ascending colon was extensively ulcerated, but mostly in the healing stage. The ulceration in some cases had involved the whole mucous coat, down to the serous covering. The transverse colon was least affected, and showed evidence of the communication between the liver and bowel. The descending colon was affected mostly in the region of the sigmoid flexure and the mucous membrane generally was congested, but not conspicuously so. There was no large area involved in the ulceration but at several points it could be noted that several foci had become confluent. Spleen enlarged, soft and dark colored.

Several small abscesses in its substance.
Kidneys pale, otherwise normal.

Remarks

The case is interesting as being one in which there was a very definite history of diarrhoea at the onset, in fact the diarrhoea was the most prominent symptom and led to the belief that she was suffering from Dysphasia F. The motions were profuse at first, with pain and tenesmus, but no blood, nor was it noted at any time. Motions consisted of light colored, frothy feculent matter, and of slimy mucus sometimes mucopus, especially latterly. Bowels acted every two hours, then every three or four hours, until before the discharge of pus from the bowel, there was rather a tendency to constipation, the motions being hard, dark, serous and scanty. The diarrhoea which was of a dysenteric character preceded the liver affection, and one may assume, was the cause of it, the large intestine especially showing the usual lesions of dysentery.

The mode of rupture into the transverse colon or other part of the bowel is not an uncommon occurrence, and next to rupture through the lung is the most satisfactory

of various methods of cure. When recovery does not take place completely or ultimately, it is due either to immediate exhaustion from *Hætic fever*, with suppuration, by some complication secondary to the abscess, or as in the majority of cases after rupture there is a temporary amelioration followed by a relapse due to re-accumulation of pus in the abscess cavity, or to an extension of it as in this case. The large size of the original abscess in this case was unusual, and the two smaller ones had evidently formed after the rupture into the bowel, either secondary to the large abscess, or they may have pre-existed and been due to the same cause, i.e. septicaemia through the portal vein from the bowel, and assumed a more rapid growth afterwards. This case shows how difficult it is at first to diagnose abscess of the liver and to differentiate it from the concurrent diarrhoea and Peritonitis, for the temperature and symptoms must have been considerably modified from development of abscess, before the presence of pus was suspected or detected. The fall of temperature with

increased pulse rate, pulse soft, rapid and with difficulty counted, together with the evidence of re-accumulation of pus offered a most unfavourable prognosis.

Case II.

"Abscess of liver secondary to gall-stones, bursting into peritoneal cavity."

Clinical history

Mrs B. aet 54, a stout fleshy woman was seen first in June 1887 complaining of severe putting pain on the right side under the ribs, extending to the pit of the stomach, occasionally even to the left side. The patient was in a state of collapse, pulseless, face of an ashen hue, and bathed in cold perspiration. Stimulants were administered and she rallied somewhat. The pain had come on suddenly while sleeping. She had had five similar attacks on previous occasions extending over 5 years, twice associated with slight jaundice and sickness. On one occasion a faceted gall stone, the size of a small pea was noticed in a uric acid after an attack. During the intervals she was comparatively free from pain and well, though she suffered at times from bilious and fainting attacks. There was no previous history apparently bearing on the case. She was married, had 5 children

and now was a drinker. After menstruation ceased she became very stout as at present.

On examination the patient is stout, pallid and flabby, and of a generally unhealthy appearance. Conjunctivae slightly turned yellow with fatty deposit on the sclerotics. A few bronchial rales over chest at bases especially, but otherwise normal. Heart apparently enlarged, intermittent, with feeble impulse and sounds, particularly the first. Abdomen distended, slightly tympanitic, and hard over the region of the gall bladder, ~~to~~ ^{in the region of} which, and not to be distinguished from liver except ^{consistence}. There is an illdefined swelling, reaching downwards to the crest of the ilium, and continuous with the liver dulness. The pain begins in this region during each attack. The liver itself is enlarged in all directions and somewhat tender, but owing to the amount of fat and tympanitis the borders cannot be accurately defined. A motion recently passed was deficient in bile, though some was present. Urine contained some bile, was scanty, high colored, loaded with urates but con-

tained no albumen. The bile pigments were diminished in proportion the luteal acids. Fomentations sprinkled with H_2O_2 were applied to the painful region, Stimulants administered, shoulders raised slightly, and milk diet advised. This attack lasted for about three hours and then suddenly left leaving the patient very weak but free from pain, only a slight tenderness. She did not seem to quite recover as on previous occasions. Appetite did not return, there was more or less constant nausea with a dull aching pain over the right lobe of the liver to the right of the R. mammary line, and over the lower ribs. This continued for a fortnight when she had a rigor followed by a rise of temperature ($102^{\circ}F$) and though this fell at times, it never reached normal, and showed combined with the other symptoms, all the signs of Malaria Febris. Pain increased, became more localized, liver more enlarged, with bulging under the margin of the ribs, though no fluctuation could be detected. Hæm of bile in urine, and deficient in stools. Diarrhoea set in after the rigor

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but only lasted for two days. Three weeks from the time of the rigor she died somewhat suddenly from shock, complaining of a severe and sudden pain all over the abdomen, co-incident with which it was remarked that the liver dulness had diminished, especially to the right of the fall bladder, the dulness corresponding to which remained unaltered.

O. M.

Body well nourished, subcutaneous tissues loaded with fat. In fact fatty degeneration was apparent in all the organs, more or less and the arteries were atheromatous. Tissues generally bile stained. Lungs edematous at the bases and congested. Several small abscesses present, and the bronchi (smaller) were filled with thin frothy fluid. Inflammatory exudation at the base of the right lung. The abdomen on being opened was found to contain over a pint of foetia pus, of a reddish yellow color, which had evidently escaped from an abscess of the liver. The point of rupture was 2" to the right of the fissure at the

anterior margin and communicated with an abscess in the liver substance, about the size of two fists. The walls were ragged and shreddy with a zone of inflamed liver tissue round about. This cavity in turn led to a small opening, downwards and to the left to the dilated and inflamed common bile duct, near the outlet of which was impacted a gall stone (composed of cholesterol, bile pigments altered, mucus & carbonate of lime). About the size of a large bean. The bile ducts for some distance into the liver substance were inflamed, dilated, and at parts contained pus, while the gall bladder was enlarged to the size of a fist, contained a trace of bile and some clear fluid the cystic duct being nearly occluded partly by an inflammatory stricture, and partly from the pressure of a small calculus in it. There were several other small calculi in the gall bladder. There was some excudation round the fœcine. The liver was uniformly enlarged ^{& smooth} with only slight adhesion over the front of R lobe. The substance was pale with some bile staining, and fatty. Numerous small

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abscesses following, chiefly the distribution
of the bile ducts were present, of various sizes.
Spleen enlarged & congested, no abscess.
Kidneys fatty. bile pigment in some of
the cells. No ulceration of stomach &
small or large intestine. Pancreas not
affected.

Remarks

Death resulted in this case by
the rupture of the abscess into the abdominal
cavity there being very little attempt
at the formation of adhesions over the seat
of abscess. It has been observed that
in recent cases at least, when the abscess
comes to the surface and bursts, there
is very seldom a sufficient amount
of exudation with adhesion to prevent
the escape of pus into the abdominal
cavity. The starting point of the inflam-
matory action was no doubt at the
seat of impaction of the gall stone in
the common bile duct. This accounted
for the jaundice and earlier symptoms
while in a secondary way, the liver
became the seat of pyaemia obviously partly
by direct continuation of the inflammation
from the dilated common bile duct, ~~and~~
to the dilated smaller bile ducts in the

liver substance, and partly through the
 blood vessels. The liver was enlarged in
 the first instance on account of the fatty
 degeneration of its substance. Abscess is
 frequently associated with this con-
 dition of the gland, possibly on account
 of the lowered vitality making it a
 fitting soil for the propagation of the
 specific organisms which are now known
 to be the cause of the abscesses. Apart
 from this, the mere fact of the common
 duct being blocked & the gall stone
 would seem to favour the development
 of abscess as Ketter has shown that
Staphylococcus pyogenus aureus and a bacillus can
 be found in the normal liver, after
 ligation of the common bile duct, in the
 bile ducts, gall bladder and in the blood.
 He also found *Staph: p: aureus* in the blood
 of a patient after an attack of colic due
 to gall stone, also in the blood in a
 case of *Schemm's fever*. In cases of obstruction
 of the bile channels then, cocci are present
 and when once there they are very
 apt to spread to the liver substance, especially
 if predisposed, and then cause suppuration.
 In this case then we had most of

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the factors conducive to pyaemic ⁱⁿfection of the liver, an unhealthy subject with feeble heart and circulation, an ulcerated bile duct, communicating with the bowel, dilated bile ducts from included common duct, and a fatty liver. Although there was some jaundice it was not excessive, and the liver itself was paler than usual owing to the fatty condition of the organ, and to pressure on the nervous radicles by the enlarged fatty cells, and as part of the general anaemia. The fact of the bile pigments (bilirubin principally) being in less proportion to the bile acids agrees with Bauehard's idea that the bilirubin is detained in the tissues and rendered innocuous up to a certain point, and that after the tissues as it were become saturated, the symptoms of bile poisoning begin. Though less marked if the kidneys are acting freely. In this case the bile acids were in excess showing that the system had not been saturated with bile, but that the tissues were still absorbing the poisonous bilirubin.

Bauehard. Auto-intoxication in disease. Hannover & others. 1894.

Jamaica was not specially noted in the above cases. It is rare in cases of tropical abscess under 3%, unless there be pressure on the bile duct, or other swelling in the neighbourhood of it. It may also appear in a transient way in the early stages of acute cases, as part of a general hyperaemia. In some cases of pyaemic abscess it seems probable that the icterus is developed quite independently of the alteration in the liver, as the liver (apart from such cases of fatty degeneration and occluded duct as in the cases now recorded) may be quite free from icterus, although the skin and conjunctivae are colored a deep yellow, and the urine shows a reaction for the pile pigments, and not for the biliary acids.

Case III

"Lumbar Abscess secondary to pyelitis,
aspiration, partial recovery, recurrence, death"

Colonic History

Mrs H. aet. 40 when first seen in Oct., 1890, was complaining of pain in the iliac region. She had suffered more or less continuously for 6 weeks previously, but it was not sufficiently bad to cause her to give up her usual domestic duties or to seek advice. She took aperients frequently but with no benefit. The pain was sharp, like a stitch, and was induced by coughing, sneezing, laughing, exertion, or by the effort of straining at stool. The bowels also became swollen, though this varied, being less when the bowels acted freely, and she was inclined to think she suffered from indigestion as her appetite failed and there was occasional nausea and sickness. She had on 3 previous occasions suffered from similar attacks, but they were slighter, and recovery took place without her seeking medical advice or adopting any special treatment. Menstruation normal; married but no children. No uterine trouble and no other history of gastric or intestinal disturbance except that she was rather constipated, and always had been so.

