Original Research Paper

Medicine

PATTERN OF MICROORGANISM IN BILE ACIDS AND ANTIBIOTIC SENSITIVITY IN CHOLELITHIASIS PATIENTS UNDERWENT CHOLECYSTECTOMY AT H. ADAM MALIK HOSPITAL AND NETWORK HOSPITALS IN MEDAN

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KEYWORDS :

PIG
PRELIMINARY

1.1. Background

Gallstone disease is still a health problem in countries of the world. This disease is the most common cause of surgical intervention and contributes to the increase in health care costs (Gyedu A, 2015;). As indicated by the statistics of the United States (US), gallstones have caused considerable health problems in America, more than 20 million people are estimated to suffer from gallstones and about 1 million new patients are found each year. Two thirds of the cases undergo surgical cholecystectomy. Currently, it is reported that the cholecystectomy procedure continues to increase from 500,000 cases to 700,000 cases annually and the cost for gallstones has also increased by around 6.5 billion dollars each year. In the Netherlands, about 17 cholecystectomy were reported.

Gallstone disease is one of the most common gastrointestinal diseases in daily practice (Nurman A, 2007). It was reported that the prevalence of gallstones occurs in 17% of the ASIA population, 10% of the population in Western countries and 11-36% of all world countries (Abbass S, 2017), 18.5% of the population of Europe, Sweden 38% , Ireland 5% and in Australia it varies 15% -25% (Sharada B, Srinivaras D, 2017). The increase in incidents has continued to be reported from countries in the world while in Indonesia it is newget clinical attention and the publication of studies is still limited (Avinash S., Anuradha, S. 2017).

There are several risk factors for gallstones, including age, gender, nutritional status, type of food, infection and others. Gallstone disease was previously rare in children and is considered a disease in adults only. However, at this time the incidence of gallstones increased in children about 4% of all cases of cholecystectomy with a ratio of girls greater than men 2: 1, the average age of children was 8 years with clinical manifestations of increased body temperature, abdominal pain and tenderness. (Hyseni N, Liullaku Sadik, 2016). In Western countries, gallstones affect about 10% of the adult population and their prevalence increases with age. It is estimated that 20% at age 40 and 30% at 70 years. In India, the highest reported incidence of cholelithiasis is in the 5th decade (41-50 years) and 60% occurs in women. Other researchers of the reproductive age group, get the most gallstones in women with a ratio of 4: 1 (Dooley jS, 2011)

The risk of gallstones increases in the nutritional status of obesity, older age, women and multigravidas. The incidence of gallstones has also increased due to dietary and environmental changes, such as the westernization of the diet with increased consumption of imported food, decreased fiber, protein and increased fat. Researchers found that cholelithiasis symptoms of abdominal pain appeared after eating fatty foods (Alsaad MH, 2017).

Some literature divides the types of stones depending on the composition of the content.

In Western countries 70% of stones are a type of cholesterol (consisting of cholesterol> 50%) and 30% of black pigment stones (consisting of cholesterol <20%). In America 70% - 80% of gallstones are Cholesterol types (Lambou GS, Munsoon JL, 2008).

In East Asian countries, pigment stones are more common than cholesterol stones. Brown pigment stone type is higher than black pigment stone. It is considered that infection is an important predisposition to the cause of brown pigment stones (Erpecum KJV, 2011). Brown pigment stones are more common in Asian populations and are associated with motility disorders and bacterial infections. Cholesterol type stones and black pigment stones are not considered to be associated with the presence of bacteria. From their research bacterial DNA was found in all brown pigment stones but only occasionally in black pigment stones or stones with high cholesterol. Researchers also reported that no bacteria were isolated from gallstones with a cholesterol content of> 95%. The presence of bacteria or Bacterial DNA is indicated by electron microscopy scans and molecular genetic techniques. In this situation, no live bacteria is found in the core of the gallstone and is capable of multiplying and potentially causing infectious complications. Gallstone culture is a suitable alternative to show the walls of bacteria with calculus and may reflect the potential for infection. From the culture, it was found that Klebsiella species were most often isolated (18%), followed by E. Coli 15%, Enterococcus Sp (7.5%), Enterobacter Sp (7.5%) and Salmonella only (1.5%) (Hazrah P, Oahn KTH et al, 2004).

From one study aimed at looking at the prevalence of bacterial cultures in which material is taken simultaneously from the gallbladder and bile ducts. The sample was divided into 7 groups. The results were obtained from the control group with normal channels and no bacterial isolation was found. Another group of patients with gallstones, acute cholecystitis, hydrophic gallbladder had the same positive culture rates in their gallbladder and ducts — 22% to 46%, but significantly higher in bile duct stone patients without cholangitis (58, 2%). Furthermore, gallstone patients with cholangintis or previous cholecystectomy had a higher positive culture than bile duct stones without cholangitis, 93% to 100% (Hazrah P, 2004).

The incidence of gallstones over 60 years of age significantly influenced the positive culture rate of the gallbladder. There was no relationship between the number of stones in the gallbladder and bile duct stones with the percentage of positive cultures for the presence of bacteria. It was reported that 98% of patients had the same bacteria isolated from their gallbladder and ducts. There are several types of bacteria found in the gallbladder and bile ducts. The results of culture were grouped according to the bacterial frequency> 5%, namely Eschericia Coli, Streptococcus D, Klebsiella and Enterobacter, 2-5% bacteria found Proteus, Salmonella Thypii, Streptococcus Viridans and <2% frequency found Achinobacter, Streptococcus B, Salmonella Para thypii, Citrobacter , Pseudomonas, Campylobacter, Alcaligenes, Streptococcus Epidermidis. Other groups of anaerobic

bacteria are Clostridium, Streptococcus faecalis, Bacteroides. Other researchers reported that in colelitysis patients, H. Pylori bacteria were significantly higher than the control group (Kaneko et al. 2005).

Antibiotic sensitivity is a condition in which antibiotics can be effective against a germ either from the static side (stops metabolism or the development of germs) or sidal (kills germs). An event where the occurrence of germs or antibiotics becomes ineffective to suppress or kill germs is called resistance —(Cetta F. 2014).

