Gallstones: Their etiology, physical character, Pathology, Symptoms, Treatment

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- under the old regulations

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Different authorities vary considerably in their estimates of the value of certain conditions in favouring the formation of gallstones. Most are agreed that they occur more frequently in females than in males. Von Schueppf thinks this may be due entirely to their more sedentary mode of life and to the use of corsets. Hanzeppa also considers the stress on the occurrence of pregnancy & says that 90% of women who suffer from gallstones have borne children, while Geo. Harley finds the explanation in the greater obesity these active life of women. 

Middle age furnishes the majority of cases of gallstones von Schueppf's age ranges the bile passages more tolerant of solid bodies & favours stasis of the bile, giving there for longer period of rest for the growth of the calculi, according to the same author, age, furnishes more precipitable substances to the bile especially cholesterol, this last is more abundant in proportion to the increase in retrograde metamorphosis taking place in the body.

It has been suggested by Morris that a right more caudal kidney drops down the duodenum & bile ducts, this prevents the proper emptying of the gallbladder & ducts & so favours gallstone formation.

Brookebank suggests that depression of the anterior part of the right lobe of the liver depresses the fundus of the gallbladder & favours precipitation in that site. It will be noted in
This connection that tight-lacing is a frequent cause of the displacements of the liver referred to, he further states, that if gallstones occur in a patient under 30 years of age, it will be found that no cardiac lesion is present: this was so in each of 8 cases examined by him, he explains this by a greater degeneration of the cells from asphyxia. Gallstones are particularly common in stout people who consume large quantities of rich saccharine & greasy foods & alcohol & who at the same time lead sedentary lives, this very probably is not due to a direct connection between a special diet & strictness & gallstones, but merely to the fact that such a diet both produces obesity & disturbs the digestion & the secretion of bile. While warm climates are also liable to cause hepatic derangements, they do not seem to form an excessive number of cases of Cholelithiasis, in fact some authors say that Gallstones are excessively rare in such countries. Explain the fact by an abnormally free flow of bile. The middle & upper classes are especially liable to suffer from gallstones, but this is probably to be explained by the more active habits of the working classes, prolonged bodily rest interfering with the flow of bile. According to M'Intosh, gallstones are often associated with gout, asthma, urinary gravel, neuralgia, migraine urticaea etc. Such a condition as gout should not however be regarded as a cause of gallstones, the real
peliosis that the two have a common origin in such
conditions as great store, less active bodily habits, better
circumstances, richer diet, etc. etc. in the same way constipation
is not a cause but results from the same cause as do gallstones.
Conditions which retard or arrest the flow of bile have an important
influence on the development of gallstones; among these must
be included the allowing too long intervals between meals.
When this happens the bile is at rest and any precipitants
that may be present have time to form themselves into
concretions; sedentary habits leading to prolonged
bodily rest also interfere with the flow of bile.
Various anatomical changes in the liver and bile ducts render
the secretion of bile more difficult, e.g., tumors pressing
on the biliary passages, abnormal depression of the
Liver or Duodenum, while an inflamed or
degenerated gallbladder or one filled by adhesions has
its contractions rendered difficult or impossible.
With regard to cataract of the gallbladder and passages
it is to be remembered that while on the one hand
gallstones cause cataract, on the other hand cataract
favors the development of gallstones, it more often
paralyzes the gallbladder, hinders the ducts, and retards the
flow of bile. cataract may also be said to produce chemical
alterations in the bile especially rendering it more nearly acid.
flakes of \( \text{pigments} \) which may form the nuclei of calculi.
Obstruction as pointed out by Waring, while generally present, is not by itself sufficient to account for the formation of gallstones, the constancy and sometimes to an inflammation of the mucous membrane of the ducts of gallbladder caused by the Bacteria coli communis. This Bacillus while always present in the intestines is said to gain access to the biliary passages either:
1) when the flow through them is retarded or the Bacillus det ring slightly mobile or
2) by the backward peristalsis forcing feces into the duct, when there is pressure on the lower part of the duodenum, as by tight wearing, or obstruction to the upward passage of feces in the colon. If these microorganisms gain access to the bile ducts, they may pass into the hepatic ducts, but pass necessariety into the gallbladder since during the intervals between digestion their ascent is made more easy by the bile passing up the hepatic duct into the gallbladder. In the gallbladder they to the Bacilli produce irritating Chemical substances (tumors or plasmalogues) which cause an inflammatory condition of the epithelial cells of the part. The metabolic processes of these cells are so modified that their interior becomes occupied by Myelid-like masses that are extended on the surface of the
Mucous membrane, cystic cases of cholesterol masses clumps, the cholesterol crystals are deposited on the surface and a calculus begins to form. The cholesterol so deposited on the surface may come either from that which is in solution in the bile or may be some of the small masses of cholesterol stripped from the epithelial cells.