At no time was there diarrhoea, nor was blood ever noticed in the motions. She had always been temperate. Within the last two months she had lost a good deal of flesh, and perspired freely on slight exertion, and by night. Breath short but no cough. On examination patient was thin, face drawn, and anxious, no jaundice. Temp. $99^{\circ}F$ in the morning and a little higher in the evening. Tongue dry and red or with slight coating in the middle. There was slight dulness at the left apex, with diminished breathing, no cough & pain. Temp. remains normal, heart normal. Abdomen slightly tympanitic with rather prominent veins over the right iliac region, when also on palpation there was resistance with some degree of bogging ^{& pain} over the situation of the vermiform appendix. This being confirmed by percussion warranted the conclusion that the patient was suffering from perityphlitis, especially as the dulness persisted after the bowel had been carefully cleared by a small dose of castor oil, followed by a small enema of soap and water. In the absence of symptoms it was concluded that the mucous surface of the bowel was not affected at all or only to a slight degree, the lesion in the bowel leading

to the inflammation outside it, having healed or being only very small. The liver was apparently normal in size and function, no tenderness and no alteration in form. Urine free from albumen and sugar, normal urea, heavy deposit of urates. Spleen not enlarged. No oedema of legs and feet.

The treatment consisted of rest in bed, locally of hot applications, and by the mouth small doses of Opium with Opesia, with very careful dietary, only liquids being allowed. The bowels were regulated by simple enemata of soap & water with an occasional small dose of Castor oil by the mouth. She improved to such an extent that in about ten days her temperature was normal all day, her pain had almost gone, appetite was returning, and she was gaining in flesh. Fowler's Syrup of the Hypophosphites was ordered and she still further improved, on physical examination the swelling and hardness being much less. Fifteen days after taking to bed, and when she felt so well that she could with difficulty be persuaded to stay in bed she had a rigor, temp $102.6^{\circ}F$ followed by sickness with pain in the epigastrium. The pain persisted in spite of local treatment (formulation \bar{c} \bar{r} Opii, poultice,

blisters with morphia dressing) and sedatives of the
 mouth only gave temporary relief. At the end
 of a fortnight — during which time the temp:
 had been more or less above normal, never
 going above $102^{\circ}F$ in the evening, with
 repeated rigors — there could be detected
 a small rounded swelling accompanying and
 obliterating the margin of the left lobe
 of the liver, continuous with it, very tender
 on pressure, and evidently quite distinct from
 the swelling in the iliac region. Sickness was
 very troublesome and was best controlled by $2\frac{1}{2}$ gr.
 doses of Liq. Morph. hydrochloratis given a few
 minutes before food was taken, followed
 by a small piece of ice to suck after food.
 Bromide, Potas. Bromid. Citrate of Caffeine, & Iodid,
 and several other drops were tried without any
 benefit whatever, and the morphia was not
 always successful. Bellini's syrup was discontinued
 after the rigors, Quinine was tried and Annon. Chlor,
 but with no appreciable benefit.

The swelling became soft and fluctuant, and as per-
 mission could not be obtained to open the abscess
 freely & drain, the aspirator was used. About
 103 of rather thick pus were withdrawn, the
 canula being left in for 24 hours and
 then withdrawn after a further aspiration.

of 3 or 7 pus. The temperature fell, pain ceased, sickness stopped, and patient was much better, there being no evidence of re-accumulation of pus, and the perityphlitis seemed to be gradually resolving. At the end of a fortnight however all the old symptoms returned, and tho' the aspirator was used several times each time with relief to the symptoms, she became hectic, and died from exhaustion 6 weeks after being first seen, and 12 weeks from the first time she felt pain over the caecum, and about a month from the first onset of symptoms referrible to the liver abscess. Unfortunately no O.M. was allowed, but the history of the case seemed sufficiently clear to warrant the above interpretation of it.

Remarks

In this case the perityphlitis which was the cause of the abscess was practically well when the patient died, there being only slight physical signs of its existence, which proves that once the septic material is carried to an organ it can there propagate, independently of the source. A source of hepatic abscess, ulceration of the bowel is perhaps the commonest, and the caecum the next frequent seat. Very often however it is not until there has been perforation

with at the site of some ulcer, with local peritonitis, and it may be with healing of the aperture, that the liver becomes the seat of septic infection from the bowel, through the portal vein. The cause of the ulceration or irritation varies, in this case it was probably due to the pressure of some extraneous or accidental substance in the hardened faeces, which of itself might account for it, as the patient was always constipated, and the caecum is a favourite seat for the retention and accumulation of the hardened faeces. There was also a suspicion of a Tuberculous taint as evidenced by the condition of the left apex. Pins and foreign bodies of various kinds have been found in the appendix as primary causes of this abscess, the thrombus or embolus extending along the mesentery to the portal vein to its ramification in the liver. Ulceration of the caecum whether specific or Mercurial has been very constantly found in connection with L. Abscess, which leads to the much vexed question as to the relationship between dysentery and L. Abscess. This will be discussed later when dealing with the Pathology of Tropical Abscess. In this particular case there was no history or symptom of Dysentery.

Case IV

"Abscess of liver bursting into lung,
intestinal ulceration and diarrhoea, Recovery"

Clinical history

M. S. a clergyman, and an excessive drinker of whisky and smoker for many years was seen first on July 20th, 1893. Complaining of diarrhoea of 3 months duration, pain in bowels, haemorrhoids, swelling of feet, loss of sight and considerable loss of flesh. He had been gradually failing in health for over a year, taking only small quantities of liquid food, but drinking at least a bottle of Scotch whisky a day, and smoking over a pound of strong tobacco a week. Faculties were clear, speech not affected. He had been a healthy athletic man, a bachelor, with no specific history.

Face ruddy, but thin, areolae senilis well marked, conjunctivae yellow, skin dry, slight tremors of hands and legs with diminished power in both. Reflexes diminished or absent. Abdomen distended. Pulse 100 per minute, feeble, soft and intermittent. Temp: 99.6° f. Urine did not contain sugar or albumen, but urea diminished by about $\frac{1}{3}$. Quantity $2\frac{1}{2}$ pints in 24 hours. Eyes were examined carefully when there was found to be deep cupping of both

discs, the vessels seeming to dip over the edges
 & disappear from focus. Vessels enlarged tortuous,
 with some retinitis. Chorioid vessels engorged.
 Both eyes myopic with slight oblique as-
 tigmatism in the right eye from right
 to left. This was confirmed by Dr Critchen
 at a later period, and suitable glasses
 afforded some relief, vision in the first
 instance being very bad, not able to
 read the large size type of Snelling
 without a hand glass. Tongue clean,
 rather red, and moist. Heart dilated,
 enlarged to the left $\frac{1}{2}$ " beyond the nipple
 line, diffused & thumping impulse no
 thrill. Heart sounds feeble, rapid, inter-
 mittent, with V.S. mitral murmur, and
 a suspicion of a V.S. aortic. Large blood
 vessels apparently normal. Lung normal
 to auscultation and percussion in front, but
 behind, but behind the breath sounds
 diminished without dulness or adventitious
 sounds, at the right base. Abdomen distended
 superficial veins prominent, borborygmi, and
 peristalsis could be observed over the stomach
 and small intestine through the thin ab-
 dominal wall. There was slight dulness
 in the left hypogastric region with pain

on pressure, and to palpation a general feeling
 of doughiness was imparted to the hand,
 all over the abdomen, but more particularly
 over this dull area, and several smaller
 spots. The liver was uniformly enlarged
 in every direction, from the level of the
 Ruppel's line above to below the ribs,
 in the R. M. line measuring 8". There was
 no irregularity of the surface or border detected,
 but there was pain on pressure all over,
 Gall bladder slightly distended but not very
 painful on pressure, or at other times, &
 no history of gallstones. Feet oedematous,
 but rest in bed soon removed this.
 Piles external & internal, relaxed sphincter,
 and mucus, sometimes bloody discharge.
 Bowels were moved at least 6 times in the
 day, most often in the early morning,
 each motion being preceded by acute
 gripping pain and tenesmus. Motions
 pale, scanty, in small hard masses, sur-
 rounded by blood-stained mucus, and
 most offensive. Sometimes only mucus &
 mucus-pus passed. He was ordered to
 stay in bed entirely, ℞ Castor oil with
 ℞ Opii ʒij administered, and diet consisted
 of equal parts of milk & soda water,

very 2 hours, varied twice a day by a small
 quantity of leaf tea or mutton broth. Lime
 water was also taken with the milk at
 times. A mixture of Dr. Keen's, Bismuth,
 Dr. M'Pherson's: & chloroform was prescribed, and
 a 18^{gr} pill of Calomel night & morning.
 Locally Dr. Kammerer's was injected into the tumor
 night & morning. Stimulants and smoking
 were entirely discontinued. He improved
 under this treatment, diarrhoea became less
 frequent, 2 or 3 times in 24 hours, motions
 contained some bile, were less offensive,
 pain and tympanites much less. Temp.
 remained slightly above normal, sleep more
 restful, but there was no alteration in
 the tumor dulness, tho' perhaps there was
 less pain on pressure, except over the R.
 lobe behind. Iron & Quinine were now
 ordered. Pulse remained over 100 per min,
 but was regular and stronger, & it
 may be remarked that his pulse was
 naturally quick, it having been noted
 as over 100 when he was a Cad^{in healthy} of his
 family doctor. Bases of both lungs
 were now (March 14th) oedematous, slight
 cough with scanty mucous expectoration.
 On the following day (15th) he had a rigor,

temp 102° F. Pain was referred to right side over the liver behind, there was pain in the R shoulder, pain on breathing or coughing, & occasionally retching, the vomicae consisting of half digested milk and mucus. Temp: varied, but was always above normal, profuse cold perspirations at night, a short dry hacking cough developed and he suffered from extreme depression. Abscess of R lobe was diagnosed, and Dr. Hurley of Jersey who saw the case in consultation confirmed the opinion. On March 30th patient had a violent attack of dyspnoea, sudden pain in the right side with cough, and he expectorated about half a pint of evil smelling pus. This quantity was brought up in about an hour, and though the cough continued, there was only a small quantity of pus, not intimately mixed with the mucous-^{presence} sputum expectoration, caused by the irritation ~~set up~~ in the lung by this irritating pus. The pain in the liver diminished, and that organ began to shrink, and continued to do so, so that within 3 weeks it had gone back to nearly half its former size.

and measured just a little over 4" in the R.M. line. During this period, i.e. after the discharge of pus through the lung, the urea was increased and a small quantity of sugar was detected on several occasions. The diarrhoea at this date April 20th, was much better, once a day, more natural, but motions still surrounded by mucus unless an aperient had been used. Tympanitic less and the dull area to the left had nearly disappeared. Temp. normal. Pulse as low as 90, stronger & regular. The general health improved & with it the sight. He was now allowed to sit up for a short time each day.

May 30th. Patient much better, walks in garden. Bowels moved once a day, motions contain bile. Still takes aloe-stimulant, but has one pipe a day. Linn further contracted, measures $3\frac{1}{2}$ " in R.M. line, no tenderness over it. There is no pain in the bowels except from indiscretion in diet. He is allowed various kinds of milk food, soups, jellies, oysters, peptonised food, white fish, chicken, strawberries, & small quantities of green & white vegetables cooked. Km & Thychemin medicinally.

with Scott's Emulsion. Weight increasing, and he has been able to assist in a service in Church. May 1896. Improvement maintained, bowels about the same, Linn still contracted. Piles nearly disappeared, & sphincter stronger.