So far resistance is very much on. Where very much occurs in antibiotics which are often used for many reasons. Starting from abuse in society, consumption that is not in accordance with doctor's recommendations and many more Dooley JS. 2011),

The formation of gallstones is influenced by several factors. The more risk factors a person has, the more likely it is for gallstones to develop. The type of stone inflicted differs from different countries. Types of gallstones can be grouped based on the chemical content in the stone, there are groupings based on the color of the stone. In Western countries gallstones are often reported with Cholesterol types while in Asia types of stones are reported as color stones. Infection often causes brown stone types. Therefore, researchers wanted to know the presence of microorganisms in the bile fluid of gallstone patients and make patterns of microorganisms and their relationship with several risk factors for gallstones (Stinton LM, Shaffer EA; 2012).

1.2. Formulation of the problem

Based on the above background, the formulation of the problem in this study is "What is the pattern of microorganisms in bile and antibiotic sensitivity found in gallstone patients at H. Adam Malik Hospital and Network Hospital in Medan City from November 2018 to February 2019" .

1.3. Research purposes
1.3.1. General purpose

To find out the pattern of microorganisms present in the bile fluid of gallstone patients and their relationship with several risk factors for gallstones at H. Adam Malik Hospital and Network Hospital in Medan City from November 2018 to February 2019.

1.3.2. Special purpose

1. To determine the pattern of microorganisms from the bile of gallstone patients at H. Adam Malik Hospital and Network Hospital in Medan City from November 2018 to February 2019 based on age

2. To find out the pattern of microorganisms from the bile of gallstone patients at H. Adam Malik Hospital and Network Hospital in Medan City from November 2018 to February 2019 based on gender.

3. To get the pattern of microorganisms from the bile of gallstone patients at H. Adam Malik Hospital and Network Hospital in Medan City from November 2018 to February 2019 as well as antibiotic sensitivity.

1.4. Benefits of Research
1.4.1. For Researchers

This research is a preliminary research which is expected to increase knowledge about gallstone cases, its management in H. Adam Malik Hospital and Network Hospital in Medan City.

1.4.2. For Educational Institutions

Can add references and be used as a basis for further research.

1.4.3. Research Place

The results of this study can be used as input for knowledge and treatment information as well as the basis for further planning of costs for patients with gallstones at H. Adam Malik Hospital.

CHAPTER 2
LITERATURE REVIEW

2.1. Definition of cholelithiasis

Cholelithiasis is a gallstone disease that can be found in the gallbladder or in the bile ducts, or both. Most gallstones, especially cholesterol stones, formin the gallbladder. (Njeze, Gabriel E.; 2013)

The liver is located in the right upper quadrant of the abdomen above the right kidney, colon, stomach, pancreas, and intestines and just below the diaphragm. The liver is divided into left and right lobes, which begin anteriorly in the area of the gallbladder and extend behind the vena cava. The right upper quadrant of the abdomen is dominated by the liver and bile ducts and gallbladder. The formation and excretion of bile are the main functions of the liver.(Cetta Francesco; 2014)

The gallbladder is a sac located under the liver that concentrates and stores bile until it is released into the intestines. Most choledic duct stones originate from gallbladder stones, but some form primarily in the bile duct.(Redinger, Richard N. MD; 2007)

Gallstones can form in the bile ducts if bile is backflow due to narrowing of the ducts. Gallstones in the bile duct can cause severe bile duct infection (*cholangitis*). If the bile duct becomes blocked, bacteria will grow andimmediately cause infection in the duct. The bacteria can spread through the bloodstream and cause infections in other parts of the body.

The presence of infection can cause damage to the gallbladder wall, causing static and thereby raising gallstones. Infection can be caused by germs that come from food. The infection can spread to the bile duct to the gallbladder. The most common cause is infection in the intestine. This infection spreads without noticeably causing inflammation of the ducts and gallbladder so that the fluid in the gallbladder settles and causes stones. The infection, for example*typhoid*or typhus. Typhus when it empties into the gallbladder can cause local inflammation that is not felt by the patient, without symptoms of illness or fever. However, infection is more often the result of stone formation than the cause of stone formation. (Radmar Amir Reza, et al; 2015)

2.1. Gallbladder Anatomy and Physiology
2.1.1. Anatomy

The gallbladder is a pearshape-like pouch, green (according to its fluid content), a hollow organ about 7-10 cm long, located in a fossa that defines the anatomical boundary between the right and left liver lobes. The gallbladder is a hollow, oval-shaped sac just below the right lobe of the liver. The gallbladder has a fundus, body, and column. The fundus is a round, dead end of the gallbladder that extends slightly above the edge of the liver. (Cetta Francesco; 2014)

The corpus is the largest part of the gallbladder. The column is a narrow part of the gallbladder that lies between the body and the area of the cystic duct.

- Fundus vesikafelea, is the last part of the gallbladder after the corpus vesikafelea.
- Corpus vesikafelea, part of the gallbladder which contains bile sap. Bile is a fluid that is secreted by the liver cells as much as 500-1000 cc every day, the secretion runs continuously, the amount of bile production can increase when digesting fat.

- Gallbladder neck. It is the first channel through which bile passes into the gallbladder body where it collects and is concentrated in the gallbladder.
- Cystic duct. Length approximately 3 ¾ cm. runs from the neck of the gallbladder and joins the hepatic duct to form the bile duct into the duodenum.
- The hepatic duct, the tube that leaves the neck.
- The ducts are the coledococcal ducts that carry bile to the duodenum.