It has been suggested by Sherrington that the meso-organism enter by the Portal vein for then their toxins having damaged the protecting hepatic tissue, pass from the bile ducts. The Bacterium coli commune is not however the sole exciting cause of these changes in the mucous membrane. It has been noted that Typhoid fever is not infrequently followed by the formation of gallstones, in such cases the Bacillus of Escherich is present in the ducts and gall bladder and it is a fact that an inflammatory condition which results in degeneration of cholesterol formation of calculi, in such cases the nuclei or small calculi have been found to contain Escherich Bacilli—further the Streptococcus haemolyticus has been found also in the bile in cases of cholelithiasis.

A diminished quantity of bile acids in the bile has been supposed to have some connection with the formation of gallstones. Bile acids help to keep cholesterol in solution, there is said to be a
tendency for gallstones to form when the bile acids are diminished in quantity, as is occurs when the diet is
poor in nitrogenous. 2. When cholestirene is increased as
in Cataract of the Bile ducts + gallbladder
Not infrequently foreign bodies have been found to be the
nucleus of gallstones. Apparently to have some relation to
their formation among these have been steel needles,
twist worms, flukes of mucus, hair, blood clots
collections of bacteria + crystals of calcium carbonate.
According to Bignol if the gallbladder be aseptic
the foreign body does not cause cholelithiasis, but if
the viscus be infected with an attenuated meriste
cholesterol + crystals out it is deposited on the
surface of the foreign body

Composition + Physical character of Gallstones
The number of gallstones that may be found, according to
Dr. Belchetz varies greatly from one to several hundred.
French computed 1950 but Otto seems to hold the
record in a case in which 7,800 were found in the
gallbladder. Generally speaking if they are
present they all show practically the same
physical characters + chemical composition.
The size varies greatly, ranging from a mere speck to masses measuring 6 inches by 2¾ inches or even 3 inches by 8¾ inches as recorded by Knobel.  

The shape depends a good deal on the nature of the deposit and the manner of its formation. Most are often round or oval, polyhedral ones are often faceted with rounded corners and edges. The surface plane, concave, convex, cubical, etc., are also met with.  

Knobloch regards the facets as the result not of pressure but of pressure, the edges forming maybe split off by pressure. The colour ranges from black through brown yellow to almost a pure white. Most of its colouring is derived from the following matter of the bile-pure cholestine crystals may show a translucency when pressed and lose it almost dry. The surface may smooth, soft and greasy, or uneven rough and granular; it may show crystalline protruberances or depressions as if worn eaten.  

The consistency is generally soft but slight. They can usually be crushed between the fingers. When more resistant there is generally a considerable amount of lime salts present. The specific gravity of course varies, being greater when they are fresh and moist than when they are dry. Hein found the specific gravity of a fresh stone to be 1.027; others found stones as high as 1.25, but these probably contained lime salts. Fresh stones will sink in water, as dried ones the previously contained water is all replaced by air and generally float. It seems probable that
it is very rare for gallstones to float in bile.
The structure of calculi has been made use of as a means of classification. French recognizes:

(A) Simple homogeneous calculi having a uniform texture & a fracture which may be in Earthy ash. The calculus consists of earthy matter, or a mixture of cholesteric compounds of cholephosphine + lime + Saponaceous acids. The calculus consists of bile + resin + its calcereous compound or of some other cholesterine. In Crystalline, when the calculus consists of pure crystalline cholesterine.

(B) Compound Calculi containing a nucleus which is surrounded by a shell & usually by a crust.