Remarks

This case was one of special interest. There was the history of gastro-intestinal catarrh and ulceration, with hemorrhoids in a hard drinker and smoker. These habits he acquired through living in a secluded country parish, as vicar, with no Society, a good income and no inclination for, or participation in, active exercise or sport. The eye troubles began a year before he was laid up with this sickness and apart from the optical defects, the state of the fundus might be ascribed to whisky and tobacco. The gastric and intestinal symptoms were very pronounced, borborrygmi almost constant, and the peristalsis of the stomach & bowels pointed to extreme irritation of these organs, partly due to the state of the mucous surfaces, but no doubt also to areas of peritonitis with adhesions. There was decided peritonitis in the left hypo-chondriac and left iliac regions, & in several

Smaller areas over the abdomen. The liver was enlarged at first in a state of congestion or it may be of hepatitis with some fatty degeneration (murchison) either due to some septic infection from the bowel (or products) or to the direct irritation caused by the absorption of alcohol through the portal vein. The gastro-intestinal symptoms were so outstanding, that attention was diverted from the liver, and it was only after the rigor, with pain in the posterior portion of the R lobe that abscess was suspected. Pain was increased by coughing and deep breath, of a throbbing rather than of a sharp sticking character, and the nature of the pain, with pain in the R shoulder led one to suspect a deep abscess in the posterior aspect of the R lobe. The cough was not characteristic tho' of a hacking character, as he had some oedema of both bases, with frothy mucous expectoration in addition to the more definite dull area at the base of R lung. The pus that was voided was of a greenish yellow color, very offensive, and gave the reaction for bile pigments, so that there

was no doubt as to the source of the pus. Sometimes bile is voided by the lungs in large quantities 900 grms in 2 days (Kais) and 400 ccs (Wolfe) and may persist for weeks (Heinemann). A case is reported by Dr. J. Adam, Hamilton in which large quantities of bile were coughed up the source of the bile being from ulceration of the common, or a large bile duct, according to Gall stones, and ulceration into the lung. This case of course might have been mistaken for Empyema but all the facts were against this idea. The pus contained bile, conclusion in itself, while the perforation and escape of an empyema

through bronchus

of septic origin is of rare occurrence (Minghella). Then the shrinking of the liver with decline of symptoms referable to it, all pointed to it as the seat of the pus. The liver must have assumed the cirrhotic form gradually after the escape of pus. Sugar appeared in the urine in small quantities during this discharge through the lungs, and from its transient nature, small quantity, and the presence of acute local changes, it was most likely due to some disturbance of the glycogenesis.

J. Adam, M.A., M.B., Chole-pulmonary Fistula. B.M.J. 12.4.90 p. 836.

function in the liver itself, rather than in
 the central nervous system. The increase
 of urea was at this time most likely
 due to the rapid absorption of waste
 material from the liver, with increased
 elimination by the kidneys. The blood
 or mucus in the motions were
 derived partly from the haemorrhoids,
 but also from the catarrhal and
 ulcerated surface of the bowel.
 The absence or deficiency of bile in the motions
 was due to defect or altered secretion
 of bile, leading to the very offensive
 odour of the motions through lack of the
 antiseptic action of the bile, and to
 the putrefaction changes in the bowel
 itself. The recovery to a state of com-
 parative health was very satisfactory,
 and bears out the assertion that per-
 foration through the lungs is the most
 favourable mode of termination without
 surgical interference. The local pneumonia
 & bronchitis due to the passage of
 the pus speedily subsided, and left
 no permanent bad effects. Figures as
 to the relative frequency of the different modes
 of perforation, and chances of recovery refer

invariably to tropical abscess, reference to which will be found on the remarks in Case vi. p. 52.

and though abscesses in the case of septicaemia are very much less frequent, yet the same general rules would apply to the septicaemic variety as to the tropical.

General Remarks on Abscess of the Liver of large size in temperate climates.

These four cases are examples of abscess of the Liver occurring in persons who had never been out of England. The disease is a comparatively rare one if we exclude the frequent small, multiple abscesses as part of a general pyaemia. It being unusual to find an abscess of any size in this country, or in temperate climates generally. No doubt they cannot be separated either pathologically or clinically from the multiple variety, yet from their size, number and general history they become more allied to some of the cases of tropical abscess, or to put it more correctly, abscess occurring in the tropics. Out of 2,463 autopsies recorded by Beuchling

Beuchling, 36 Fälle von Leber Abscess, Diss. Berlin 1868.

36 were cases of Liver Abscess or 1.5%.

It may be briefly stated that abscess of the liver in this Country, and in temperate zones generally is pyaemic in character, and secondary to some source of septic infection of which we have seen several examples in the cases quoted. It is still a disputed point as to what class cases of Liver Abscess associated with dysentery in temperate zones should belong; and our present state of knowledge does not warrant us in speaking dogmatically on the subject, but it may be tentatively asserted that it is more likely to belong to the tropical and specific than to the septic and general, and the two may be associated or co-existent.

In addition to the causes mentioned for pyaemic abscess the following briefly may be mentioned:—

Causes of Abscess I

Traumatic hepatitis the result of direct injury to the liver. only 11 cases recorded. and Borius' states that it may be caused by long continued pressure in one position on the liver

II. By extension of inflamed or ulcerated surfaces
 Borius, Gaz. des Hôp. 1866. 11. 49.

into parenchyma of liver from the bile ducts, of calculi, round worms, by suppuration of echinococcus cyst, or by perforation from the stomach to the liver.

III.

By the blood vessels, from any external septic wound, suppuration in or around bone, from suppuration of any internal organ especially if in connection with the portal vein. Next to infection from organs or tissues drained by the portal vein, the lungs afford a source of infection for the liver. If not directly in connection with the portal system the blood has to pass through the heart lungs, back to heart & thence to the system generally so that in this case the liver is less likely to be affected or at least not specially affected as when the liver has to filter the portal blood. A case recorded by Dr R. M. Buchanan¹ is interesting in this respect. A woman suffered from suppurating P. ovary after confinement, she developed liver abscess and died. P.M. it was found that the ovarian vein was blocked, and the collateral circulation carried on by the inf. hæmorrhoidal vein which joins the portal & thus accounted directly for the abscess in

¹ Glasgow Med Journal, Trans, Clinical & Pathological Society Glasgow, 1895.

the liver. If the varian vein had been patent, the blood would have gone into the inf: cava, and the liver would have been much less likely to be infected and then only be part of a systemic disease.

Abscess of the liver of course under this heading may occur as part of, or secondary to the general blood poisoning in the specific fevers, as Small Pox, Scarlet F, Diphtheria etc.

The active agents in the septic matter are bacteria and they are usually of the variety, Staphylococcus. The most virulent and the most common of these is

- Staphylococcus pyogenes aureus*, orange yellow color
- " " *albus*, pale or white. Uncommon.
- " " *cereus albus*.
- " " *flavus* } occasionally in pus.
- " " *citrinus* }

Streptococcus pyogenes (in chains).

The fact that these can and do circulate in the blood in cases of pyaemia has very materially altered the pathology in these and allied cases, as they need not of necessity be an embolus, or thrombus as the cocci get into the circulation and lodge and grow in any suitable

soil. The knowledge of these coeca, their mode of growth, conveyance to different organs after reaching the blood, and of their effects has simplified matters very much, and done away with many ingenious theories as to the manner in which the septic material is conveyed to the organs.

Tropical Abscess.

Case 5

Clinical history

" Tropical abscess of R. Lobe, operation, recovery"
 D.H., act 34 returned from India, Bengal Presidency in June 1889 (when he had been for 5 years) on account of Malarial fever, from which he suffered severely for 3 months before coming to England. He had 3 attacks of Dysentery, the last being the least severe in May 1888, and passed off without any complication, or sequelae. He was otherwise a fairly healthy man, tho' at the age of 25 he expectorated a small quantity of blood, which at the time was supposed to be due to some tubercular affection of the lung. There was no recurrence of it, nor any constitutional symptoms pointing to a progressive development of the disease.

He improved considerably on the voyage home, and for some time after his arrival, the fever was still present, the temp: being variable normal, and about May 3rd day there was exacerbation of the symptoms, with rigors in the afternoon followed by rise of temp: headache, general aching, slight nausea, thirst, sweating and fall of temperature to nearly normal

followed by great prostration. These attacks
 became less severe each time with longer
 intervals, and he could bear exposure to
 the air with less risk of bringing on an
 attack, appetite improved and he
 gained flesh. Urine normal, spleen
 considerably enlarged, skin sallow, con-
 junctivae tinged, no trace of pulmonary
 or cardiac affection. This improvement
 was maintained until the end of August
 when he had a pretty severe rigor,
 followed by fever, temp. $103^{\circ}F$, and
 tho' somewhat similar to former attacks
 of fever, yet the temp: did not fall
 to normal within the first 12 hours
 as on former occasions, but remained
 at about $100^{\circ}F$ near under, & in the
 evening usually reaching $102^{\circ}F$.
 He began to lose flesh again, appetite very
 poor, tongue coated at first, then raw,
 nausea, occasional slight rigors, pain on
 deep inspiration on the right side, also on
 pressure over the vertebral dorsal line at
 the level of the 9th rib. Pain in right
 shoulder and down R arm to a lesser
 degree. Tenderness of R rectus abdominis
 muscle evidently reflex. Continuing

to get worse and abscess being suspected, Dr. Paul Swan of Plymouth made an exploratory puncture over the seat of pain and found pus. Under an anaesthetic about an inch of the 19th rib in the dorsal vertical line was removed, and an incision about an inch deep reached a cavity about the size of fist from which about 12 oz of pus with thin debris was evacuated. After washing out the cavity well with weak carbolic solution, a drainage tube was inserted, dressing changed next day; & the tube gradually shortened then removed, and the wound was healed in a month. The interior of the cavity was fairly smooth, a scar well being in process of formation. The pus contained Staph. pyogenus aureus, but no amoebae were detected. After the operation temp: fell, pain ceased, tongue cleared, appetite returned & he made a complete recovery so that he has been actively engaged in private practice in this country since 6 months after the operation. Tills now, May, 1896, when he is still well, The spleen is still slightly

enlarged, and the bacteria only shows itself when he has any accidental sickness with temperature. The treatment adopted at first was rest in bed, and a full nutritious diet when the fever abated, with milk diet generally during the exacerbations of temperature, which were treated by 5 grs Irim: Sulph. the attacks being anticipated if possible, repeated every 3 hours while temp was above $100^{\circ}f$; attention to bowels on general principles. When Linn symptoms became pronounced, Ammon: Chlor in 20 grs doses every 4 hours was tried, but without effect; Irim: Sulph, and Pulv: Speac: about equally useless. Local applications in the form of fomentation, and poultices gave relief, and when pain and sleeplessness were excessive, an emema of starch and opium was administered with much relief.

Remarks

This case illustrates the good results from early exploratory puncture, with subsequent free evacuation of the pus, when found. There was no diarrhoea or dysentery occurring at the same time or immediately preceding it, the last

attack, 13 months before being of a mild type. The case was complicated by malaria, and this caused some doubt in the diagnosis at first there being some difficulty in distinguishing between the Malaria and the fever induced by the hepatitis. Deep throbbing pain in the liver, pain in the right shoulder, retraction of the R rectus abdominis, pain on pressure over a small liver area, and slight general enlargement of the organ all suggested the presence of an abscess apart from the temperature. The pus was of a reddish color, said by some observers (e.g. Weinman & Bidd) to be typical of pus from L. abscess, tho' no doubt it may get much altered by the time it reaches the surface. The reddish color is supposed to be due to altered blood with the formation of Haematin.

