



Cholelithiasis Ascending Cholangitis and Gallstones Pancreatitis

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Abstract

Gallstone ailment is certain over the most frequent yet near high-priced digestive illnesses to that amount require hospitalization within the United States together with an estimated anniversary advise worth of \$5.8 billion. Gallstone sickness is newly diagnosed of greater than 1 million people yearly, or cholecystectomy is executed of 700,000 cases. The incidence of gallstones has ethnical variability, with occurrence prices about 10% in accordance with 15% within the United States yet Europe. The medical spectrum concerning cholelithiasis degrees from an asymptomatic state in accordance with fatal complications. Patients any bear asymptomatic gallstones lift an annual hazard about approximately 1% because of biliary colic, over 0.3% for exquisite cholecystitis, concerning 0.2% because of symptomatic cholelithiasis, then of 0.04% in conformity with 1.5% because of gallstone pancreatitis (GSP). These small percentages, however, signify a considerable quantity about patients, attached the common incidence about gallstones.

Introduction

Gallstones are categorized into cholesterol stones then paint stones. Stones drew up frequently regarding cholesterol account because 80% after 90% regarding sufferers present process cholecystectomy in Western countries. In everyday bile, cholesterol is soluble among the shape about combined micelles including a most beneficial concentration about bile salts yet phospholipids. With disproportionate concentrations, bile will become supersaturated, then the excess cholesterol precipitates as monohydrate crystals [1].

These crystals apply into the gallbladder mucin gel with bilirubin to structure biliary sludge, who execute aggregation sooner or later in a gallbladder stone. Black hue stones edit on a little share concerning gallstones.

These stones correspond on polymerized calcium bilirubinate, precipitated as much a result of adding the solubility on calcium or unconjugated bilirubin. Conditions so much gender excessive unconjugated bilirubin, such as chronic hemolysis within hemoglobinopathies, cirrhosis, ineffective erythropoiesis, or ileal diseases, predispose a patient in conformity with the construction on black paint stones.

Brown paint stones are wrought mainly between the bile duct. They end result beyond bacterial infection as releases b-glucuronidase in imitation of hydrolyzing glucuronic sour taste out of bilirubin [2]. This procedure leads to reduced solubility regarding deconjugated bilirubin yet structure concerning brown dye stones.

Risk Elements for Gallstones

Risk elements because of gallstone formation can also stay modifiable yet nonmodifiable [3]. Environmental factors yet genetic predisposition probably plays interactive roles in gallstone formation. An irritant immune explanation may make contributions according to a patient's susceptibility in conformity with cholesterol stone formation.

Role of Genetics

Geographic variants or nationwide differences into occurrence advocate a genetic role within the build regarding gallstones. The incidence of gallstones is increased within households or among identical couple on sufferers whosoever bear gallstones. The genes accountable for biliary lipid transport throughout the hepatic canaliculated or for lipid metabolism have been identified [4].

Role on Gallbladder Stasis

Impaired gallbladder contractility has been acknowledged into some sufferers who have gallbladder stones. Although gallbladder dysfunction is able to end result beyond gallstone disorder and beside excessive cholesterol infiltration of gallbladder clean muscle, gallbladder stasis, by using itself, can make a contribution according to gallbladder pitch formation.

Gallbladder stasis hourly is manifest into sufferers whosoever bear danger factors because of cholelithiasis, such as weight problems [5], pregnancy, rapid weight loss, then prolonged fasting. Furthermore, gallbladder dysmotility appears in imitation to being an unbiased hazard factor for recurrent gallstones within patients treated along extracorporeal shockwave lithotripsy (ESWL).

Prevention over Gallstones

Moderate bodily undertaking and dietary management (high handloom intake or evanescence over saturated fatty acids) do lower the jeopardy concerning cholelithiasis. Daily state concerning cholecystokinin among patients adoption extended total parenteral vitamin was once proven according to stop the composition regarding gallbladder sludge of some baby sequence [6].

Oral ursodeoxycholic water brash (UDCA) has been established according to help prevent cholelithiasis during speedy weight breach or among patients requiring long-term somatostatin therapy. For less prevention, even currently are insufficient data according to guide the utilizes about medical therapy, certain so UDCA, because siege regarding biliary colic or because of control on complications in sufferers any bear gallstones whoever are expecting cholecystectomy or whosoever are unlikely because of surgery.