The nucleus is mostly either flack or brown, it consists of cholephosphine + lime + some mucous, some lime, also Choleto-phine + crystalline Cholesterine. Rarely foreign bodies as chondroitin, horns, bone, etc. The nucleus generally is nucleus central but it may be eccentric. The shell is usually stratified or consists of crystals of Cholesterine arranged in a radial or manner. The crystals may be pure or mixed with pigment; generally there is also a concentric laminae appearance indicating that the growth of the concretion has resulted from the deposit of successive layers; very rarely the shell consists entirely of thin concentric laminae, often the shell is devoid of all structure & presents neither striate nor laminae, but rather a scaly, The crust in some cases is wanting. The radiating fibers of cholesterine are reaching the surface & rendering it warty.
The crust layer is generally present and may be recognized from the shell by its color, lamination, homogeneity, a cohesive crust is smooth while on other fixed bases like teeth, acholepyn is the crust is very thin, brown or black, carbonate-aphite crust may be either thick or smooth, laminated while a-pain may be wavy like the vocal cords.

Harrison classified the calculi arising in the gall bladder as follows:

1. Pure cholesterol
2. Striated cholesterol
3. Common Beltrani calculi, usually numerous, multiple, faceted.
4. Mixed, Beltrani-calcium usually having cholesterol scattered through them.
5. Pure Beltrani-calcium
6. Rare forms including amorphous or imperfectly crystallized cholesterol calcium carbonate + conglomerate calculi.

With regard to the different Beltrani's found in calculi it may be noted that the following are most common:

Cholesterol forms the entire mass of some calculi, most of their like is as their chief constituent amounting often to 70-80%. It is generally crystalline in form but may be amorphous.

Beltrani colouring matters are present in varying quantities in nearly all stones. The most important is cholepyrin, which occurs either pure or combined with lime, it is more plentiful in the crust and nucleus than in the middle zone.

Beltrani acid and their salts are most calculi Beltrani acids are found in small quantities generally combined with soda rarely with lime.
Fatty acids are present somewhere in combination with lime as sparable of lime
Lime is the only important inorganic ingredient of gallstones as already mentioned it may be combined with
Cholesterol or Bilirubin or fatty acids but it also occurs as Carbonate of Lime—this last salt generally
forms only on incrassation it originates chiefly from the mucous of the gallbladder it is most likely to be
precipitated when the gallbladder is free from bile.

Pathological Results

Gallstones may be present in the intrahepatic ducts in numerous numbers and are generally small, soft and dark-coloured._
When present the Beleducts tend to become dilated they may assume either a dilated or cylindrical form
With these changes there is almost always associated Calcar 
and at an earlier stage probably alteration of the duct wall. In such cases too a surrounding fibrosis is an intrathelial extension
is met with—Chesnut affirms that cirrhosis arises from chronic obstruction of the Beleducts, but Sharkey post-
when any such occurrence—In some cases the
inflammation may be acute as to produce abscess of the liver—Pylephlebitis may arise from extension of the
inflammation to a branch of the Portal Vein—Renal injury of the formation of fibrous tissue a
gallstone may become encysted.
As regards the Hepatic duct itself it very rarely contains stones and hence it is uncommon to find in it any lesions resulting from gallstones. The gallbladder may become changed in many directions, sometimes indeed, no change can be made out, but this is rare - concretions of the size of a halfpenny may be found embedded in the bladder wall. These probably are formed in the dilated gland cavities. Sometimes a stone may be found adhering to the mucous membrane. Inflammation of the mucous membrane is of course common, there may be mucous-pulent Erysipelas which may go on to suppuration of the gallbladder or there may be more or less ulceration which may even end in perforation. This perforation may open into the stomach or intestine, into the substance of neighboring solid organs or involve the abdominal wall & so open on the surface or again the perforation may open into the general peritoneal cavity. As a result of a chronic inflammation the walls of the gall bladder may contract into a firm small sac, with smooth lining membrane which is closely applied to the contained stones. This is usually preceded by Hydrophobia. As a result of constant attempts to expel the abnormal contents there may arise a hyper trophy of the muscular fibers of the bladder leading to thickening, the interior may present a fasciculated or serrated appearance. While these changes are taking place there is probably a thickening of the loose connective tissue - will or without adhesions to the胰腺. Often Duodenum or Liver, these adhesions are by some said to give rise to symptoms resembling those produced by stones in the gall bladder.
A fulness is reached when calcification of the walls occurs of the bile duct. There are two forms described viz:

1. Calcification of the mucous membrane with bile salts
2. True calcification of the walls with lime. The so-called stenosis of the bile duct.