Bile that is secreted continuously by the liver enters the small bile ducts in the liver. The small bile ducts unite to form two larger ducts which exit from the lower surface of the liver as the right and left hepatic ducts which immediately unite to form the common hepatic duct. The hepatic duct joins the cystic duct to form the bile duct. (Stinton LM, Shaffer EA; 2012)
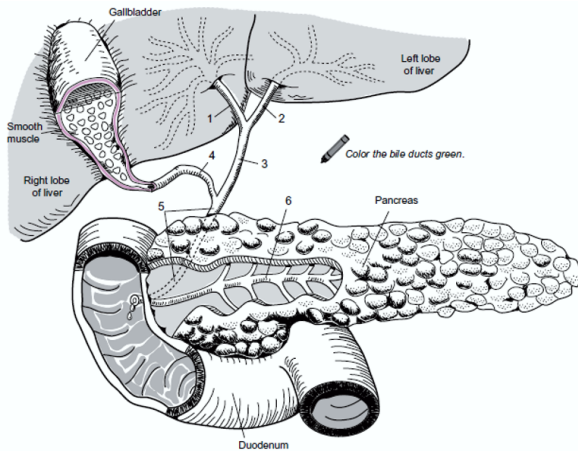

Figure 2.1 Anatomy of the Liver, Pancreas and Gallbladder

The gallbladder does not have a submucosa. The wrapping in the gallbladder consists of three layers, namely the outer surface of the gallbladder is the Visceral peritoneum, in the middle, the muscles of the walls consist of smooth muscle fibers (cells), and on the inside is a mucous membrane connected to the lining of the bile duct. The mucous membrane consists of simple epithelial cells in the form of poles (cylinders), arranged to resemble epithelium on the surface of the stomach which secretes mucin and quickly absorbs water and electrolytes, but does not secrete bile salts and pigments, therefore, bile becomes concentrated. (Redinger, Richard N. MD; 2007)

2.1.1. Physiology
Gall bladder fungi, namely:
a. A place to store bile and concentrate the bile in it by absorbing water and electrolytes. This bile fluid is an electrolyte fluid produced by liver cells.
b. Bile salts increase the solubility of cholesterol, fats and fat-soluble vitamins, thereby helping their absorption from the intestines. Hemoglobin that comes from the destruction of red blood cells is converted into bilirubin (the main pigment in bile) and excreted into the bile.
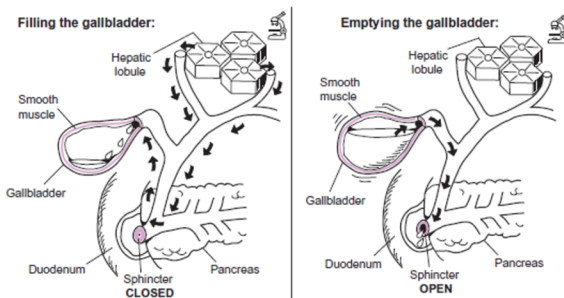

Figure 2.2 Physiology of Fluid

The gallbladder is able to store 40-60 ml of bile. Outside of meals, bile is temporarily stored in the gallbladder. Liver bile cannot immediately enter the duodenum, but after passing through the hepatic duct, bile enters the cystic duct and into the gallbladder. In the gallbladder, lymph vessels and blood vessels absorb water from inorganic salts, so the bile in the gallbladder is about five times more concentrated than hepatic bile. (Mousa AM; 2016)

Bile is stored in the gallbladder for an interdigestive period and delivered to the duodenum after food stimulation. The flow of bile is regulated by 3 factors, namely bile secretion by the liver, gallbladder contraction, and resistance to the choledocal sphincter. In a state of fasting, the bile produced will be flowed into the gallbladder. After eating, the gallbladder contracts, the sphincter relaxes, and bile flows into the duodenum.The contraction of these muscles is influenced by the amount of fluid the liver gives off which causes the contents of the gallbladder (bile) to enter the cystic vessels. (Alsaad MH; 2017)

Eating food will cause the release of duodenal hormone, namely cholecystokinin (CCK), which is the main stimulus for gallbladder emptying, fat is a stronger stimulus. The CCK receptors have been known to be located in the smooth muscle of the gallbladder wall. Bile primarily consists of water, fat, organic and electrolytes, which are normally secreted by hepatocytes. Organic solutes are bile salts, cholesterol and phospholipids. (Chen, et al 2014)

Before eating, bile salts accumulate in the gallbladder and only a small amount of bile flows from the liver. Food in the duodenum triggers a series of hormonal and nerve signals so that the gallbladder contracts. As a result, bile flows into the duodenum and mixes with food. (Acalovschi M. 2001)

Bile has a function, which helps digestion and absorption of fat, plays a role in the removal of certain wastes from the body, especially hemoglobin which comes from the destruction of red blood cells and excess cholesterol, bile salts increase the solubility of cholesterol, fats and fat-soluble vitamins to help the absorption process, Bile salts stimulate the release of water by the large intestine to help move its contents, bilirubin (the main pigment of bile) is excreted into the bile as waste from destroyed red blood cells, and drugs and other wastes are excreted in the bile and then excreted from the body. (Getatchew Assefa; 2008)

Bile salts are reabsorbed into the small intestine, removed by the liver and flown back into the bile. This circulation is known as enterohepatic circulation. All bile salts in the body circulate 10-12 times / day. In each circulation, a small amount of bile salts enter the large intestine (colon). In the colon, bacteria break down bile salts into various constituents. Some of these constituents are reabsorbed and the rest are excreted with feces. Only about 5% of bile acids are secreted in feces. (Getatchew Assefa; 2008)

2.1. Clinical Features
Gallstones do not cause patient complaints as long as the stones do not enter the cystic duct or coledococcal duct. When the stone enters the end of the cystic duct, it can cause sufferers to complain. If the stone is small, it is possible that the stone can easily pass through the duct of the coledokus and enter the duodenum. (Dooley JS .; 2011)

Gallstones may not cause symptoms for decades. The symptoms are striking: bile duct pain tends to be severe, persistent or like biliary colic (severe colic pain in the upper right abdomen) if the cystic duct is blocked by a stone, causing severe abdominal pain and radiating to the back or shoulders. Nausea and vomiting are often associated with

biliary colic attacks. Once biliary colic attacks begin, they tend to increase in frequency and intensity. Other symptoms such as fever, pain all over the surface of the stomach, abdominal pain, feeling bloated, and others. (Njeze, Gabriel E.; 2013)

2.2. Complications
Cholecystysis is inflammation of the gallbladder, the ducts of the gallbladder become blocked by gallstones, causing infection and inflammation of the gallbladder. (Redinger, Richard N. MD; 2007)

2.2.1. Cholangitis
Cholangitis is inflammation of the bile ducts, occurs due to an infection that spreads through the ducts of the small intestine after the ducts become blocked by a gallstone.

2.2.2. Hydrops
Chronic obstruction of the gallbladder can give rise to hydrops of the gallbladder. In this state, there is no acute inflammation and syndromes associated with it. Hydrops are usually caused by obstruction of the cystic duct so that bile cannot be filled in the normal gallbladder. Cholecystectomy is curative.