Case vi

"Abscess of Liver secondary to Dysentery, discharge through bowel, Recovery"

Clinical history General E. aet 50 (father of Lieut. E. of Chival fame) was invalided home from India (Madras Presidency) in 1892, on account of persistent diarrhoea with mucus and blood in the stools, loss of flesh

and Fever, with severe abdominal pains of a griping character, more or less constant, but worse immediately before or during the act of defaecation. He was certified medically as suffering from dysentery with fever. He had been abroad for over 20 years in various parts of India, in Burmah, & for a short time in China. During that time he had slight recurrent attacks of Fever, dysentery on several occasions, but never any serious illness. His last attack for which he was invalided home was the most serious illness in his life. He was a temperate man in every sense of the word, in eating, drinking, smoking, & exercise, and regular & methodical in his habits. Though he complained of some pain in the region of the liver before he left India abroad was not suspected. He became much worse on the voyage home, and with difficulty reached Hunter Abbot, the journey leaving him in a very exhausted state. On being first seen in June 1892 he was almost collapsed, pulses feeble, rapid, 120 per minute, face pale washed

cold perspiration on the face, breathing rapid
 temp 99° f. He was extremely emaciated.
 The diarrhea & tenesmus were not so pro-
 nounced at that time as he had been
 taking opiates to enable him to travel.
 Tongue red, dry & painful, conjunctiva
 slightly tinged yellow. Slight cough
 with frothy mucous expectoration, with
 rales & diminished breathing at both
 bases. No other pulmonary trouble. Heart
 sounds normal but feeble. Abdomen
 moderately distended, Liver enlarged
 measuring 7" in R M line, 5" in middle line
 in front, and 7½" in the dorsal vertical line
 behind. Great pain on pressure over
 the epigastrium when the outline of the
 liver is lower, rounded, and the
 anterior margin is felt to bulge with
 an elastic feeling on palpation, and
 a swelling can be seen in a correspond-
 ing situation. The border of the liver
 to the right & left of this is smooth
 and uniform. and not particularly
 tender. The abdomen is tympanitic to
 percussion, with slight impairment of
 the note in the R hypochondriac region.
 and to the left & downwards from

the umbilicus. Over the caecum which
 is distended the area is slightly tympanitic
 Spleen only slightly enlarged, & not
 tender. Urine loaded with urates,
 which colored, but without any
 albumen or sugar. There is great
 pain also just inside the rectum and
 this was found to be due to several
 ulcers just above the internal sphincter
 which may have accounted for
 the tenesmus & frequent calls to stool.
 Motion was scanty & consisted of
 partially digested food, which was
 bile stained, mucus, or mucus-pus, & blood.
 No microscopic examination was made.
 Two days after his arrival, he experienced
 great pain in the epigastrium, followed
 by straining, and about a pint of
 matter was evacuated per anum at
 one sitting. Pus continued to be passed
 in the motion for 15 days from this,
 gradually getting less, tho' the diarrhoea
 persisted. The temp: slowly fell
 until at the end of the 3rd week it
 was normal. Co-incident with the
 escape of pus from the bowel, the
 swelling disappeared from the

epigastrium, and did not return, tho' on
 several occasions when there had been
 less discharge of pus from the bowel
 there was a return of pain in that
 situation, relieved by the free escape
 of pus from the bowel. The liver
 dulness all over went back to nearly
 normal. The diarrhoea was treated with
 Bismuth and Rub. Specae: occasionally
 Rub. Specae Co. & locally by starch and
 opium enemata. Iain. Sulph. each
 morning at 6 o'clock in 5 gr doses. Later
 on small doses of Iain. Sulph. & Iron
 when the diarrhoea was better. At
 which time also, suppositories of Ungt.
 Hydragr: ox, rubr. grs iii with Cocain. Hydro-
 chlor gr $\frac{1}{2}$ in each were used. Night
 & morning the lower bowel was washed
 out by weak solution of Condy's fluid,
 as a ^{stringent} ~~stimulant~~ seemed indicated
 Hamemalis with ac. Boracii were injected
 into the bowel as a lotion, sometimes
 with Plum. Aest, and sometimes with
 opium as required. The Hamemalis
 seemed to be distinctly beneficial, the
 membranes becoming firmer, ulcers healing,
 and more tonicly in the sphincter.

the rectum generally. The utmost cleanliness was observed after each motion, cotton wool being used for wiping, followed by bathing with weak sanitas, and drying thoroughly.

The patient always used the bed pan in bed lying on his back, or on the floor latterly, and in this way any unnecessary straining was avoided. Threatened attacks of both external & internal piles were in this way prevented, an affection that could be very readily induced on account of the relaxed state of the mucous membrane. In 6 months time from the rupture of the abscess he was perfectly well, had gained flesh appetite good, no diarrhoea, or pain anywhere. Any indiscretion in diet however, would still bring on a diarrhoea which was remedied by a dose of castor oil, the motion containing undigested food, & the diarrhoea due to this fact. He followed the Iron & Strychnine Mixture by an acid tonic containing *Ac. Nitro-muriat. dil.* and once a week a dose of Ferrous was

given in the evening. A year later he was able to return to India quite well, and has remained so. He is now in this country and well.

Remarks. This case differs from the preceding in having a very decided antecedent history of Dysentery, with frequent diarrhoea, and this in the absence of any other cause might reasonably be assumed to be the cause of the abscess. From the history & clinical observation there must have been considerable ulceration of the large intestine in the caecum, and in the descending colon as far down as the pectum. The range of temp: was not seen in the earlier part of the case, but latterly it would have shown a somewhat variable range, not typical of either Dysentery, Malacia or abscess. The observation on temp: after his arrival are of no importance in the diagnosis. The case illustrates the not infavourable termination after perforation into the bowel, in the case of a single large abscess, a result to be expected more in the tropical abscess than in that of the pyæmic abscess of this & other temperate climates, where usually there

are more than one, mostly many. In the case of the hepatic abscess it is as if were a more localized affection, than part of a general affection, as in Pyæmia.

In the latter also, the organs, lungs especially, may be as sound as the liver. The remedy was complete, tho' the liability to diarrhoea from partially digested & irritating food showed that although stronger, and healed, the mucous membrane of the stomach and bowels had not been restored to their natural functions, a state that time will remedy up to a certain point, but after attacks of dysentery there seems to be a tendency to diarrhoea from indiscretions in diet and from chill. Possibly a certain amount of Malaria complicates these cases and Fever is induced which further favours the development of Colic symptoms under these circumstances.

Out of 170 cases of perforation collected by Miesfelder, 32 opened into the bowel and of 14 cases of perforation into the lungs observed by Rouis², 7 recovered.

¹ *Mémoires Encyclop. Méd.* Vol. IX, p. 138.

² Rouis. Recherches sur les suppurations endémiques de foie. Paris.

While referring to perforation, it may be well to enquire into some other mode of rupture, & their relative frequency. Perforation into the lung is absolutely and relatively the most frequent and most favourable as regards result. Rouis (loc cit) found that out of 30 patients in whom the abscess opened into the air passages, 15 recovered (Case IV. recovered by this mode of perforation), and De Castro¹ observed that out of 25 cases, 19 recovered; a very satisfactory result when we compare the effects of perforation in other cavities, organs, or externally.

Perforation occurs in about one half of the cases of hepatic abscess, & of 170 cases collected by Thierfelder (loc cit) perforation was into the bronchi in 74, 32 into intestinal tube, 20 into R. pleura, 23 into the abdominal cavity, 13 into the stomach, 4 into the pericardium, and one into the pelvis of the kidney. The number of cases & of recoveries by rupture into the bronchi, being thus shown to be greatest absolutely & relatively. The least favourable cases are those that burst into the abdominal cavity, or into the pericardium or vena cava.

¹ S. J. de Castro. Des abscesses des pueps chauds et leur traitement chirurgical. Paris. 1870

Diagnosis and Prognosis.

We now come to a consideration of other symptoms than what have been alluded to in the preceding cases, with reference to Diagnosis and Prognosis, and as bearing on this, of cases that simulate *Leish abscess*.

Diagnosis

There are some symptoms in common in the two varieties, but on the whole the clinical histories differ in many important respects. In order to compare them, the symptoms in the two classes will be discussed now, more or less in particular instances according as they have been remarked upon before.

Enlargement of the Liver is common in both. In pyæmic it is usually moderate, sometimes so much that the lower border reaches the umbilicus' (murchison). The enlargement is uniform, there is no bulging of the ribs, except in exceptional cases that have been of longer duration than usual, and when probably there has been coalescence and extension of several smaller ones. as was the case in ^{Case} I. II. & III. Sometimes there is nodulation along the margin from the presence of several small abscesses.

¹ Murchison. Disease of the Liver. subsept pyæmic abscess.

In tropical abscess in 90% of the cases the liver is enlarged'. (Waring) but as a rule unless the liver be fatty or congested the enlargement is not uniform at least when the abscess is distinct. The greatest weight recorded of Waring² was 8½ lbs, and as much as a gallon of pus has been removed from an abscess. Annandale³ reports one case in which 17 pints of pus were found. The outline is altered and this will correspond with the direction and situation of the abscess. The ribs may bulge with obliteration of the costal spaces. The bulging in tropical abscess is tense, round smooth, and not nodular except from the pressure of secondary abscesses. Fluctuation can be detected in this tumour, but not in the enlarged liver due to Oxyaemia, unless large, while the feeling of vibration that one experiences in palpating or tapping a hydatid cyst is absent. If the abscess be deep seated it may not give a feeling of fluctuation ~~even~~ even if of large size. There is usually in tropical abscess, after the disease has existed for some time, an area of inflammatory hardness round the abscess as if nature were attempting to limit it.

¹ Waring. Brit. & Foreign Med. Rev. 2/55, 1 p 1

² Loc. cit.

³ Annandale. Researches into the cause nature & treatment of the more prevalent diseases of India. London 1841.

Cases I, II & III are remarkable in as much as they assumed such large proportions. Pain and tenderness are always present in the Pyæmic form, due to the fact that the abscesses & abscesses are near the surface, with consequent local peritonitis. The pain is often increased by coughing etc, so respiration is short, quick and thoracic. In Tropical A. pain is often absent, when present it is dull or heavy, after throbbing, the latter condition pointing to deep seated suppuration in the lung substance. If the inflammation affects the surface pain is sharp on account of pleuritis, or by stretching of the capsule, & integuments. There is that pain may be absent or slight during the earlier progress of the case, but become severe as the abscess approaches the surface. There may be pain from an induced pleurisy and when the under surface of the diaphragm is involved there may be that dry, hacking cough independent of any pulmonary complication. All cases of cough and pain are not of this nature however, as very often there is some bronchial or inflammatory condition of lung which induces cough, and

the cough in its turn sets up pain in the inflamed and tender tissues. Pain in the right shoulder is not uncommon, it occurs in about half the cases. When present it points to abscess involving the convex surface of the R. Lobe. It is sympathetic in character, and may extend to the shoulder blade, neck or down the arm. Pressure on the lobe will increase it, and it varies in character and intensity with the individual attacks. It was a marked symptom in Case V. before there were any other signs of suppuration. I have observed it very often in cases of hepatic congestion of which there are many in this relaxing part of the County (D. Swam), more often referred to the R. shoulder blade than to the shoulder itself. The explanation of this pain as given by Zusekha¹ is most likely correct. It is that the filaments of the phrenic nerve which go to supply the pericardium and respiratory ligament, and especially the peritoneal covering of the diaphragm, when implicated, transmit this abnormal irritation through the central organs to the filaments of the 4th cervical nerves that run across the shoulder, and from which the phrenic nerve

¹ Zusekha, Der Nervus phrenicus des Menschen, Jüb., 1853, und die Anatomie des Menschen Jüb., 1863, Bd I. abth. 2, S 221.

principally arises. Pain in the limbs may feel like a bar laid across the chest, or it may be only induced by special movements as by horse exercise (distach).