The cystic duct is often completely blocked with stones impacted in it, when this happens dropy of the gall bladder develops, no bile can pass into or escape from the bladder. The bile in the gall bladder at the time of obstruction is removed by the lymphatics. Nucleus however continues to be poured out of it until it fills the sac which may ultimately become very large. 

First found one occupying the greater part of the abdomen. Around the impacted stone there is inflammation of the duct wall which may lead to perforation or to a fervid stenosis.

The common duct, is often the seat of an impacted gallstone. At the same time it is capable of considerable distention, the great difficulty comes to be that dilatation at the duct, in the cystic duct and at the hilus of the liver. As long as the duct, may close by growing larger, or by the lining of the duct becoming smaller from inflammatory swelling, a descent of pressure alteration may occur and may go on to perforation. The duct sometimes becomes dilated into quite a wide sac. Ferreol describes one 


Six inches long, by five inches wide, an inch and a half dilated. The gall bladder is not necessarily enlarged, it is to be remembered that duct contains not bile but a colourless mucus, for as the contained fluid reaches a certain pressure the-
Rile passes into the hepatic duct — an account of damage caused by passage of gallstones there may develop syphous structure of the duct.

With present obstruction there is a tendency for the production of Calcarval or Suppurative Cholangitis, in the first of these conditions the Common duct often admits the finger; the Hepatic duct & its radicals in the liver are greatly dilated the mucous membrane of the ducts is clear & smooth and filled with a clear watery mucous, in obstruction with Suppurative Cholangitis the mucous membrane is thickened rough & even ulcerated. Sometimes there is extensive suppuration in the ducts throughout the liver and even suppuration of the Gall-bladder. Suppuration may extend beyond the ducts of the liver producing Hepatic Abscess, and acute Suppurative Peritonitis may follow. The microorganism found in cases of this kind are: *Staphylococcus Pyogenes, Staphylococcus Pyogenes Aureus, Bacillus coli communis* & *Diploceoccus Pneumoniae*.

Carcinoma is not infrequently found associated with gallstones, it may involve either the gall-bladder or one of the ducts; it seems probable that its development is due to continued irritation of the mucous membrane by the calculi, but the opposite view is held by some viz. that the carcinoma is primary & that the escape of bile favors the formation of calculi.
Fistulae opening in various directions are not an uncommon result—ureteric fistulae occur in four cases which opened into the Stomach, such an opening would suggest the presence of calculi in the Urin, it is said that rounded calculi assemble and their way into the Stomach by reversed peristalsis—fistulae opening into the Duodenum are more common, ureteric fistulae 33 cases, stones reaching the Intestine in this way may pass onward & be expelled "per annum" or may if of large size cause intestinal obstruction—The fistulous opening is generally at the Fundus of the Bladder, more rarely from the Common duct—An opening into the Colon seems to be rare than into the Duodenum to more frequent than into the Stomach, as great varieties may find communications with an open Wurzus, the Pelvis of the Right kidney, the Lungs, the Portal Vein, or the Hepatic duct—in some cases gallstones have been found in the Abdominal cavity having escaped either from the the Gallbladder or the Common duct. Stones carried containing gallstones have frequently been found in the neighbourhood of the Gallbladder or ducts receding in the lowest part of the Common duct seems sometimes to set up an inflammation of the duct which extends to the head of the Pancreas, an interstitial inflammation of the gland follows which ends in the formation of tumors. Clinically duct a condition resembles a case of Cancer of Pancreas.
Xanthoma or Xanthoma reverse frequently occurs in longstanding cases of jaundice — generally after interval of 18 months, this is the form known as Xanthoma Multiple (Rossier) in which the lesions are mostly nodular but also in the mouth, palms, hands or penis. The disease consists of yellowish deposits in the Corium either in flakes or flakes or nodules. The deposit has been compared to atheroma in the walls of the arteries. Clinically the most common forms are the soft, yellow, not raised plaque seen in the scalp.

**Symptoms of Gallstones**

The symptoms of gallstones vary especially in relation to their site and in the faeces. The calculi may be absolutely quiescent or "silent" or may cause much slight inconvenience that the patient disregards, or may complain of discomfort in the hepatic region. According to Mayo Paton, where gallstones are found post-mortem, in people who have never complained of pain it will be found in the majority of cases that there are no adhesions of the gallbladder. While the migration of calculi may take place without pain, yet generally when a calculus passes into the cystic duct there is a sudden onset of lancinating pain commonly known as "Hepatic Colic", this may radiate towards the back, the angle of the right Scapula.
The left hypochondriac region or downwards into the abdomen rarely however does it extend below the umbilicus. Moreover the pain is accompanied by vomiting, fluctuating emotions, pallor and more or less collapse.