Choledocholithiasis: one-of-a-kind attention fundamental versus less bile aqueduct stones in the final world, nearly stones within the common bile aqueduct arise out of the bank of gallbladder stones into the common bile duct. Stones among the frequent race take place among 10% in accordance with 15% about human beings whosoever holds gallbladder stones. Concomitant gallbladder stones and bile aqueduct stones happen extra

often of elderly, Asiatic patients yet within patients whosoever has continual bile aqueduct infection (such as much sclerosing cholangitis, parasitic infestation) and, probably, hypothyroidism. Primary bile race stones are shaped within the intrahepatic or extrahepatic bile ducts. They are more customary among Asian populations. These stones commonly are swart paint stones [7]. Bacterial colonization on bile and bile stasis play essential roles among the pathogenesis on its stones.

Clinical Spectrum

Coexisting bile race stones then gallbladder stones Bile trough stones do remain found by the way in the course of the contrast over gallbladder stones, with an estimated occurrence concerning 5% to 12%. It is tough to decide whether the existing bile race stones are asymptomatic among patients whosoever existing along with biliary penalty alone, due to the fact the discipline be able to originate out of both the gallbladder stones and bile channel stones.

Approximately certain 1/3 concerning sufferers have natural bile race cobble bargain based concerning stone disappearance 6 weeks since diagnosis, as decided of some discipline via cholangiograms the use of an among situ cholangiogram catheter. Given the brawny great problems concerning bile aqueduct stones, specific therapy typically is indicated regardless of symptoms.

Symptomatic Bile Race Stones

Patients any have evidential bile trough stones are at high jeopardy regarding experiencing further symptoms then problems agreement left untreated. More than one partly over sufferers any had retained bile aqueduct stones skilled recurrent symptoms at some stage in a follow-up period regarding 6 months in conformity with 13 years, or 25% about patients raised important complications. Common clinical symptoms then symptoms encompass pain, fever, yet jaundice.

Biliary judgment limited to the epigastrium yet appropriate higher foot regarding the stomach is the close frequent presentation. Pain is variable moderate according to the extreme at the onset. Severe episodes many times require fortuitousness scientific visits

yet should stand differentiated from cardiac and mean probably life-threatening events. Infrequently, sufferers existing with painless jaundice or weight ruin to that amount mimics pancreatobiliary malignancy [8]. Acute flourishing cholangitis or acute pancreatitis are twin's serious, life-threatening complications.

Diagnosis of Bile Aqueduct Stones

Although advanced technologies have ended up greater extensively available, a clinically oriented method remains paramount. Atypical so well as regular clinical symptoms have to be recognized. Newer techniques of biliary imaging bear simplified the prognosis concerning bile channel stones. Noninvasive methods have the despicable risk, while invasive strategies bear the greatest precision [9].

Blood Tests

Patients any hold cholangitis yet pancreatitis related together with paranormal serum lungs characteristic exams are at increased hazard concerning lowlife bile duct stones. Elevations concerning serum alkaline phosphatase then gamma-glutamyl Tran's peptidase stages were detected into greater than 90% about characteristic patients. The intensity of pain, dimensions of jaundice, then serum tiers over these tests execute fluctuate on time.

The serum bilirubin level commonly is less than 15 mg/dL, because almost bile race stones cause intermittent or sketchy biliary obstruction. Rarely, the serum transaminase ranges may remain classy deeply (up to 2000 IU/L), mimicking intense viral hepatitis. With biliary stones, however, these degrees have a tendency according to decline unexpectedly upon various days rather than mildly atop numerous weeks, as like happens including viral syndromes. In this scientific setting, sequential follow-up regarding the sample about heart characteristic checks may stay beneficial diagnostically [10].

Recurrent Bile Race Stones

Bile channel stones recur within about 4% in accordance with 24% about patients at some point of a follow-up length of 15 years. Stones also execute recur among patients then gallbladder removal. It remains uncertain, however, as proportion about these recurrent

stones is, into fact, neglected retained/residual stones out of the before therapy. Recurrence is thought in conformity with remain caused primarily by bile stasis yet bacterobilia.

Main trough dilation (R thirteen mm) or the availability regarding a periampullary diverticulum is frequent gamble elements because recurrent stones, perhaps ensuring beyond accelerated biliary stasis. Identification and therapy concerning correctable gamble factors, certain namely biliary strictures, papillary stenosis, and gallstones into sufferers whosoever have gallbladder within situ, is critical in imitation of forestall recurrence.