In Opaemia A. there is very rarely interference with the portal circulation consequently ascites and enlargement of the abdominal veins are rare, unless a large branch of vein be implicated. The same applies to Tropical H. and this occurrence are accidental tho' there may be fluid in the peritoneum from peritonitis.

Jaunder has been referred to at p. 18.

Constitutional symptoms in these cases afford a very important aid in diagnosis and prognosis. In Opaemia A. mainly fever, at first hectic, then Dysphoid. Rigors are of great aid, but they may be absent or occur at first so regularly, as to make one suspect ague. Still rigors are not produced by ague alone as the passage of a gall stone may produce both pyrexia and rigors. Temperature is variable, sometimes reaches $106^{\circ}F$, sometimes normal, but soon after a rigor it reaches $103^{\circ}F$, and after this falls to about $100^{\circ}F$ or $101^{\circ}F$ with further fall

towards the termination of the case, fatal or otherwise. As indicated in the cases recorded. Profuse perspiration are common during sleep mostly. Patient becomes emaciated, exhausted, with at times vomiting and diarrhoea, then typhoid symptoms if terminating fatally without rupture.

In Suppurative Abscess after suppuration has begun, the most important constitutional symptoms are, progressive emaciation, and fever of a hectic type. Pulse little increased at first. There is mostly elevation of temperature at some period of the day of several degrees, most commonly in the evening. Rigors and night sweats this present are not so common, as in Pyaemic A. Loss of appetite variable, tongue red and dry in the advanced stages. Obstinate vomiting may be present and in fact may be the outstanding symptom to the obscuration of the symptoms of abscess. as recorded by Maclean¹ & Jaynes². When vomiting is obstinate abscess ought always to be suspected in tropical climates. Diarrhoea & dysentery may occur in some cases, but whether as a result or Merism of the abscess can hardly be decided.

¹ Dr W. G. Maclean, } B.M.J. 1874, p 138, Vol II.
² Sir Joseph Jaynes }

The urine is loaded with urates, contains much pigment, even much increased. But if there be much disturbance of hepatic tissue it may be diminished. Temporary albuminuria not uncommon. Some cases are very obscure or latent and then may be only debility with paroxysms of fever, or the fever may be missed, believed to be malarious, but failing to yield to large doses of Quinine. Abscess with absence of pyrexia has been recorded by Murchison. In Pyæmic Abscess the course is rapid, at most 5 months (Lendet²) though cases I & IV. would point to a modification of this statement. In Tropical A., this it may burst or terminate fatally in 5 weeks, yet the course is less rapid than in the former. It may extend over 2, 3 or 6 months, or may be quiescent for years and then break down and enlarge. The circumstances under which these cases of Pyæmic Abscess occur, ought to suggest it. Likewise we may be assisted in the diagnosis by the consideration that Tropical Abscess occurs more frequently in certain parts of the tropics, in India & China particularly, and that it is

¹ Lendet. Clin. med. Paris 1874. p. 33.

extremely rare in temperate climates. In the W. India it is comparatively rare, probably due to the temperate sea breezes. (Macleam). It is perhaps more prevalent near the sea board, with a hot moist atmosphere, than the converse. For a fuller reference as to distribution, symptoms etc consult the works of observers as at the foot note. Children suffer less frequently than women & women than men, mostly between the ages of 20 & 25 in persons of indolent and intemperate habits. A case is recorded by Dr Norman Moore in which a child at 3 1/2 years suffered from abscess of the Linn following English dysentery, and Eastman cites a case of abscess in a girl 3 1/2 on the gold cold with recovery. Of 300 cases investigated by Waring, 67.5% were intemperate, & 32.5% sober, of the fatal cases 45.714% were robust & temperate, 35.714% slender & sickly. 23% of fatal cases occurred in people less than a year in India. (Waring)

- 1 De Castro. loc cit.
- 2 Ravis. loc cit.
- 3 Parkes. Remarks on Dysentery & the fevers in India. London. 1846.
- 4 Leedes. Clin. Illustrations of the diseases of India. London 1846.
- 5 Waring. loc cit.
- 6 Macleam. various.
- 7 Fajres, various, & in Davidson's diseases of warm climates. article, Linn Abscess.
- 8 Annals. loc cit.
- 9 Macleam. Clinical Research on diseases of the Linn in India. London 1856.
- 10 Budd, (Diseases of the Linn). Macleam, Mierfeldt, Fajres, and others may be consulted with regard to symptoms, & Pathology more particularly. & very full reference in the Surgeon General's Catalogue, United States.
- 11 Trans. Path. Soc. vol 32 p 132. 1851.

There are certain diseases which may be confounded with tropical abscess, and as they may afford some difficulty in the diagnosis they will be considered here. They are chiefly, hydatid tumour of the liver, inflammatory enlargement of the gall bladder, pyemic abscess, abscess of abdominal parietes, medullary cancer, cystic kidney, peri-hepatic abscess, and Pleurisy or Empyema.

In the hydatid tumour there may be projection, fluctuation, but with vibration, while in the Py. abscess there is pain, a more rapid growth, constitutional symptoms, and the circumstances under which it occurs have also to be taken into account. Still a hydatid may suppurate, but the treatment would be the same, after the nature of the tumour had been determined by an exploratory puncture.

The gall bladder if inflamed may be mistaken for liver abscess, but the previous history, the shape, situation, & perhaps the association of jaundice would help in the diagnosis, in addition to which a large abscess in connection with the liver in a person who has never been out of

This country is in most cases, a suppurating hydatid or gall bladder. The doughy feeling is wanting.

There may be a difficulty in distinguishing from Pyæmia A, through the constitutional symptoms being the same, but we must then depend on the form of enlargement, circumstances of occurrence, the great tendency of Pyæmia A to jaundice, and the symptoms of blood poisoning.

An abscess of the abdominal parietes it has been suggested by Sachs that if there be doubt as to whether abscess is in the parietes, or in the liver, a small insect pin should be inserted till the point is free in the cavity, when if it is an hepatic abscess, the free end will move in the opposite direction to the diaphragm, remaining on the other hand motionless during respiration, when inserted into an abscess of the abdominal wall.

Medullary cancer may have nodules so soft as to be suspicious of pus, but the duration, and the whole history of the case should clear up any doubt as to its nature.

A case of Septic kidney under my care, which finally suppurated and for which nephrotomy

was performed with final recovery, has
 had a curious history, and been mistaken
 for abscess of the Liver among other things.
 The patient, a lady, aet. 52 had been in
 India for many years, had Fever & Dysentery
 at various times, but never severely. She
 had 8 children, labours normal, no uterine
 troubles at any time. Bowels always regular
 and so far as she knew, there was no
 affection of the urinary system. She
 complained of pain & swelling in the right
 hypochondriac & partly in the R iliac region.
 On consulting an army doctor (in India)
 she was told (1885) she had undoubted
 Cancer of the liver, and that she had not
 long to live. Another doctor in Consultation
 thought it was hydatid of the liver but
 would not say it was not abscess.
 Sir Joseph Fayrer thought it was hydatid of
 the liver or kidney, and another doctor
 whom she saw in India considered it to
 be dilated full bladder. Dr Swanwick of
 Plymouth thought it was hydatid of the
 kidney. She was under my care for
 some time, and careful observation of
 the tumour and the urine, showed that
 this varied from time to time, the tumour

- 1 less rounded,
- 2 smaller,
- 3 spleen,
- 4 less prominent
- 7 with clear area of percussion between lines & kidney.

in shape ~~but~~ size², and consistence³, & consequently position⁴, while the urine at these times was increased and contained a small quantity of albumen and pus with some tube casts, mostly granular, with diminished quantity of urea. With the clearing of the urine, and return to normal quality & quantity the tumour would increase in size till the clear space which existed between it and the lines disappeared, and the impression would be again got that the tumour was continuous with the under surface of the lines. No hooklets were ever found in the urinary deposit.

In August 1895 after a relapse the swelling increased to an extreme degree, dulness extending from the lower border of lines to the ^R iliac fossa and to near the middle line in front, with complete dulness over the lumbar region. Temp rose to 104° F and there was great pain over the tumour. Nephrotomy was performed by lumbar incision and 3 pints of offensive, thin, purulent fluid were discharged. This came from the R kidney which was not much more than a greatly distended sac, the kidney tissue having to a great extent disappeared, only a few bands of renal tissue being found radiating from

the calyx. The ureter in the upper part was much dilated but no stone could be detected. A sound could not be passed into the bladder, the lower segment of the ureter being either stenosed or occluded. The patient is now well and the wound healed.

Perihepatic abscess might easily be mistaken for L. abscess. A case observed } me was exceedingly obscure at the onset.

Pain was complained of at the lower margin of the ribs on the right side, in the R.M. line. The liver was not enlarged, nor the gall-bladder. No pulmonary symptoms, no lymphadenitis or diarrhoea. Temperature rose after a rigor, and remained high, of an intermittent type, not usually under $103^{\circ}F$ in the evening for at least a month.

In the meantime on account of some dulness and diminished breath sounds I inserted a fine trocar and canula into the base of the R. pleural cavity, but got no pus, and into the R. lobe of liver posteriorly with a like result, only a few drops of pus escaping. A fortnight after the rigor he complained of pain shooting from this particular painful spot, and there

in June 1893

was some tympanitis. By the end of a month
 there was extension downwards of dulness con-
 tinuous with the liver, very painful, but
 not fluctuant, rather doughy. A week
 later he was put under Chloroform, an
 incision was made into this dull area, and
 about $1\frac{1}{2}$ pints of creamy pus removed
 from an abscess which was sub-hepatic
 and localized by adhesions. The under surface
 of the liver could be felt to be uniform
 and healthy except for exudation from
 the abscess. Neither the gall bladder nor
 ducts could be felt to contain a stone.
 There was some wasting of the bowel. The
 abscess could not be found to lead to
 bone, in fact no very apparent cause
 could be found for it. It must have
 originated as a deep sub-hepatic or
 sub-diaphragmatic abscess and found its
 way to the surface. Urine normal throughout.
 The wound healed rapidly and the patient
 was comparatively well till 3 months ago
 when he consulted me about pain in
 the right groin which had been gradually
 increasing for a month. I found a
 painful, elastic swelling in the groin
 above Poupart's ligament, midway between

the anterior, sup: spine and the crest of pubis. There was no impetus on coughing, & no bowel trouble or sickness. Temp 100° F, fell to normal in a week. Rest in bed, dieting etc, effected a great improvement so that in 10 days the swelling could not be felt and it has not returned. There was no evidence of spinal caries or of any source of purulent infection in the abdomen (except slightly altered percussion over the seat of the old abscess) or out of it. The duration of the symptoms, the severe pain for so long a time before the swelling appeared, and the absence of any source of infection pointed against its being Abscess in the Liver.

A Pleurisy or Empyema, may lead to difficulty in diagnosis at the right base. Exudation into the pleura is not uncommon in cases of abscess involving the convex surface of the liver and pleurisy or Empyema might lead us to think that this was the disease of itself, and not secondary to the primary abscess. Only a careful study of the facts of the case, and careful clinical observation can in some of these cases enable

one to arrive at a correct diagnosis, which after all, is reached more by a process of elimination than by the actual interpretation of the active symptoms.