The duration of the pain varies from a few minutes to several hours or rarely to a couple of days & even though it a feeling of great tenderness to pressure, it may pass off quite suddenly or the escape upward or downwards of the stone from its narrow passage, or it may pass off gradually, probably coincidently with the obstruction of the muscular wall of the duct. The paroxysms of pain are especially liable to occur after meals or violent exertion.

Sickness is a common symptom in the subjects of lithiasis, some attacks are already noted occur during the colic. They seem to be due to the passage through the movement of calculi in the full bladder.

Vomiting occurs especially towards the end of the attack of colic, the vomit at first consists merely of the seminal contents, but later provided the common duct is not hacked it is composed of a bile stained fluid, they even become stereoaecous. Rarely a calculus has been found in the vomit its presence being ascertained either by reversed peristalsis or by the presence of a fistulous opening between the full bladder and stomach.
Collapse may arise either from very severe or prolonged pain or from persistent vomiting, it may vary between mere prostration with cold clammy sweat, feeble pulse, and subnormal temperature to actual collapse which may prove fatal. Rarely these symptoms are not met with. Collapse simulating that produced by perforation of an abdominal organ conditions may also occur.

Jaundice arises when a calculus completely or almost completely obstructs the common duct. Under such conditions an accumulation of bile takes place behind the obstruction. When the bile pressure reaches a certain height the bile passes into the lymphatics thence into the thoracic duct into the general circulation producing jaundice. The urine becomes bile-stained and the conjunctiva and skin tinctured. The face are bile-stained usually clay coloured. Jaundice is regarded as due to the absence of bile pigment but others attribute it to the presence of undigested fat. There is often constipation, but this may alternate with attacks of irritable diarrhoea. The symptoms of jaundice seem worthy of attention.

Other regards the following constitutions as characteristic of jaundice:

1. Jaundice of varying intensity, deepening after each paroxysm, which may persist for months or even years.
21. Acute colic attacks, characterized by chill, sweating, fever, after which the jaundice usually becomes more intense.

22. At the time of the paroxysm pain in region of the liver.

Jaundice is often present in cases of gallstones colic especially if the jaundice is also present, soon after the colic there is not necessarily any rise in the temperature to say 103°F. The attack is short but tends to recur.—Murchison and 2nd regard the pain as purely reflex from irritation of the mucous membrane but more probably the attacks are due to cholestasis due to the absorption of the bacteria organisms and their products through a lesion of the mucous membrane produced by the gallstones. This view is supported by the fact that microorganisms have been found in the blood of the jaundiced patients and enlarged spleen may be found later.

Schoelesthiaris there may be (according to Riedel) jaundice when there are no calculi in the duct. He states that the common bile duct is obstructed by an inflammatory swelling beginning in the gall bladder and spreading hence to the duct. In the jaundiced there may be colic, jaundice and enlarged gall bladder.

Jaundice may therefore be due to incomplete second occlusion of the duct by a large stone. It is inflammatory swelling due to small calculus lying in the duct. Extension of swelling to the duct caused by calculus in the gall bladder.
The rubor of the breast is often interesting - in jaundice alone that fever is frequently normal or subnormal. Even when jaundice is present the pulse rate may be normal until jaundice. However, it is generally increased in case of hepatic jaundice. The presence of the pulse is often referred to the action of bile acids. Bile-stained urine is often the earliest indication of the onset of jaundice. The presence of bile pigment is best recognized by the use of a strong filter paper at sample from green this blue tetracycline or addition of pure bile acid.

Nicking of the skin is no gullarosa as in calcarhial jaundice. Not infrequently very troublesome, it has been referred to the action of the bile acids or the remnant.
ordinary type, between the attacks the temperature is normal, the general health is not progressively deteriorated, the liver is not so much enlarged.

In Suppurative Cholangitis the fever may be intermittent but is more often remittent, the jaundice is not so intense and does not deepen after the paroxysm; there is generally more enlargement of the liver, with tenderness at more definite signs of septicaemia. The cases run a shorter course and recovery very rarely if ever occurs.