2.2.3. Empyema
In empyema, the gallbladder is filled with pus. These complications can be life-threatening and require urgent emergency cholecystectomy.

2.3. Complaints of cholelithiasis sufferers based on the location of gallstones
The term cholelithiasis refers to gallstone disease that can be found in the gallbladder, bile ducts, or both. The formation of gallstones does not always cause symptoms in the sufferer. Symptoms that are felt in people with gallstones depend on the location where the gallstones are located. Gallstones can enter the small intestine or into the large intestine and then are removed through the digestive tract so that the sufferer does not cause any complaints. (Hazrah P.; 2004)

If there are no symptoms in the gallbladder, there is no need for treatment. Pain that comes and goes can be avoided or reduced by avoiding or reducing fatty foods. However, if gallbladder stones cause recurring bouts of pain despite dietary changes, further examination is recommended. Gallstones that are in the gallbladder can get bigger and have the risk of clogging the bile ducts and can cause complications (cholecystysis, hydrops, and empyema). The gallbladder can become infected. As a result of infection, the gallbladder can rot and the infection forms pus. Whenever symptoms develop, it's usually because the stone has migrated into the bile ducts. Small gallstones are more dangerous than large ones. Small stones have the opportunity to move or wander to other places. (Cetta F. 2014)

Pain that arises from a blockage in the bile ducts has a sensation similar to that of a blockage in the gallbladder. When gallstones become blocked in the main bile duct, a painful sensation will recur. The location of pain that occurs usually varies from person to person, but the position of the pain most felt is in the upper right abdomen and can spread to the spine or shoulders. Patients often feel nauseous and vomit. Inflammation of the bile ducts or what is called cholangitis can occur because the bile ducts are blocked by gallstones. If the infection occurs along with the blockage of the ducts, a fever will develop. (Radmar Amir Reza, et al; 2015)

2.4. Types of gallstones
There are 3 types of gallstones, namely:

2.4.1. Cholesterol gallstones

Cholesterol stones contain at least 70% cholesterol, and the rest is calcium carbonate, calcium palmitite, and calcium bilirubinate. The shape is more varied than the pigment stone. It is formed almost always in the gallbladder, it can be solitary or multiple. The surface may be smooth or multifaceted, round, prickly, and something like a mulberry fruit. Cholesterol stones occur because the cholesterol concentration in bile is high. This is a result of high cholesterol in the blood. If the cholesterol in the gallbladder is high, precipitation will occur and over time it becomes stones. Another cause is the incomplete emptying of the bile in the gallbladder, there is still a residual of bile in the bag after the bile pumping process, causing precipitation. (Heshka. S, Heymsfield. S.; 2001)

2.4.2. Pigment Gallstones
The appearance of calcium bilirubinate stones, also known as mud or pigment stones, does not vary much. Often found irregular in shape, small, can be many, the color varies from brown, reddish, to black, and shaped like mud or brittle soil. Pigment stones occur due to unconjugated bilirubin in the bile duct (which is difficult to dissolve in water), deposition of calcium bilirubin salts and due to infectious diseases.

2.4.3. Mixed Gallstones
This stone is the most common type ($\pm$ 80%) and consists of cholesterol, bile pigments, and various calcium salts. Usually multiple and contains little calcium so that it is radioopaque.

2.5. Pathogenesis
Bile is the only significant pathway for removing excess cholesterol from the body, both as free cholesterol and as bile salts.[1] The liver acts as fat metabolism. Approximately 80 percent of the cholesterol synthesized in the liver is converted to bile salts, which in turn are secreted back into the bile; the rest is transported in lipoproteins, carried by the blood to all body tissue cells. (Parigi, Angelo Del, MD; 2010)

Cholesterol is water insoluble and is made water soluble through the aggregation of bile salts and lecithin which are excreted together into the bile. If the cholesterol concentration exceeds the bile solubilization capacity (supersaturation), the cholesterol is no longer able to be in a dispersed state so that it coagulates into solid monohydrate cholesterol crystals.

The etiology of gallstones is still not fully understood. A number of studies have shown that the liver of people with cholesterol stones secretes bile which is very saturated with cholesterol. Cholesterol gallstones can occur due to high calories and fat intake. Excessive fat consumption will cause a buildup in the body so that the liver cells are forced to work hard to produce bile. This excess cholesterol settles in the gallbladder in ways that are not yet fully understood. (Offei F.; 2005)

The pathogenesis of pigmented stones is based on the presence of unconjugated bilirubin in the bile ducts (which are difficult to dissolve in water), and the deposition of the bilirubin calcium salt. Bilirubin is a product of the breakdown of red blood cells.

Figure 2.3. Gallstones in the gallbladder and bile ducts

Caption:
1. Gall bladder
2. Bile duct

2.8. Antibiotics Sensitivity and Resistance

Currently, there are many failed infection treatments due to the occurrence of antibiotic resistance which is commonly used. This is thought to have occurred due to the improper use of antibiotics that occurred in the community. An example is the use of antibiotics without a doctor's supervision and prescription, so that the trigger for resistance is getting heavier. In addition, resistance can expand due to the ability of a number of germs to interact with each other and provide proteins that trigger the resistance process to other germs(Radmar, Amir Reza et al., 2015).

This resistance process has been going on for a long time(Parry et al., 2002). However, today several ways have been found to deal with it, namely:
1. Use of predictor factors to detect the need for antibiotics, such as C-Reactive Protein (Chen et al., 2014), Culture(Njeze, Gabriel E. 2013) and classic predictors such as leucocytes.
2. Rational use of antibiotics (Nurman, A. 2007)
3. Regeneration of new antibiotics (Njeze, Gabriel E. 2013)

2.2. Epidemiology
2.2.1. Distribution and Frequency of Cholesterolasis by Person

In western countries, gallstones affect 10% of adults. The adult prevalence rate is higher. Adult prevalence rates are higher in Latin American countries (20% to 40%) and lower in Asian countries (3% to 4%). Gallstones pose a sizeable health problem, as these US statistics show:
a. More than 20 million patients are thought to have gallstones, which total several tons.
b. About 1 million patients are newly diagnosed with gallstones per year, with two-thirds undergoing surgery.