Diagnosis

Diagnosis has been partly alluded to in several details, in discussing the modes of rupture, termination etc, and in the histories of the cases, and ^{there} need not be further referred to.

We must always regard suppurative hepatitis as an extremely dangerous disease, which is rendered still more so by complications such as dysentery, remittent fever, or affection of the organs which accelerate exhaustion. It is more unfavorable when of pyaemic origin, and tho' there are no definite statistics as to mortality in this or other temperate climates, yet it is high, mainly due to the fact that the abscess is only a local manifestation of a general poisoning of the system.

Death results in most cases from perforation into some vital cavity or organ, or by exhaustion with typhoid symptoms. The cure of an abscess of any size that has not burst is so rare as not to be worth considering. It is of great importance

in prognosis that after the rupture & evacuation of the contents of an abscess the symptoms abate, and disappear, no matter no matter what the channel, for persistence of symptoms means either that the abscess is re-accumulating, or another forming, or that the abscess has been too long standing to become cicatrized and an exhausting discharge continues. Evacuation of the pus gives the patient a better chance of recovery than leaving it to nature. The existence of any complication would materially affect this opinion in any particular case. "It is wise not to give an absolutely favorable opinion prognosis even after the healing of the external wound" (Dutchenau)

III & IV.

Pathology, and Etiology.

In considering the Pathology it will be advisable to describe generally the condition of the Abscess in the two forms, macro- & microscopically, while from the very intimate relationship between Splenic and Hepatic Abscess^{*}, these two affections will be discussed as far as they bear on each other with some reference to micro-organisms found in the canal and in the abscess cavity.

* Splenic

The pyaemic abscesses result from septic absorption, are small, multiple and more or less wedge-shaped (woodhead). They may become large by coalescence, but usually there is no basis for the formation of them. (can. i. ii. iii.) They are often limited to certain branches of the portal vein and are found especially near the surface of the organ. The pus is usually of a dirty color, yellow or ash-colored smelling, and is made up of pus corpuscles, perhaps a few red blood corpuscles, and shreds of fibrous hepatic tissue in various stages of disintegration. The walls are sloughy and ragged, infiltrated with serum & pus, & outside this there is a highly injected and vascular area. With staining thrombi can be seen in the vessels, in this zone, and in the neighbourhood of the clot the hepatic cells are granular, or broken up. The nuclei are lost, and the portal spaces exhibit changes such as one sees in the course of acute fever. Micrococci will be found in the clot, pus, & even in the tissues, in the form principally of granular masses. The micrococci have been alluded to at p. 39.

The Tropical abscess is usually single and large, or there may be two or three. They are usually seated in the R lobe, in the proportion of 67.3% R lobe to 16% in left, and 35% in both (waring). The walls are ragged and shreds of liver tissue are found hanging into the cavity. There may be no trace of a membrane or of condensation of the surrounding tissues, pointing to a necrosis rather than to suppuration of the tissues. Marston however affirms that the walls of the cavity have a dense, fibrous tough wall with pure pus, as distinguished from the metastatic which contains liver debris in addition. This however is not generally accepted. There may be an attempt at the formation of a membrane in old standing cavities if quiescent, or if there be a tendency to absorption, it being an attempt of nature to cure & limit the disease, but nothing like a definite sac is found in the tropical abscess, not even exudation, unless there be some septile organisms as a complication. The contents are of a creamy pus-like material, tinged with blood, of a sickly odour, but not putrid.

The fluid consists of pus corpuscles (or not) debris of living cells, shreds of connective tissue, and red blood corpuscles. Round the abscess there is no sign of inflammation. It appears as if the abscess is completely broken down round one focus, with little hyperaemia or inflammation round about. At an early stage there may be no pus cells in the fluid at all.

In some cases of small abscess the pus may become encapsulated in a sac of fibrous tissue which limits the pus, and in this state it may remain for a long time, the capsule becoming almost cartilaginous and the pus inspissated.

Dysentery always has been, and is now a much vexed question among observers as to its causal relationship to hepatic abscess. Some such as Annesley (loc cit) maintain that the dysentery is secondary to the hepatitis; Budd (loc cit) maintain that the abscess is secondary to some stomach & bowel (portal) lesion; Albercombis¹ thought they were co-existent but independent of each other, agreed to by Murchein, Maclean &c. Fayer (Disease of warm climates, Dunder, 1843) is of opinion

¹ Albercombis, Pathologie & Practische Researchen in Disease of the Stomach & Intestines London 1823. See 10th 2d Busch. 1833.

that the abscesses are of two kinds ① large & single, or at most two and independent of dysentery, tho' it may be complicated by it or by malaria, and this variety he considers to be caused by errors in dietary, heat, and other climatic causes. ② Abscess associated with dysentery, secondary to it, multiple, and septic like ordinary pyaemic abscess.

Bristowe¹ was of opinion that dysentery and Abscess were different manifestations of the same disease or morbid influence which in one case may give rise to hepatitis, in another to dysentery, and in a third to both.

Murchison² agrees with this in part, and thinks that dysentery in hepatitis is often due to mercurials and purgatives.

Parkes³ considers the Liver predisposed, as he thinks it is more or less affected in function in all cases of dysentery, and he regards the association of the two diseases as related in some way to a sympathy in the function of the liver, and of the glandular structure of the colon. Murchison practically agrees with Jaynes, tho' he does not quite admit that they may be the double effect of a common

¹ Bristowe. Path. Trans. p. 241. Vol. IX.

² Murchison. Clin. Research Diseases of India. 1856. Vol. II p. 11.

³ Parkes. Dysentery & Hepatitis in India 1846. p. 58.

cause, and he quotes 2 cases' of thin abscess following simple ulcer of the stomach without any bowel lesion, and he thinks that this is an argument against the idea that tropical abscess is always due to dysenteric ulcerations of the bowel.

That dysentery is very often and closely associated with \perp abscess no one can deny, tho' the proportion in which they occur as cause and effect or otherwise varies with the district, the particular season, and with the prevailing attention to hygiene and sanitation, & habits. Moore found that only 23% cases ^{of dysentery} were associated with ^{abscess} dysentery, and he naturally asks how is it that 77% cases of dysentery were not followed by abscess if they stand in the relation of cause and effect. Waring found dysentery & \perp abscess in 72% of fatal cases.

Dr. Moxon² was of opinion that a lesion of the bowel did or had existed at the time or another, but that as intestinal ulcers heal quickly they might be overlooked. He considers that if the

P.M. examination of the bowel is made

¹ Murchison, Trans. Path. Soc. Vol. ~~XXIII~~^{XXIV}, 1866, p. 145

² Moxon, Trans. Path. Soc. Vol. ~~XXIV~~^{XXV}, 1875, p. 116.

carefully enough, a lesion will be found in every case of tropical abscess, and he would thus classify them with the pyaemic, attributing the larger size of the tropical to the longer course of the disease, as the abscesses at first being multiple would have time to coalesce. Dr Neil MacLeod¹ cites a case in which during life there were no intestinal symptoms, yet at death there was extensive ulceration of the caecum. In another there was well marked dysentery, followed later on by abscess after the dysenteric symptoms had disappeared, and at the O.M. only faint cicatrices could be found in the caecum, showing how easily they might have been overlooked. Judging from these and other cases he is strongly of opinion that tropical abscess is invariably the result of dysenteric ulceration. Even in cases where there has been no evidence of intestinal or gastric ulceration there may be other possible sources of infection as in the case reported of R. King, M.B.² where there was suppuration in a bronchus

¹ Dr Neil MacLeod. B.M.J. March 31/94 p 678.

² R King, M.B. Trans. Path. Soc. 1874, vol XXV. p 1106

with emphysema. This ~~unusual~~ haemum I think
 have to be classed with the ordinary pyaemic
 variety.

Dysentery in temperate climates is very rarely
 met with or associated with or accompanied
 by Abscess. Over a period of 30 years, at Millbank
 Prison where dysentery was very prevalent,
 not one case of Abscess is reported by Dr. Bayley.
 Case I might fairly be considered one of
 English dysentery followed by abscess and
 Dr. Dickinson¹ records a case of single large
 abscess following English dysentery, in a
 man who had never been out of England.

Dr. Moore² also records a case of abscess in
 a child, following English dysentery and
 comments on the rarity of the affection.

Out of 878 cases of acute diarrhoea recorded
 in the Report, Med. & Surg. of the War of the
 Rebellion, med. col. part II. only one case is
 reported to have shown signs of
 liver abscess, a large one in the R lobe,
 & a smaller in the left, while out of
 118 cases of Diphtheritic dysentery there
 were 7 abscesses, 3 single & 4 multiple.

These facts show that though dysentery

1. Dickinson. Trans. Path. Soc. Vol XXXII, p. 127. 1851.

2. Moore. Trans. Path. Soc. Vol XXXII. p. 132. 1851.

may be and probably is a cause of
 abscess, yet it does not stand towards
 it in the relation of cause & effect in
 all cases, the proportion of cases
 followed by abscess depending on the
 country, age and kind of attack, and
 the state of the individual as regards
 predisposition. These cases have been
 quoted at some length as showing
 the diversity of opinions shared by
 such able and careful observers,
 but probably as our knowledge of
 the pathology becomes more exact, it
 will be possible to reconcile these various
 views.

Cases have been observed in which the
 dysentery seemed to follow the abscess
 instead of preceding it, but whether
 caused by the Linn condition is a moot
 point. That there is a very intimate
 connection between the function of the
 liver and colon cannot be denied and
 has been already commented on by
 Parkes p. 74. Arnott¹ thinks that
 altered bile, but more especially obstructed
 circulation in the bowel has to do with

¹ Arnott. Trans. Med. & Phys. Soc. Bombay. Notes on Dysentery
 1873.

the production of dysentery, and Dr J. Finlayson's has recorded a most interesting case of Liver abscess following simple gastric ulcer, without intestinal lesion, death resulting from haemorrhage from the bowel by oozing. The colon was intensely injected, but showed no breach of surface. He contrasts the condition with that met in Cirrhosis of the Liver, and finds that there is this point in common, a tendency to congestion of the lower bowel, sometimes haematemesis and ascites.

"The congested state of the bowel would predispose to ulceration, from causes which would otherwise be inert, and as hepatic abscess occurs in countries where dysentery is extremely rife, it may be safely inferred that any slight proclivity in that direction may determine the occurrence of the complication." In cases such as this it would happen that dysentery was secondary to the liver symptoms, the dysentery only occurring as a complication.

That dysentery is not the sole cause of L. Abscess may be readily admitted, and conversely the liver condition cannot

¹ Dr Finlayson, Glasgow Med. Journal. 1873. July.

the influence for
the production of

be regarded as causing all the bowel symptoms, yet in a few cases it may predispose to emigration, to emigration with diarrhoea, and even to congestion of a large portion of the colon with ulceration, especially in districts where dysentery is prevalent.

There remain those cases in which dysentery cannot be assigned as a cause. Of these, two varieties may be mentioned ① the large single Idiopathic abscess of Fagor, without any intestinal symptoms or ulceration whatever, or if present, only as a complication, and ② the smaller multiple abscess whether secondary to dysentery or of septice origin. For all cases of dysentery are not followed by the same symptoms, nor by the same pathological distribution or results.