Tumors in the region of the Gallbladder

Tumors in the Gallbladder may form from a tumor under the following conditions:

1. The Cystic duct being blocked by a calculus the Gallbladder becomes distended by mucus
2. A calculus acting as a tail valve allows bile to enter the Gallbladder but prevents its escape
3. The Gallbladder containing calculus or fluid pustules or and distends the Cystic duct
4. Calculus choledochitis extending into the Common Gall duct.

According to Layfor the Gallbladder enlarges downward and forwards in a line drawn from the Trunk Right costal cartilage and crossing the Middle line a little below the umbilicus.

The size varies from a tumor just perceptible to touch.
to one which may resemble an ovarian cyst.

While it is generally closely applied to the anterior abdominal wall it may project backwards into the loin, and simulate a renal tumor. If doubt arises as to which of these the swelling is Ziemann advocates the distension of the colon with air or carbonic acid gas, if the swelling is kidney, it will be pushed further into the loin, while if it is gallbladder it will be pushed upwards forwards. According to MayoRobson this test does not always furnish useful information, a distended gallbladder however can generally be recognised by:

1. No position in the right side of the abdomen
2. If moves with the diaphragm in respiration
3. It grows from above downwards
4. The small rounded outline
5. Positively feels empty or if large may get fluctuation
6. Dullness on percussion, and absent resonance between it and the liver according as to whether the colon does or does not cross it.

7. Starts from the liver instead
8. No lateral mobility

The distension of the gall bladder may vary from the stone changing its position allowing intermittent
patency of the bile duct - pressure may also be
harshly points out - diminish the size of the tumour.
A perceptible distension of the gall bladder without
Jaundice indicates intra-ductal structure of the bile duct-
or a inpaction of stone in it. - Distension of
the gall bladder with jaundice is according to
Papet Rotar, almost always due to cancer of
the head of the Pancreas, or of the Common duct.
In most cases of obstruction of the Common duct-
the spiral valve in the bile duct tends to prevent
Bile under high pressure passing into the Gall bladder.
Gallstones in the ducts should be sought for by staving up the
Rotherhi water to which Carbonic Acid may be added-
then passing thru a sieve - while their presence in the motors
is valuable evidence it is to be remembered their
absence even over a prolonged period is of no
positive value, as on the one hand a calculas
may slip back from the cystic duct into the Gall
Bladder and on the other hand a calculas ejected
into the intestine may be disintegrated before reaching
the anus - Sounding the Gall bladder by a cannula
stake or by an operating needle is dangerous from the
Tendency to subsequent peritonitis which should not be performed
I'm sure to make a small exploratory incision with
the antiseptic precautions if further operative treatment
is required to enlarge the opening —
Treatment may be required for the colic, for the lodgement of a stone in the passages, or for some complication.

It must at once be admitted that no drug is known which can dissolve a gall stone in situ.

As regards colic, by far our most useful remedy is Opium in some form or other, it is best to give it in the form of a hypodermic injection of Morphia, but it is to be remembered that here a large dose is both requisite and safe. The pain may however be so intense that relief is only to be obtained by putting the patient under the influence of Chloroform - hot baths are useful as are also large draughts of hot alkaline solutions or Soda Bicarbonate. Stimulants are frequently useful.

The use of Morphia has been objected to as leading to diminish the secretion of Bile. This objection may (Waring) be got over by combining with the Morphia 1/20 of Sulfate of Atropine or according to Burney 1/20 by giving large quantities of warm water with Bicarbonate and Solutio salis of Soda. Olive oil has for many years been from time to time væmmed as efficacious in gallstone colic and jaundice, it seems without doubt these quick relief to patients who were troubled by frequently recurring colic and jaundice. These at last give them long periods of freedom from jaun.
increase the number of gallstones found in the feces.
Some have reported the passage during its administration
of large numbers of "softened gallstones", but it is
evident that these were merely concretions formed of
fatty acids with bile pigment; such bodies are to be
found if olive oil be administered in cases of Catarhal
Jaundice, or in cases where the Bile duct is obstructed
by pressure. Map Robertson says that he has rarely found
olive oil of the slightest service in causing expulsion
or in favoring the passage of Gall Stones, my experience
confirms this but I have known cases considerably
benefited by a course of Linseed Oil. The interval
between the attacks was markedly increased and
at the same time the alkaline function of the Bowel
was considerably increased, the tendency to Obstinate
Constipation in this condition is one of the most-
troublesome conditions we have to treat.
Belladonna has also been given during attacks of this
it has been supposed to act by relaxing the muscular
fiber fibers 520 allowing the passage onward. It
said it should be given freely, until the patient is
delirium under its influence, in conjunction with a paste
composed of Glycerine of Salal of Belladonna is
extremely soothing if its effects may be heightened
by the application of warm cloths over the part-
For those who are the subject of colic, or those suffering from lithiasis or from the lodgement of a calculus in the duct, a good deal may be done. As was noted in speaking regarding stenosis, the tight clothing is by many regarded as favouring the formation of gallstones, there should therefore be nothing tight worn about the waist, which is tight. Plenty of open air exercise should be taken, but nothing of a violent nature should be attempted. The cycling if moderation is practised is extremely valuable, horseback exercise is also useful. Duckworth advises that patients subject to colic should not take exercise about the time the food leaves the stomach, for at that time the gall bladder is emptying itself and exercise might easily dislodge a calculus.