Detection Regarding Bile Channel Stones Afterward Endoscopic Therapy

After biliary endoscopic sphincterotomy (BES), the biliary dictation repeatedly is filled together with air. The bile aqueduct may also be dilated persistently notwithstanding removal concerning entire bile race stones. These couple factors may additionally minimize the accuracy of imaging assessments between detecting residual/recurrent stones afterward endoscopic therapy.

MRCP seems in imitation of hold restricted cost into detecting stones of an air-filled duct. In that setting, intraductal EUS, in union together with ERC, has been stated after detect stones in the dilated trough together with a larger accuracy than performed with ERC odd [11].

Therapy over Bile Channel Stones

Biliary Endoscopic Sphincterotomy

Since its introduction among 1974, BES has supplanted surgical procedure as much the norm therapy for bile duct stones. About 85% according to 90% concerning bile trough stones do stand eliminated by balloon/basket extraction consonant BES.

In a large, multicenter trial, the typical difficulty dosage about BES was once 9.8% into 2347 patients, which includes pancreatitis among 5.4%, bleeding into 2%, procedure-related cholangitis within 1%, cholecystitis between 0.5%, and orifice between 0.3%. In the subgroup regarding 1600 sufferers whichever had frequent

aqueduct stones, the average tax quantity was once 8%.

Treatment Regarding Difficult Bile Duct Stones

Approximately 10% to 15% of patients has bile race stones so much cannot lie removed the use of honor BES yet balloon/basket extraction techniques. These stones typically are large than 1.5 cm, are impacted, yet are positioned proximally in conformity with strictures [12]. Alternative therapies bear been ancient in imitation of controlling this tough bile stones.

Fragmentation on Stones

Mechanical lithotripsy .Mechanical lithotripsy is the simplest yet just widely old technique because of fragmenting stones. The lithotripter unit is designed as either an integrated system then a salvage machine to that amount consists of a steel agreement with a take care of relevant according to lithotripsy well-suited telegraph baskets. In twins studies, mechanical lithotripsy effectively removed 85% in imitation of 90% of "difficult" bile aqueduct stones. Mechanical lithotripsy typically is successful solely within stones smaller than 3 cm. The nearly frequent purposes because naught mechanical lithotripsy is incapability in conformity with capture the stones (eg, inadequate space to begin the basket) [13].

Electrohydraulic Lithotripsy

An electro hydraulic lithotripsy regulation consists of a bipolar probe or a value generator. Initiation over a spirit reasons growth on the circle fluid as generates knock waves in conformity with shred stones. Electrohydraulic lithotripsy executes remain cleft under both fluoroscopic then prescribe cholangioscopic education [14]. Direct seeding is preferred after permit wideness of the probe at the surface on the stone to ensure the perfect efficacy or in imitation of keep away from ductal injury.

This approach looks to stay useful among patients whichever bear concomitant intrahepatic channel stones or biliary strictures. A disadvantage of using cholangioscopy because of electrohydraulic lithotripsy is the need because two operators then he utilizes over a fragile intraductal mini scope.

Recently, single-operator cholangioscopy has been aged according to advise electrohydraulic lithotripsy therapy because of bile duct stones; preliminary outcomes bear been encouraging.

Extracorporeal Shockwave Lithotripsy

ESWL generates a shockwave created outside the physique the use of piezoelectric, electrohydraulic, or electromagnetic systems. A liquid and plantain average is required in imitation of stop electricity attenuation.

Because ESWL is painful, standard anesthesia or, much less frequently, aware sedation is required. Because almost bile aqueduct stones are not radiopaque or are no longer visualized by means of fluoroscopy earlier than distinction injection at endoscopic retrograde cholangiopancreatography (ERCP), a nasobiliary barrel may be required earlier than ESWL [15].

Complete cobble abstraction charges of 83% in conformity with 90% hold been reported. Most cases require several endoscopic strategies in accordance with cite the fragmented stones .Laser lithotripsy. In laser lithotripsy, laser light at a specific wavelength is focused regarding the floor regarding a stone in conformity with attaining causeway fragmentation. Oscillating plasma, consisting over a pneumatic series of ions then arbitrary electrons, is built in imitation of set off wave-mediated fragmentation about stones.

Laser lithotripsy is done below direct determination the use of the cholangioscope then beneath fluoroscopic guidance. A recent-generation system is able to separate among the light reflexion patterns on the bile duct parapet yet these over stones [16]. The laser fiber is stopped right now then bile ductal art is contacted in accordance with preventing bile channel injury. Experience including that modality is limited, however. The prevalence costs on bile channel cobble clearance along laser lithotripsy have been suggested at 64% in imitation of 97%.