There can be no reasonable doubt but that the active agents in producing both dysentery & L. Abscess are micro-organisms, which gain access to the system by various channels, mouth, lungs, abraded surface etc, and produce local and remote effects.

Amoeba dysenteriae within the last few years very important

observations have been made principally by Councilman and Lafleur in America, and by Kartulis in Alexandria (Egypt) on the Bacteriological relation between dysentery and *L. Abscess*. They have found a protozoon, an amoeba, the amoeba dysenteriae (Lafleur) invariably associated with a certain form of dysentery, tropical dysentery, and in many of these cases, 50%, there is *L. Abscess*, in the pus of which these were found amoebae identical with those in the intestine, but no pyogenic organisms.

The Amoeba coli has long been known to be present in the faeces, but Loech of St Petersburg in 1875 was the first to connect it with dysentery, when he described a case of that disease in which they were present. Many observations have since been made, by Councilman and Lafleur¹, and Oster² in America, by Kartulis³ in Egypt, by Hekis in India, and Manson and Maefadyen in this country.

Kartulis reported 500 cases of "Tropical Dysentery" in every one of which he found the Amoeba.

1. Councilman & Lafleur, John Hopkins Hosp Rept. Vol II, nos. 7, 8, 9.
2. Oster, do Bulletin, 1890.
3. Kartulis, Virchow's Archives, Bd 118, 1889.

dysenteriae, & in 50% of these cases there
 was liver abscess as well, which contained
 in the pus the ameba, identical with
 those in the bowel. That the abscess
 does not occur in all the cases may
 be due to milder degrees of the dysentery
 or to a less congenial soil in perhaps
 healthier patients. In a few cases he
 found Staphylococci in the pus, but
 these were probably accidental and
 carried to the liver by the amebae,
 while in the "Idiopathic" liver abscess
 the amebae were absent, & only pyogenic
 organisms present. Oster describes two
 cases of dysentery, with liver abscess in
 the pus of which were amoeboid bodies,
 12 times larger than white blood corpuscles,
 possessing movement, and these were
 found also in the faeces even after
 the dysentery had ceased.

Manson describes a case of Liver
 abscess in the pus of which Dr Galloway
 found amoeboid bodies, identical with
 those described by Carmichael & Loefler.
 Patient had been abroad (India, Arabia, &
 Zanzibar) but there was no history of
 dysentery. Patient died shortly after the

operation, but unfortunately no P.M. was allowed.
The amoebae were found and seen to be
freely moving on the hot stage, 4 hours
after removal from the body. Dr. Manson
is of opinion that the immediate cause
of tropical Liver Abscess is the same in every
case. He thinks it strange that this
form of disease with a geographical
distribution so limited, should be
brought about by a variety of causes,
each of which must concur in producing
a similar limited geographical dis-
tribution. As to why the parasite is
not found in all cases of L. Abscess,
it is possible that the amoeba may be
really polymorphic, and that, like
the microorganisms of Malaria, they are
do not see them owing to not recognizing
their different phases, though they
are really present all the time, at one
time or another.

Severn and Nettles state that the pus from
tropical abscess is sterile, and secondary
to dysentery, and a case that proved
this very distinctly was reported
by M. Pezot in which while operating

on liver abscess, after opening it, the opening into the abscess disappeared from the field of operation and pus escaped into the peritoneal cavity, without bad results.

Calmeth found pus from Lillesien in culture sterile in 7 cases, and in these the pyogenic organisms must have been absent. Calmeth has not been able to find the amoebae actually present, yet one is inclined to think they must exist, otherwise on what grounds can one suppose that the abscess is present at all. He endeavours to explain this by the theory that the abscess is caused by a toxin probably produced in the colon, and which has a selective action for the liver tissues. This would not explain those cases in which there is no dysentery or history of it, and of those others in which the abscess apparently produces the dysentery.

Baumgarten in criticising Kartulis observations remarks "we regard it as unlikely that the amoebae could cause all the conditions of the dysenteric processes. We have no analogy

1. Calmeth, Archives Medicals, Navales et Coloniales 1893

to show that amoeboid parasites can induce ulceration, & we rather believe that the pyogenic organisms, well known as exciters of ulceration processes are concerned with the amoebae in the causation of the "typical dysentery". This may be readily admitted ^{in the bowel lesion} I think, as one could hardly imagine any ulcerative process going on in such a septic situation as the bowel, without being influenced to a very considerable extent by the pyogenic organisms to be found there.

Dr Alava a Russian observer, injected fresh stools containing amoebae into the bowels of dogs. He produced dysentery in two with multiplication of the amoebae, also in 4 rabbits out of 6, but no effects were produced on rabbits, fowls or Guinea pigs.

Massimini found amoeboid parasites in 5 cases ① Chronic dysentery, ② Chronic Intest. Catarrh ③ Dysentery with lat. diarrhoea ④ & ⑤ Diarrhoea with fluid mucoid motions. He supposes they gain access to the bowel through water, but from the variety of diseases in which they occur, and from

them being present in presumably normal motions unassociated with dysentery he is inclined not to attach much importance to them, Sossino, Cunningham and Grassi agreeing with him.

Having thus given the views of various observers for and against, as recently as current literature on the subject would permit, it may be as well now to briefly describe the observations of Carmeliman and Lefleur on the *Amoeba dysenteriae* with some of their conclusions based on them.

It may be first of all stated that the *Amoeba coli* has an extensive distribution having been found in dysentery ulcers in Russia, Austria, Egypt, India, Central America and the United States. The observations are based on 14 cases of hopeless dysentery in all of which there was *A. abscis*.

They consider that there is a specific dysentery differing in clinical and pathological detail from other forms of the disease. Amoebas, but no pus cells are found in the pus of the ulcers.

Description of
Amoebae.

The amoebae when at rest are round or slightly oblong bodies 0.016 to 0.024 mm in diameter, consisting of an outer pale, homogeneous substance enclosing a somewhat greenish, highly refractive mass, which contains vacuoles of various sizes and a nucleus. Movement is distinctive and consists of first a progressive motion, and secondly, of a protrusion and withdrawal of pseudo-podia, both of which vary in activity. The pseudo-podia are formed from the outer homogeneous part which however may be invisible both in the resting and the moving stage. The amoebae often contain foreign bodies as red blood corpuscles, pus cells, blood pigment, micrococci, bacilli and their spores etc. They probably enter with the food and pass on till the large intestine is reached where the necessary alkalinity is reached ^{suitable} for their growth. Here they penetrate and undermine the mucous membrane producing their effects by liquefying ~~the~~ tissues, thus causing ulceration and necrosis. In the mucous membrane they are found chiefly in the submucosa

in the lymph spaces and blood vessels, and in the gelatinous contents of the ulcers. They may penetrate to the liver either by the portal vessels or through the peritoneum (causing peritonitis) which in the former case may be multiple, in the latter they (abscess) lie close to the surface of the right lobe, the commonest situation. The liver shows no signs of inflammatory reaction, and the abscess cavity is filled not with pus but with debris of liver tissue & sometimes a necrotic mass. The contents however may be old pus, in which case the suppuration is due to the action of microorganisms conveyed by the amoebae (Kartulis). The liver abscess may extend directly to involve the lung, (a case is reported by Lapleur in which the base of R lung was involved and in which amoebae were found in the sputum) or the amoebae may traverse the diaphragm and set an abscess by liquefying the tissues, but here the cavity is surrounded by an area of interstitial inflammation. That the amoebae do not travel by the lymphatics is shown

by their absence from the mesenteric glands, and they have no special preference for the lymphoid follicles.

Auto-mortem, the amoebae may be found in the stools, particularly the gelatinous particles, in the pus from liver abscess, and in the sputum in the case of lung abscess.

In the idiopathic abscess these amoebae have not been found. A case of idiopathic L. Abscess is reported by Dr Macfarlane in which no amoebae were found in the liver pus, only the *Staph: pyog: aureus*. There was no history of dysentery in the case, so that probably the bacteria did not find their way through the portal vein. They may have gained access to the liver through the bile channels, helped perhaps by the a diseased condition of the bile duct. This case of abscess then was due to pyogenic micrococci and not to amoebae, at least they were not found. The second variety of Lagen small, or multiple with dysentery or not, are simply septic abscess due to portal infection, and in no way differs from ordinary pyaemic abscess.

Remarks and Conclusions.

From the foregoing remarks it will be seen that considerable diversity of opinion exists as to the cause of L. Abscess.

In the Pyaemic cases there can be little doubt but that the micrococci are the immediate and direct exciting agents, and it is equally certain that many cases of hepatic abscess are entirely free from pus forming organisms. But between these two varieties there are cases which cannot be referred to either. The former (pyaemic) are the usual small multiple abscesses, the latter are to be regarded as hepatic liver abscess, of large size, usually, and the intermediate variety includes such cases as Idiopathic L. Abscess. (Fayer) solitary large containing Staphylococci in the pus. Though there is still some doubt as to the causal relation between amoebae and the liver abscess, yet the frequent association of Dysentery with L. Abscess, and of Amoeba with both points to a very strong relationship between them, to something more than a mere accident. The amoebic theory

does not explain all the cases of L. Abscess, but we must regard them as being responsible for a great number. How the amoebae act is still uncertain, whether by breaking down the tissues, liquefying and disintegrating them, or by simply acting as carriers of micro-organisms which produce necrosis and ulceration. They are associated at times with micrococci, which have been found in this substance; tho rarely, and mostly after the case has gone on for a long time, the micrococci in this case being accidental. But might not this explain the Pathology of some of the cases of L. Abscess (Idiopathic)? It is conceivable that a case may have begun as one of tropical abscess, containing amoebae, septic organism gain access to it, the amoebae disappear, and at the time of examination, pus contains only micrococci.

Laper & Murchison would say that Idiopathic L. Abscess is independent of dysentery or that if it exists, it is only as a complication. But it must be an exceedingly difficult thing to give an absolute negative to the existence

of dysentery, as Dr. Neil MacLeod and others have demonstrated, and it would be still more difficult for one to say in a particular case that if dysentery were present, it existed only as a complication, and it seems to me more than possible that as our observation of these cases increases in India especially, a great many cases now regarded as Idiosyncratic will prove to be really tropical, altered by the complication of micrococci. Further support is lent to this view by the ingenious and suggestive theory of Manson that the amoeba is polymorphic and that there are phases in its life history when it may not be recognized. Or again, it has been proved that tropical abscess if small may get surrounded by a more or less dense sac, the contents become encysted and imprisoned and in this state it may be dormant for years. In the event of any inflammation of the liver, or of weak health in patient from whatever cause, this would be likely to break

down and form an abscess which would be very unlikely to contain Anaeobae, but would certainly yield pyogenic organisms. and thus account for the abscess occurring even without dysentery ulceration of the bowel.

If this interpretation be not the correct one then we must fall back on the theory that in Id: L. Abscess in the absence of symptoms or of D.M. evidence of ulceration of bowel, the microcoei gained access to the liver through the bile ducts, probably diseased, and then set up infection and inflammation, subsequently abscess. It seems strange that the same micro-organism should in this country produce small multiple abscesses, and in the tropics a single large abscess, unless there were something specific in addition which could not be accounted for merely by predisposition from associated conditions. This suggestion if correct would simplify the Pathology, and help to co-relate cases which as judged by the varied descriptions of different observers are almost anomalies.