Brackenbury advocates in the intervals between the attacks of when all acute symptoms are absent, massage several times a day over the right hypochondriac region. He says this is of use in aiding the expulsion of bile from the gall bladder and ducts. While this procedure may possibly be of use, the form of massage advocated by Geo. Harley should be avoided. He here advocates massage and compression of the distended gall bladder, so as to expel calculi.
Such a forcible proceeding is dangerous as it may easily produce ulceration or even rupture of the gallbladder or ducts. Dilatation of the gallbladder described by the same author is to be avoided — when possible, this operation is performed. The still diluted gallbladder is almost sure to leak to set up Peritonitis. It is to be remembered that in these cases the sac contains not bile, the escape of which might be dangerous, but a nectar or mucopus containing various microorganisms. Opinions differ as regards the definite treatment of Cholelithiasis. Gourwe foods which change the liver must be avoided;
yet it is true as Brookbank thinks that the bile salts which help to dissolve the cholesterol are derived from nitrogenous foods, and are diminished in amount when such foods are not taken. Hence it is evident that the more easily digestible forms of nitrogenous food should enter largely into the diet of those subject to Cholelithiasis.

Landor Burnet: Cap stress on the importance of drinking plenty of water. Says that almost every patient with Gallstones that he saw confessed to drinking too little water, he makes such people drink a large tumbler of water, preferably hot, with or without carlisted salts every morning. Finds that he received formula: if Gallstones may in many cases be prevented.
This line of treatment has given me most satisfactory results, but I find it is advantageous to order together with the Carlstedt water an equal quantity of Esculap water. I generally direct the patient if female to take every morning, about an hour before breakfast 2 oz of Carlstedt water + the same quantity of Esculap water made up to a pint with hot water. This should be sipped slowly & it is important that no other fluid or food should be taken for at least half an hour. It is found that when the mixture is taken as hot as it can be conveniently sipped, it is almost entirely devoid of taste – for a female the quantity ordered is reduced by ½. This is persisted u. for a fortnight & then each of the mineral waters are diminished by an ounce, after continuing this for a further period of 10 days, the treatment is altered + 2 oz of Carlstedt water + a pint of hot water is ordered for another month – then the patient discontinue further treatment for a period of 3 months & then the round of treatment is recommenced. By some such plan it will be found that whilst the patient’s appetite is improved, loose flaky fat which is so often present is got rid of, the patient experiences a feeling of increased vigour & mental & bodily activity.
Alkalies, quinckes or in similar way do not seem to have any solvent action on gall stones. The benefit derived is partly due to the previously mentioned good effects of water and partly to their power of stimulating the intestines to obtain a regular evacuation of the bowels, and partly to their power of stimulating and improving the digestive processes. In this connection we must not omit to mention the great benefit obtained by a course of treatment at some of the Home and Continental spas, the latter Carlstadt is probably the most efficacious, Contezelle, N.Y., Hong Kong and Kissingen are also used in great repute, whilst in England, Harrogate and Bath, are found useful. Harrogate is fortunate in possessing not less than 16 different springs. The composition of these differ a great deal in each case. The strong and mild water, Shepherd Springs are generally taken before breakfast and in the afternoon: a pleasant, cool, chalky, saline is taken.

Salicin will, if used in doses of 20 grains every day, be often useful, probably it acts like a cholagogue effect.