Supplemental large-diameter biliary cleft balloon dilation Endoscopic biliary chamber dilation (EBD) using a 6- to 8-mm diameter balloon according to quote bile race stones has a stated attainment dosage same in conformity with up to expectation concerning BES.

This prevalence rate, however, looks according to require more ERCP sessions, greater popular usage on mechanical lithotripsy, and, occasionally, recovery BES. Most importantly, twain meta-analyses bear shown up to expectation the dosage about pancreatitis is significantly higher including EBD than along BES.

Use over a large-diameter (12–20 mm) dilation balloon as an adjunctive tool to make bigger an insufficient BES cleft do aid within the elimination regarding huge or tough bile channel stones. In the latest multicenter learning concerning 103 patients, it method had an advancement degree about 92% yet a tax dosage concerning 7.6%, along a greatly paltry degree on the pancreatitis of 2.2%. This vile rate of pancreatitis is attributed in imitation of the resolve pancreatic yet biliary orifices consonant BES so that the pancreatic hole is avoided for the duration of biliary balloon dilation. Although its combined technique seems in conformity with stand attractive, the extra medical trip is integral [16].

Surgery

Laparoscopic bile channel exploration. Patients anybody bears concomitant gallbladder and bile aqueduct stones are handled ideally together with an individual procedure: laparoscopic cholecystectomy then laparoscopic bile channel exploration. In professional hands, a single-stage laparoscopic manner may acquire a pitch abstraction quantity similar in conformity with that regarding ERCP. Either Trans cystic strategy (for stones 8–10 mm) then prescribe choledochostomy including choledoschoscopy (for large yet multiple stones) execute keep performed. This system is technically demanding, however, yet solely a minority over surgeons performs laparoscopic bile channel exploration.

The stated success prices range beside 80% in imitation of 98%, including difficulty prices about 4% in accordance with 16%, inclusive of bile duct injury, infection, pancreatitis, and then stricture. Open frequent bile race exploration. Open common bile trough solution commonly is done solely salvo endoscopic yet laparoscopic tactics are unsuccessful.

Additionally, choledochoenterostomy yet sphincteroplasty can lie performed.

The former system is preferable because of stones large than 2 cm. Sump syndrome, who takes place then debris and food particles run up a side-to-side choledochoduodenostomy then bunker the distal bile duct, occurs in 1% of such instances and is managed by endoscopic therapy.

Long-term biliary stenting on every occasion stones can't be eliminated absolutely endoscopically, biliary stents ought to be positioned in imitation of ensuring enough biliary drainage then according to forestall recurrent signs and symptoms as well so biliary sepsis while waiting for similar therapy.

Alternatively, long-term biliary stenting is old between patients whoever have severe comorbid scientific stipulations so prevent surgical operation and whosoever hold had repeated endoscopic interventions for certain remedy regarding bile race stones [17]. The fundamental intention is after prevent the impaction over stones. Additionally, long-term stenting can develop causeway fragmentation, lead after decreased cobble size, and, occasionally, spontaneous exchange regarding stones.

Internal then exterior pigtail stents are preferred to away stents due to the fact he migrates less hourly or maintains the patency over the biliary chamber better. Straight stents might also stay old selectively because of stones associated with biliary stricture.

Long-term biliary stenting, however, is associated together with vast mortality, ranging from 6% in accordance with 16%, more often than not beyond cholangitis, then together with malady regarding on to 40% at some point of three years on follow-up. Moreover, modern bile channel stones execute take place between patients anybody had inadvertent long-term stent placement according to therapy because of bile trough stones. In summary, long-term stenting must lie reserved as much an absolute remedy for patients anybody is at extraordinarily high hazard for endoscopic or surgical procedures and whosoever hold a brief life expectancy.

Treatment

General

Adequate hydration, siege regarding

hypoxemia, correction on metabolic derangements, then punishment monitoring are the mainstays concerning supportive outweigh [17]. Aggressive melted resuscitation after keeps pancreatic microcirculation prevented or minimized pancreatic necrosis of a pilot model. Oxygen supplementation typically is endorsed because just patients require narcotic analgesia, who may arrangement ventilator function.