The result of concerted, frequent and

systematic observation on the same lines in different parts of the world could not fail to clear up doubtful points, and ultimately to accurately determine the true cause of Linn abscess, which in my opinion will be found to be amebic.

V Treatment.

The treatment of these cases may be conveniently divided into two heads,

I General, up to the time of the escape of pus whether by spontaneous rupture of the abscess, or by operation.

II Local, operative, and after treatment of such cases.

① General. The general treatment is based on broad principles & about it there is not much diversity of opinion. The disease is an extremely exhausting one, whether in the pyaemic or tropical form so the idea is to keep up the strength to tide over the critical period when the abscess finds vent.

Rest in bed is essential and the diet is not of much importance in the early stages, or in mild cases,

yet even in these and in severe cases, the most comfortable position will be to lie partly on the R side, with the knees drawn up, the head forward and to the right. It is the position naturally assumed by the patients in order to relieve the pressure of the painful organ against the ribs.

Diet must be restricted and must consist of liquid foods, such as milk, milk and soda water, or lime water, beef tea, broth, soups in liquid or jelly form, etc. the quantity and kind to be regulated by the symptoms. In cases where the fever is not high, a milk diet generally, with egg flip, jinket, white fish chicken, etc. will be indicated but in cases that go on to recovery, they require a liberal diet in the convalescent stage, taking care to order anything that would be likely to cause a return of bowel troubles. Stimulants are required when the patient becomes hectic, best in the form of Brandy or Champagne. and in the convalescent stage also, malt liquor not being so generally good or useful as the light wines of France etc, or perhaps softer Scotch whisky well diluted with water as all stimulants in these cases.

must be. It seems to be tolerated better and can be longer taken than the others.

In the early stages before suppuration has commenced and there is simply hepatitis, a purgative of mercury in some form (calomel) followed or not by a saline will be of considerable benefit. The use of purgatives must however be very carefully considered, and the state of the bowel taken into account as much harm may be done by the injudicious use of mercurials & purgatives generally.

Murhead believes that ulceration of the intestine is sometimes produced by the ~~excessive~~ use of purgatives as calomel, Arnould also holds that the bowel symptoms in dysentery are secondary to irritating secretion from the liver, and that the bowel is predisposed to ulceration, if not actually caused in some cases by the excessive use of purgatives.

As regards the drops in this affection many have been tried, & antiseptics for the bowel lesion etc, but none except perhaps Dubo's Peppas have

been of any use. To give one grain twice a day as long as there is much diarrhoea and pending Dickson is usually caused by it. A preparation without the emetic principle has been described but not with any considerable benefit, as even in the larger doses of usual drug sickness is not common, and it may be that this principle (emetin) acts beneficially on the mucous membrane of the bowels. Ammon. Chlorid seems to be of some use in the hepatitis, but it is of no use whatever in the suppurating stage. Quinin will be of use in cases complicated with malaria. Diarrhoea and pain will best be treated by opium, sleeplessness by opium or chloral, and other complaints on general principles as they arise. Fowler recommends large & small doses of Tartar emetic if abscess not septic, but few care to adopt the treatment.

Fomentations, or poultices, cupping or blistering over the painful part, and leeches to the anus will relieve the pain there.

During the convalescent stage the Ac. Min. may die with Strychnin & Iron; perhaps ol. Turpinal, & change of air to a more bracing climate, non-malarious, with very careful attention to the diet and habits, in fact there

must be temperance in all things, climate included, in these cases.

In the septic variety in addition to the general rules to be followed, it is necessary to begin with stimulants at an early period, & to give them freely. Special attention must be given to the source of infection when possible, to render them as antiseptic as possible, and usually those anti-septics, which affect the temperature & render local antiseptics most of the local fur derivations will be found useful, a watch being kept on the heart, which may require stimulation of digitalis and Strychnine.

② Local treatment has varied from time to time, and it was so recent as in 1840 that Dr Murray in India used an exploratory Trocar for diagnostic purposes mainly, but he continued to use it as he found that it gave relief by the abstraction of a small ^{quantity of} pus as well as blood. It did not find much favour for a considerable time, until the aspirator began to be used as a curative means, and this (aspiration)

was the method adopted until very recent times, in fact some men practice it now. Many special apparatus were devised and described, having for their object the introduction of a cannula of sufficient size for efficient drainage, and which could be left in the wound in such a way that the opening into the liver could be dilated by forceps or knife in a few days, and of these, Davidson's formed Cannula, and Mason's system seemed to answer the purpose best. Of the aspirators, Deschamps' is perhaps the best all round. Dr. Laurie¹ records 26 cases treated by aspiration, and of these only 4 died. He recommends aspiration in all cases unless pointing when an incision should be made.

Davidson (loc. cit.) strongly advocates puncture for exploration, followed by aspiration and may be by incision. There is no danger from this puncture, if there be no coehæria from splenic leucocythæmia, in which case there is a risk of hæmorrhage.^{*} Harley² recommends repeated small punctures with abstraction of blood in cases of Hepatitis congestiva etc. with pain, even if no pus present.

¹ Dr. Laurie. Civil Med. Dept. Hyderabad.

² Harley. Diseases of liver, ib.

^{*} vide pleura or peritoneum.

In most cases of aspiration, unless free drainage be secured, repeated aspirations are necessary.

At the present time, the plan adopted is to first make an exploratory puncture and having found pus to make an incision down to the abscess and evacuate it. The object of the operation is to thoroughly remove the pus, and to secure good drainage afterwards, and to prevent decomposition in the cavity, this latter being secured by the strictest antiseptic precautions during the operation, and by the injection of weak antiseptic non-mercurial solutions.

There are several points to be considered and rules to be observed in such operation. There is a very general consensus of opinion as to the advisability of operation, the mortality having fallen from 80% to 90% in the pre-sterilization days, whether operated on or not, to between 15% & 30% now. (Manson).

Godlee. Lays down some general rules as to the surgical treatment of these cases. he says,

- ① If abscess presents at the epigastrium, the presence of adhesions must be ascertained before incising the skin.
- ② If through the chest wall, the opening must be below the pleura, as sometimes the diaphragm

is sometimes pushed up so as to simulate
 intrapleural accumulation, and if either the
 pleura or peritoneum be opened, the opening
 must be closed by a double row of stitches
 before incising the liver. - Dr Curman, and
Johnston Smith describes a case in which before
 opening an abscess they stitched the capsule to
 the wound after removing a portion of the 7th rib,
 with recovery -

- ③ If into the lung, pleura, peritoneum, pericardium
 or kidney and its position clearly defined,
 it must be opened without delay, and
 empyema, pericarditis, peritonitis etc caused
 by the rupture must be treated in the
 ordinary way, according to general principles.
- ④ If it bursts into the bowel and also points it
 is better to open ~~the~~ latter as well. It gives
 the patient a better chance of recovery.

Adhesions do not seem to be necessary. They only
 occur in 4% of fatal cases (morehead) and if required
 they may be produced by a preliminary application
 of caustic potash, and this is not necessary if
 the opening is made below the ribs. The cases
 most favourable for operation are those in
 which the constitutional symptoms are not
 profound, in which there is a single abscess

Dr Curman & Johnston Smith Lancet, 1897. Vol II. p 1438.

uncomplicated with dependent, or other affection,
 and the earlier the pus is removed the
 better the chance of recovery. In favourable
 cases the temp: falls often to subnormal,
 and frequently recovery takes place quickly,
 within 2 or 3 weeks. In others the discharge
 remains for a considerable time and
 recovery may ultimately take place or
 the patient dies from exhaustion. If
 the temp: keeps up, with pain, fever
 and sweating then either the pus is
 decomposing in the cavity, or another
 abscess is forming, in which case,
 explore again. If it be impossible to
 diagnose pus, wait as long as you
 can, provided the patient is not
 losing ground. Mr. Cornell of Calcutta
 says that the opening is preferred through
 the abdominal wall and not between the
 ribs unless it presents there, as necrosis
 of the ribs has often already taken place.
 In addition the tube gets wedged between
 the ribs during movement, or the tract
 becomes tortuous from contraction so that
 the drainage is difficult, and a counter
 opening necessary. Resection of a rib is
 not favourably spoken of by him.

Dr Jones has so well described the operation in his System of Surgery, Vol II p 580, 1895-96. That it may be executable if a portion of it is here quoted.

" If an exploratory aspiration be considered necessary the needle should first be thrust into the 7th or 8th space in the ant: axillary line. If no pus be reached, it should, in the second place, be introduced just below the ribs on the middle line, and if no indication follows it should in the third place, be introduced behind, just below the edge of the lung, in a line continued down from the tip of the Scapula. ^(transverse)

The only surgical treatment is early and free incision, through drainage, and the utmost care in the after treatment to keep the region surgically clean. If an external opening already exist, it should be well enlarged and counter openings made if necessary. When no opening exists, the incision must be made in what appears to be the most advantageous position. This will be decided by the aspirator by the redness of the skin or by swelling.

If any swelling exists, the most prominent part of it should be selected. Adhesion will be very generally found attached to the points at the point selected. In such cases

The abscess should be at once opened.
 If no such adhesion exist, the operation
 should be divided into two stages,
 In the first the line is fixed to the
 margins of the parietal wound, when
 -as is frequent- this is not possible
 a plug of Iodoform Gauze is introduced
 and retained in position till adhesion
 forms. Should the case be urgent
 and no adhesions exist, the surgeon
 must do his best to limit extravasation
 of pus by means of sutures and gauze
 plugs. In order to open the abscess a
 considerable thickness of liver tissue may
 have to be cut through. A counter-
 opening may be sometimes indicated.
 The septa of the abscess cavity should
 be broken down. Search should be
 made with the finger for other abscesses.
 The larger the abscess the more likely is it
 to be single. Very free drainage is
 required. I use tubes with a lumen
 of one inch in diameter. The after treatment
 consists of frequent irrigation with some
 antiseptic solution (creolin 1-600 or more well),
 the prevention of all trapping of pus,
 the attaining of perfect cleanliness,

and the supporting of the patient's strength.

In a case in which the peritoneum was freely opened by him, in order to prevent the escape of pus into the peritoneum, (found omentum protruding in the wound), he stuffed the cavity with iodoform gauze, 4 1/2 ft long and 6" wide.

This was replaced on the third day by zinc gauze, 12 ft long & 4" wide. It gradually became absorbed, and extended & finally removed, the amount of gauze removed without being absorbed being 9 ft. 5"

Concluding
Remarks

In the present state of our knowledge then we conclude that the proper treatment of such cases is by the early evacuation of the pus, by free incision, with efficient drainage. The risk, when proper antiseptic precautions are adopted is not great, much less than if the case were left alone, and as compared with aspiration we can by this method (incision) make a more thorough exploration, evacuate the pus better, while there is not the same possibility of future operation for the relief of pent up pus as sometimes happens in cases of aspiration. Whether as our knowledge of the Pathology increases, it will be possible to so adapt our treatment as to prevent the liver lesion

by suitable antiseptic applied to the
 local lesion, or by an anti-toxin,
 or both, remain to be solved; but
 granted a constant and well established
 exciting cause, and that a micro-organism
 it seems to me to be very probable that
 much will yet be achieved in that
 direction, and that we will be able
 at no distant date to treat such
 cases with as much certainty of
 success as we now do those of
 Diphtheria, Small Pox, and Goitre.

A. J. Nichol M.B.

Keaton Abbt.

Decm.