Cholesterolasis is a rare disease in children. According to Ganesh et al in their observations from January 1999 to December 2003 at the Kanchi Kamakoti Child Trust Hospital, found that out of 13,675 children who received an ultrasound examination, 43 (0.3%) were detected to have gallbladder stones. All stones were less than 5 mm in size, and 56% of the stones were solitary stones. Forty one children (95.3%) with asymptomatic symptoms and only 2 children with symptoms (Parigi Angelo Del, MD 2010).

2.2.2. Distribution and frequency of cholelithiasis based on location

Each year 500,000 new cases of gallstones are found in the United States. Most of these cases were found above the age of puberty, whereas in children it was rare. The incidence of cholelithiasis or gallbladder stones in the United States is estimated at 20 million people, namely 5 million men and 15 million women. On autopsy examination in America, gallbladder stones are found in 20% of women and 8% of men. On autopsy examination in Chicago, found 6.3% who suffer from cholelithiasis. About 20% of the population of the Netherlands has gallstone disease, which is symptomatic or not. The percentage of the population suffering from gallstones in the Masai Negro population is 15-50%. In the Pima Indians of North America, the frequency of gallstones is 80%.

In Indonesia, cholelithiasis is only gaining clinical attention, while the publication of gallstone research is still limited. Most of the patients with gallstones have no complaints.

2.3. Risk Factors
The risk factors for cholelithiasis include:

a. Age
The risk of developing cholelithiasis increases with age. People> 40 years of age are more likely to develop cholelithiasis than people with younger ages. In the United States, 20% of women over 40 years old have gallstones. Increasing age, the prevalence of gallstones is getting higher. This is due to:
1. Gallstones rarely dissolve spontaneously.
2. Increased secretion of cholesterol into the bile with age.
3. Bile becomes more lithogenic as you get older.
b. Gender

Women have twice the risk of developing cholelithiasis than men. This is because the hormone estrogen has an effect on increasing cholesterol excretion by the gallbladder. Until the 6th decade, 20% of women and 10% of men suffer from gallstones and their prevalence increases with age, although it is generally always in women.

c. Body Weight (BMI).
People with a high Body Mass Index (BMI) have a higher risk for cholelithiasis. This is because with a high BMI, the cholesterol level in the gallbladder is also high, and it also reduces bile salts and reduces the contraction / emptying of the gallbladder.

d. Food
Consumption of foods containing fat, especially animal fats, is at risk for suffering from cholelithiasis. Cholesterol is a component of fat. If the level of cholesterol contained in bile exceeds the normal limit, bile can settle and gradually become stones. Low chloride intake, rapid weight loss results in disruption of the chemical constituents of the bile and can cause a decrease in gallbladder contractions.

e. Physical Activity.
Lack of physical activity is associated with an increased risk of cholelithiasis. This may be caused by the gallbladder contracting less.

2.4. Prevention of Cholelithiasis
2.4.1. Primary Prevention
Primary prevention is an effort to prevent cholelithiasis in healthy people who are at risk for cholelithiasis. Primary prevention for individuals who are at risk for cholelithiation is by maintaining food hygiene to prevent infection, for example S. Typosa, lowering cholesterol levels by reducing saturated fat intake, increasing intake of vegetables, fruits, and other dietary fibers that will bind. a small portion of bile in the intestine thus lowering the risk of stagnation of bile in the gallbladder, drink about 8 glasses of water every day to maintain proper water levels of bile. (Redinger, Richard N. MD. 2007)

2.4.2. Secondary Precautions
Secondary prevention is carried out by early diagnosis of cholelithiasis sufferers and is usually directed at individuals who have positively suffered from cholelithiasis so that appropriate treatment and management can be carried out. Secondary prevention can be performed nonsurgically or surgically. Non-surgical countermeasures are medical dissolution, ERCP, and ESWL. Treatment with surgery is called cholecystectomy. (Dooley JS. 2011)

1. Non-surgical treatment
a) Medical Dissolution

Previous medical dissolution must meet the criteria for non-operative therapy including cholesterol stones <20mm in diameter and stones less than 4 stones, good gallbladder function, and patent cystic duct.

b) Endoscopic Retrograde Cholangio Pancreatography (ERCP)

To remove bile duct stones, a therapeutic ERCP can be performed by performing an endoscopic sphincterectomy. This technique has been developed since 1974 until now as the standard standard of non-operative therapy for bile duct stones. Furthermore, the stones in the bile duct are removed with a wire basket or extraction balloon through the large estuary into the duodenal lumen so that the stones can pass with the feces. For difficult bile duct stones (large stones, stones stuck in the bile duct or stones that are located above the narrow bile duct) several additional endoscopic procedures after sphincterotomy such as breaking stones with mechanical lithotripsy and laser lithotripsy are required.

c. Extracorporeal Shock Wave Lithotripsy (ESWL)

Electroshock lithotripsy (ESWL) is a rock breaking with sound waves. ESWL was popularly used several years ago, current cost-benefit analyzes have shown that this procedure is limited to patients who have actually been considered for this therapy.

2. Surgical countermeasures, namely
a) Open cholecystectomy

This operation is the best standard for the management of patients with symptomatic cholelithiasis. The most common indication for cholecystectomy is recurrent bile colic, followed by acute cholecystitis.

b) Laparoscopic cholecystectomy

Laparoscopic cholecystectomy was introduced in 1990 and currently about 90% of cholecystectomy is performed laparoscopically. Eighty to ninety percent of gallstones in the UK are removed this way. The gallbladder is removed through a tube that is inserted through a small incision in the abdominal wall. Indications for gallbladder surgery are when symptomatic, biliary complaints are bothersome or the more frequent or severe. Another indication is that indicating an advanced stage, or gallbladder with large stones, more than 2 cm in diameter, because it causes acute cholecystitis more often than smaller stones. Laparoscopic cholecystectomy has become the standard procedure for symptomatic gallbladder removal.