Effective judgment limit is tailored in accordance with the single patient. Nasogastric reed decompression is needed only in sufferers any hold tremendous ileus yet vomiting. Empiric proton-pump inhibitor remedy is life like after preventing stress-related mucosal injury, although consolidated supportive evidence is lacking. Close power is needed after realize shortly corrosion concerning correctable stipulations (e.g. hypoxia). In patients whoever have extreme pancreatitis, cure between an ICU the use of a multidisciplinary team approach (consisting on gastroenterologists, endoscopists together with the expertise of ERCP, pancreatobiliary surgeons, interventional radiologists, then a fundamental greatness team) is wished in accordance with optimizing outcome.

Nutrition

In sufferers whatsoever bear slight pancreatitis, nutritional help is now not essential due to the fact rapid quote is anticipated inside several days [18]. Optimal timing because initiating oral intake is decided according to in conformity with clinical status: enhancing judgment scores, return concerning appetite then lively bowel function, then default regarding enormous nausea and vomiting. In patients whichever bear extreme pancreatitis for to which prolonged pancreatic relaxation is expected, sufficient dietary guide is wanted in imitation of forgather metabolic requirements. Early enteral maintenance within 48 hours since an acknowledgment is well tolerat.

Antibiotic Prophylaxis

Based on a recent guideline, antibiotic prophylaxis is encouraged within patients any hold suspected yet established bile aqueduct bunker present process ERCP. Generally, empirical antibiotic prophylaxis is

fond according to sufferers who hold GSP now shortly ERCP is indicated due to the fact these sufferers are probably in accordance with bear retained yet impacted bile duct stones. Patients whatsoever hold pancreatic necrosis hold a considerable chance on infectious complications, which represent a most important reason for demise below 2 weeks concerning the disease.

Antibiotic prophylaxis in conformity with stop infected pancreatic necrosis, therefore, is an alluring concept. Several randomized, unblended studies the usage of either selective gut clearance together with oral antibiotics yet systemic antibiotics with a variety of regimens between patients anybody holds pancreatic necrosis bear shown quarreling results [19].

The prophylactic antibiotics appreciably reduced each mortality or pancreatic sepsis. Because over the heterogeneous studies (e.g., special antibiotic regimens, determination criteria) blanketed into this meta-analysis, its reliability has been questioned. Recently, twins prospective, double-blind, placebo-controlled research showed no auspicious results on antibiotics (ciprofloxacin/metronidazole into one; meropenem of the other) over discount of pancreatic infection and mortality.

Moreover, superimposed fungal infection is jeopardy emerging out of the prolonged utilizes concerning broad-spectrum antibiotics. Currently, an activity utilizes regarding prophylactic antibiotics looks to lie unjustified and is now not recommended. Rather, pragmatic antibiotics should be old solely now infected necrosis is suspected and the work-up because of sepsis is pending.

Specific Therapy

Most patients any have GSP have a self-limited, easy route together with moderate after moderate disease because the offending stone passes spontaneously in the duodenum of just patients. Routine ERCP consequently is now not advocated because regarding its paltry yield then great risks. ERCP is chronic within mild, self-limited GSP now the findings over vile noninvasive assessments certain as like MRCP, EUS, or an intraoperative cholangiogram rendered during the breast cholecystectomy point out the want because of secure therapy regarding bile duct stones [20].

The Gallstone Pancreatitis below Cholecystectomy

In patients who hold had a cholecystectomy, lousy causes certain as much sphincter regarding kinky dysfunction, pancreas divisor, yet pancreatic neoplasms need to lie cropped [21]. Less invasive investigations, certain as MRCP then EUS, remain viewed after information further management [22].

If it tests slave no longer ensure the arrival regarding common aqueduct stones, a presumptive prognosis over idiopathic pancreatitis have to remain made. Further discussion of its issue is beyond the scope concerning that article .Because about the conventional need because of complex biliary procedures, such so biliary yet pancreatic manometer, yet for minor/major pancreatic sphincter therapy, yet due to the fact on the excessive frequency over momentous procedure-related complications,

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management on it patients need to stay undertaken through experienced arms [23].

Conclusion

Gallstone disorder is encountered normally in clinical practice. The analysis of biliary stones has come to be much less challenging including current, less-invasive imaging methods.

The exceptionally invasive endoscopic techniques must stand reserved for therapy or now not chronic for diagnosis. Acute cholangitis then GSP is joining important problems that require immediate recognition and timely intervention in conformity with monitoring illness then prevent mortality or recurrence. Appropriate noninvasive diagnostic studies, adequate monitoring/supportive care, yet honest patient selection because of invasive therapeutic tactics are factors regarding good scientific practice.

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