It is of the utmost importance that the physician should bear clearly in his mind the conditions which necessitate the calling in of the surgeon under the following conditions in cholelithiasis, an operation is necessary.
11. Intestinal gall bladder forming an abdominal tumor
12. Persistent Jaundice from a stone in the Common duct
13. Recurrent Biliary Colic, injurious to health, not relieved by medical treatment
14. Signs of inflammation about the gall bladder with attacks of Biliary Colic
15. Acute peritonitis due to perforation of the gall bladder or Biliary ducts

As regards the treatment of intestinal obstruction due to gallstones there is considerable difference of opinion, one school advocates early operation by Laparotomy, the other opinion is to use massage under anaesthesia. — Mayo Roberts says that if one could be certain that the block was due to a gallstone probably the expectant treatment would be advisable, since records show that the stone will eventually pass. The difficulties of diagnosis are so great that probably the safer plan is to operate.

Surgeon Treatment — on following page.
The surgical treatment of gallstones and their complications will be long shortly referred to. In considering the propriety of operation one must remember that the blood is diluted with bile and that in many cases a considerable tendency to haemorrhage.

Men such a haemorrhagic diathesis is suspected days before administration of calomel. Chloride in large doses, with a view of increasing the copiousness of the flow, he gives ½ grains every 4 hours the two days previous to the operation.

It is remembered that prolonged jaundice does not always reduce this tendency to haemorrhage after operation.

The chief operations performed are —

1. Cholecystotomy consists in incising the gallbladder, removing the calculi, stitching the edges of the wound in those of the abdominal incision. In doing this, the peritoneum stitches the edges of the gallbladder incision to the abdominal wall at the skin of the abdominal wall — a stitch should be made of all the calculi have been removed from the gallbladder. Cholecystotomy consists in incising the gallbladder, suturing the edges of the wound to the abdominal wall, closing the incision by a peri-umbilical suture, after the contents of the gallbladder have been removed. This operation is seldom performed.

2. "Steel" cholecystotomy consists in incising the gallbladder, emptying it of its contents, closing it up again, and replacing it in the abdominal cavity at the same operation. It is said to be easy, quick, and simple.
and to lessen the chance of fistulous tracts from the abdominal wall. The objectives to be kept in mind are: it is very difficult during an operation to ensure that all the calculi have been removed from both the gall bladder and ducts if not completely removed relapses are likely to follow it.

Cholecystenterostomy is the artificial formation of a gall bladder—intestinal fistula, the walls of the gall bladder and intestine being united by sutures or "stitches"—it has been advocated especially in cases where the common duct is involved. Suturing which cannot be removed—mucin of the ducts seems to have largely displaced this operation.

Cholecystectomy or extirpation of the gall bladder consists in ligaturing the cystic duct, dividing the gall bladder from its attachments, tearing it off—this is indicated in persistent bilious cholangiomas, fistulae with hooked cystic duct, a sphygoma of gall bladder with hooked cystic duct and in some other conditions. It is contra-indicated when the gall bladder is strongly adherent to the liver and when the common duct is blocked by permanent changes such as stricture.

Cholecystolithotomy consists in crushing calculi lying in the ducts either by the prong or by padded forceps. The fragments are left to find their way out. Suture through the ducts two or more frequently. The calculus fistula is rare and when it occurs it is the missis of one of the ducts. The removal of the stone structure of
The incision is the duct. If no calculi are present in the gallbladder some advise that it be not opened while others would advise it so as to get drainage as in an ordinary case of Cholecystotomy. In cases where the duct cannot be dilated after incision a good result can often be obtained by placing the end of a drainage tube near the incision & bringing it out through the abdominal incision.

As regards prognosis I can permit only to say that calculi seem rarely to reform after operation. Probably this is due to the mucus membrane recovering its healthy condition.

Fridis
List of Works referred to:

1. Von Schmeppl in Zeimses's Cyclopaedia of Medicine Vol IX page 886.

2. Rummel. Klinik der Cholelithiasis by Dr. Rummel 1876.


4. Dr. Harrison. Diseases of Skin by Dr. Harrison 1896.


15. Mayo and Rosent. Gallstones and Their Treatment 1892.


17. F. A. Smith. The Practice of Medicine 1877.

18. Zeimses's Cyclopaedia of Medicine Vol IX.


20. Duckworth. International Medical Clinic Series IV Vol IV.