3. Diagnosis of cholelithiasis
a) History

Half to two thirds of cholelithiasis sufferers are asymptomatic. A complaint that may arise is dyspepsia which is sometimes accompanied by intolerance to fatty foods. In symptomatic, the main complaint is pain in the epigastric area, right upper quadrant or perikomdrium. Another pain is biliary colic which may last more than 15 minutes, and sometimes disappears a few hours later. The onset of pain is mostly gradual but in 30% of cases it occurs suddenly. About a quarter of sufferers reported less pain after using antacids. If cholelithiasis occurs, complaints of pain persist and increase when taking a deep breath. (Heshka. S, Heymsfield. S. 2001)

b) Ultrasound or Ultrasound Examination

This ultrasound is a standard examination, which is very good for diagnosing gallbladder stones. The veracity of this ultrasound can be up to 95% in the hands of a radiologist.

c) CT Scanning

CT scanning is done if the stone is in the bile duct.

d) Magnetic Resonance Imaging (MRI)

Sometimes this examination is needed if there are complications of jaundice.

e) Laboratory examination

Gallbladder stones are asymptomatic, generally not showing laboratory abnormalities. A mild rise in serum bilirubin results from compression of the bile ducts by a stone, and propagation of inflammation to the compressed wall. (Avinash S., Anarudha S. 2017)

2.5. Tertiary Prevention

Tertiary prevention can be done with palliative care with the aim of maintaining the quality of life of the sufferer and slowing the progression of the disease and reducing pain and other complaints. Tertiary prevention can be done by paying attention to food intake. Low chloride intake, rapid weight loss (such as after gatrointestinal surgery) results in disruption of the chemical constituents of bile and can lead to decreased gallbladder contractions.

2.6. Complaints of patients with cholelithiasis based on medical management

The most common indication for cholecystectomy (surgery) is the presence of bothersome or more frequent or severe biliary complaints and complications. If cholecystectomy is not performed, ESWL (Extracorporeal Shock Wave Lithotripsy) procedures, ERCP (Endoscopic Retrograde Cholangio Pancreatography), medical dissolution (non-surgical treatment) can be provided as an alternative.

2.7. Gallstone Size Based on Medical Management

If the size of the gallstone has grown, which is about 3-4 cm, it is appropriate to remove the stone. If the stone is large, the gallbladder must be removed quickly and immediately removed. However, if the size of the gallstones is still small or in the range of 2-3 mm, there is no need to perform surgical steps to remove the gallbladder.

2.15. Theoretical framework
From the existing literature, this research can create a theoretical framework:
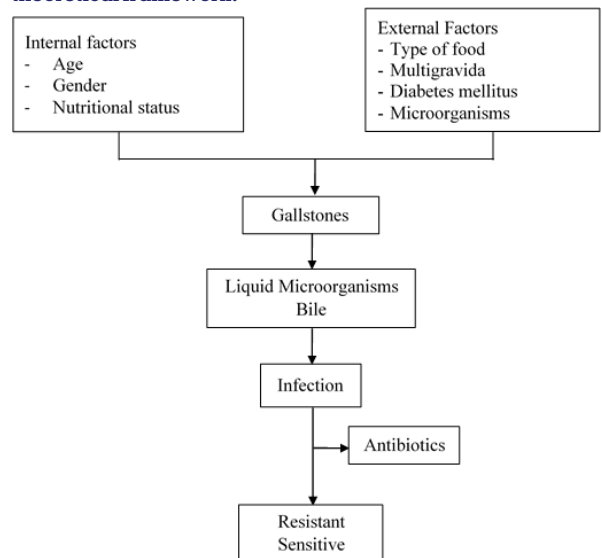
Figure 2.4 Theoretical Framework
Source: WHO, MOH, Munsoon

According to literature and previous research, there are several factors associated with the presence of gallbladder stones. However, not all factors are included in the conceptual framework of this study. In theory, microorganism infection affects the incidence of gallstones, so that researchers want to know the pattern of microorganisms in gallstone patients.

CHAPTER 3
RESEARCH METHODS
3.1. Types of research

This research is descriptive-analytic, where the data collected will make a description of the important points found, then the

important variables found will be linked (analysis) to obtain new data or conclusions.

3.2. Time and Location of Research

This research was conducted at RSUP H. Adam Malik Medan and RS Jejaring in Medan, in patients with cholelitithiasis who underwent surgery to remove stones from the gallbladder. Data were collected from patients from November 2018 to February 2019

3.3. Population and Sample Research
3.3.1. Research Population

The population of these patients were all cholelithiasis patients who underwent surgery during November 2018 to February 2019.

3.3.2. Research Samples

The sample in this study is a total sampling technique, where the entire population found will be taken as a sample. So that according to the following formula:

Number of Samples (nS) = Number of Affordable Populations (nPT)

Legend:
nS = Sample Nominal (number of Samples)
nPT = Nominal Affordable Population

3.4. Research Concept Framework

Based on the research objectives, it can be concluded that the research concept framework is as follows:

concept framework is as follows:

| Patient Cholelithia | → | Cholecystecto my | → | Analysis of Bile Samples in the Laboratory | → | Description and Analysis
• Patient Age
• Patient Gender
• Types of Microbes in the Sample
• Antibiotic sensitivity of the sample |

3.5. Operational definition

The operational definition used in this study is as follows:
1. Patient age is the age calculated from the date of birth of the patient to the day of sampling, results will be rounded to years.
2. The gender of the patient is the gender listed on the population card recorded on the medical record sheet.
3. Types of microbes are types of microbes that are found during laboratory examinations and are written on official examination results.
4. Antibiotic sensitivity is a property obtained from the application of Ex Vivo antibiotic discs to the sample culture to determine sensitivity or resistance to the agent.

3.6. Measuring Way

Measured Aspects	Measuring instrument	How to Measure	Scale
Patient Age	Medical record	Recording	Nominal
Patient Gender	Medical record	Recording	Nominal
Types of Microbes	Lab Results	Recording	Nominal
Antibiotic Sensitivity	Lab Results	Recording	Nominal

3.7. Data collection technique
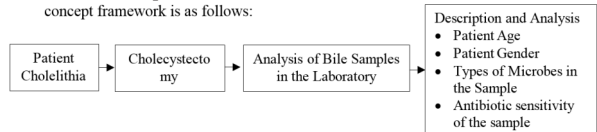### 3.7.1. Primary data

It is data collected from Medical Records (Age, Gender) and data obtained on official laboratory results sheets (Microbial Types and Sensitivity Test Results).

3.7.2. Processing and data analysis

The analyzed data will be tabulated through the spreadsheet application, then this data will be entered into a statistical processing application to determine the results of the research which will produce output data in the form of descriptions and analysis results.

3.8. Research Ethics

This study has obtained an Ethical Clearance from the Research Ethics Committee of the Faculty of Medicine, University of North Sumatra.

CHAPTER 4
RESEARCH RESULT
4.1. Description of Research Results

This study found 24 populations. Where the entire population is sampled (n = 24). Of the total samples, only 11 samples (45.83%) grew bacteria in the culture process.

4.1.1. Bacterial Profile

Table 4.1. Bacterial Profile

Frequency	Percentage	
Not found	13	54.2
Enterococcus faecalis	1	4,2
Klebsiella pneumoniae	4	16.7
Staphylococcus aureus	2	8.3
Acinebacter baumanii	2	8.3
Enterococcus galinarum	2	8.3
Total	24	100.0

The table above shows that germs are found in less than 50% of the population. The most common bacteria were Klebsiella pneumoniae (4 cases; 36.36% of all cases), and the lowest was Enterococcus faecalis (1 case; 9.19% of all cases).

4.1.2. Profile of Fungi (mushrooms)

In this study, no fungi were found from all samples taken from the entire population.

4.2. Analysis of Research Results

4.2.1. Patient Age and Gender

Table 4.2. Patient Age and Gender

Gender	Age Range (n = 24)						Total
	30-34	35-39	40-44	45-49	50-54	55-59	
Male	1	0	5	4	0	1	11
Women	0	0	4	6	0	3	13
Total	1	0	9	10	0	4	24

From this study, it can be seen that the largest population of patients is in the range 40-49 years (79.17%), where men are older than 44 years (25.0%), and women over 45 years (37.5%).).

4.2.2. Patient Age and Types of Infectious Bacteria

Table 4.3. Patient Age and Types of Infectious Bacteria

Patient Age Range	Type of Bacteria (n = 11)										Total
	Enterococus faecalis		Klebsiella pneumoniae		Staphylococus aureus		Acinebacter Baumanii		Enterococcus galinarum		
30-34	0	0%	0	0%	1	9.09%	0	0%	0	0%	1
35-39	0	0%	0	0%	0	0%	0	0%	0	0%	0
40-44	1	9.09%	4	36.36%	1	9.09%	2	18.18%	0	0%	8
45-49	0	0%	0	0%	0	0%	0	0%	1	9.09%	1
50-54	0	0%	0	0%	0	0%	0	0%	0	0%	0

| 55-59 | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 1 | 9.09% | 1 |
| Total | 1 | 9.09% | 4 | 36.36% | 2 | 18.18% | 2 | 18.18% | 2 | 0% | 11 |

From the table above, it can be seen that the most germs were found in the age range 40-44 years (72.73%), with Klebsiella pneumonia as the cause of the most (36.36%).

4.2.3.Patient Age and Resistance to Antibiotics

Table 4.4. Patient Age and Resistance to Antibiotics

Antibiotic	Age Range (n = 11)											
	30-34		35-39		40-44		45-49		50-54		55-59	
	S	R	S	R	S	R	S	R	S	R	S	R
Amikacin	0	0	0	5	0	0	0	0	0	0	0	0
Amoxicillin	1	0	0	0	2	0	0	0	0	0	0	0
Ampicillin	1	0	0	0	1	5	0	1	0	0	1	0
Amoxicillin / Clavulanic Acid	1	0	0	0	1	0	0	0	0	0	0	0
Ampicillin / Sulbactam	1	0	0	0	4	2	0	0	0	0	0	0
Azitrhromycin	0	0	0	0	0	0	0	0	0	0	0	0
Aztreonam	0	0	0	0	3	3	0	0	0	0	0	0
Carbenicin	0	0	0	0	0	0	0	0	0	0	0	0
Cefoxitin	1	0	0	0	1	0	0	0	0	0	0	0
Cefalexin	0	0	0	0	0	0	0	0	0	0	0	0
Cefazolin	0	0	0	0	0	0	0	0	0	0	0	0
Cefotaxime	1	0	0	0	4	3	0	0	0	0	0	0
Ceftazidime	1	0	0	0	6	1	0	0	0	0	0	0
Ceftriaxone	1	0	0	0	3	4	0	0	0	0	0	0
Cefuroxime	0	0	0	0	0	0	0	0	0	0	0	0
Cefepime	1	0	0	0	6	0	0	0	0	0	0	0
Cefoperazone / Sulbactam	1	0	0	0	1	0	0	0	0	0	0	0
Chlorampenicol	0	0	0	0	0	0	0	0	0	0	0	0
Ciprofloxacin	0	1	0	0	5	3	0	1	0	0	0	1
Clindamycin	0	0	0	0	1	1	0	1	0	0	0	1
Cotrimoxazole	0	1	0	0	5	3	0	1	0	0	0	1
Cefmetazole	0	0	0	0	0	0	0	0	0	0	0	0
Doxycycline	0	0	0	0	0	0	0	0	0	0	0	0
Ertapenem	0	0	0	0	0	0	0	0	0	0	0	0
Erythromycin	0	0	0	0	1	1	0	1	0	0	0	1
Imipenem	0	0	0	0	0	0	0	0	0	0	0	0
Claritomycin	0	0	0	0	0	0	0	0	0	0	0	0
Gentamycin	1	0	0	0	7	1	0	1	0	0	0	1
Kanamycin	0	0	0	0	0	0	0	0	0	0	0	0
Levofloxacin	1	0	0	0	4	3	0	1	0	0	0	1
Meropenem	1	0	0	0	7	0	0	0	0	0	0	0
Moxifloxacin	0	0	0	0	0	0	0	0	0	0	0	0
Metrodinazole	0	0	0	0	0	0	0	0	0	0	0	0
Metilmicin	0	0	0	0	0	0	0	0	0	0	0	0
Nitrofurantoin	0	0	0	0	0	0	0	0	0	0	0	0
Ofloxacin	0	0	0	0	0	0	0	0	0	0	0	0
Oxacilin	1	0	0	0	1	1	0	1	0	0	1	0
Penicillin	0	0	0	0	0	0	0	0	0	0	0	0
Piperacillin	0	0	0	0	1	0	0	0	0	0	0	0
Piperacilin-Tanzobactam	0	0	0	0	5	1	0	0	0	0	0	0
Tigecyline	0	0	0	0	5	0	0	0	0	0	0	0
Colixtin	0	0	0	0	0	0			0	0	0	0
Linezolid	1	0	0	0	1	1	0	1	0	0	0	1
Tetracycline	0	1	0	0	0	2	0	1	0	0	1	0
Tobramycin	0	0	0	0	0	0	0	0	0	0	0	0
Fosfomycin	0	0	0	0	0	0	0	0	0	0	0	0
Vancomycin	1	0	0	0	2	0	1	0	0	0	1	0

From the table above, it is found that Gentamicin and Meropenem are the most sensitive antibiotics (63.64%). Followed by Ceftazidime, and Cefepime (54.54%), then Amikacin, Ciprofloxacin, Cotrimoxazole, Piperacilin-Tanzobactam, and Tigecyline (45.45%). The highest resistance was found in Ampicillin (45.45%) and tetracycline

(18.18%), however the resistance ratio decreased to be more sensitive when combined with Sulbactam. It is interesting that the antibiotics are often found where the sensitivity ratio is greater in Cefotaxime, Ciprofloxacin, Cotrimoxazole, Gentamicin, and Levofloxacin. Then the resistance ratio was greater only for Ceftriaxone.

4.2.4.Gender and Types of Infectious Bacteria
Table 4.5. Gender and Types of Infectious Bacteria

Gender	Types of Bacteria									
	Enterococus faecalis		Klebsiella pneumoniae		Staphylococus aureus		Acinebacter Baumanii		Enterococcus galinarum	
	n	%	n	%	n	%	n	%	n	%
Male	0	0%	3	27.27%	1	9.09%	2	18.18%	1	9.09%
Women	1	9.09%	1	9.09%	1	9.09%	0	0%	1	9.09%
Total	1	9.09%	4	36.36%	2	18.18%	2	18.18%	2	18.18%

From the table above, it can be seen that Klebsiella pneumonia is the most commonly found germ, especially in men (27, 27%) and women (9.09%).

4.2.5.Gender and Resistance to Antibiotics

Table 4.6. Gender and Resistance to Antibiotics

Antibiotic	Gender (n = 11)			
	Male		Women	
	S	R	S	R
Amikacin	4	0	1	0
Amoxicillin	2	0	1	0
Ampicillin	1	4	2	2
Amoxicillin / Clavulanic Acid	1	0	1	0
Ampicillin / Sulbactam	4	1	1	1
Azitrhromycin	0	0	0	0
Aztreonam	3	2	0	1
Carbenicin	0	0	0	0
Cefoxitin	1	0	1	0
Cefalexin	0	0	0	0
Cefazolin	0	0	0	0
Cefotaxime	4	2	1	1
Ceftazidime	5	1	2	0
Ceftriaxone	3	3	1	1
Cefuroxime	0	0	0	0
Cefepime	5	0	2	0
Cefoperazone / Sulbactam	1	0	1	0
Chlorampenicol	0	0	0	0
Ciprofloxacin	4	3	1	3
Clindamycin	0	1	1	2
Cotrimoxazole	4	3	1	3
Cefmetazole	0	0	0	0
Doxycycline	0	0	0	0
Ertapenem	0	0	0	0
Erythromycin	0	1	1	2
Imipenem	0	0	0	0
Claritomycin	0	0	0	0
Gentamycin	6	1	2	2
Kanamycin	0	0	0	0
Levofloxacin	4	2	1	3
Meropenem	6	0	2	0
Moxifloxacin	0	0	0	0
Metrodinazole	0	0	0	0
Metilmicin	0	0	0	0
Nitrofurantoin	0	0	0	0
Ofloxacin	0	0	0	0

Oxacilin	1	1	2	1
Penicillin	0	0	0	0
Piperacillin	1		0	
Piperacilin-Tanzobactam	0	0	0	0
Tigecyline	4	0	1	0
Colixtin	0	0	0	0
Linezolid	1	1	1	1
Tetracycline	0	2	1	2
Tobramycin	0	0	0	0
Fosfomycin	0	0	0	0
Vancomycin	2	0	2	0

From the table above, it was found in men that Gentamicin and Meropenem were the most sensitive antibiotics (54.55%). Followed by Ceftazidime, and Cefepime (45.45%), then Amikacin, Ampicilin / Sulbactam, Ciprofloxacin, Cotrimoxazole, Piperacilin-Tanzobactam, and Tigecyline (45.45%). Resistance was found mostly in Ampicillin (27.27%) and tetracycline (18.18%) /, but the resistance ratio decreased to be more sensitive when combined with Sulbactam. It is interesting that the antibiotics are often found where the sensitivity ratio is greater in Cefotaxime, Ciprofloxacin, Cotrimoxazole, Gentamicin, and Levofloxacin. Then the resistance ratio is as large as the sensitivity only for Ceftriaxone.

From the table above, it was found that there were no striking results on antibiotic sensitivity, but resistance was found to the types of antibiotics that are often used, namely Ciprofloxacin, Cotrimoxazole, and Levofloxacin (27.27%).

4.2.6. Types of Infecting Bacteria and Their Resistance to Antibiotics

Table 4.7. Types of Infecting Bacteria and Their Resistance to Antibiotics

| Antibiotika | Jenis Bakteri | | | | | | | | | |
| | Enterococus faecalis | | Klebsiella pneumoniae | | Staphylococus aureus | | Acinebacter Baumanii | | Enterococcus galinarum | |
	S	R	S	R	S	R	S	R	S	R
Amikacin	0	0	4	0	0	0	1	0	0	0
Amoxicilin	0	0	0	0	2	0	1	0	0	0
Ampicilin	0	1	0	4	2	0	0	0	1	1
Amoxicilin/Clavulanic Acid	0	0	0	0	2	0	0	0	0	0
Ampicilin/Sulbactam	0	0	2	2	2	0	1	0	0	0
Azitrhromycin	0	0	1	3	0	0	2	0	0	0
Aztreonam	0	0	1	3	0	0	2	0	0	0
Carbenicin	0	0	0	0	0	0	0	0	0	0
Cefoxitin	0	0	0	0	2	0	0	0	0	0
Cefalexin	0	0	0	0	0	0	0	0	0	0
Cefazolin	0	0	0	0	0	0	0	0	0	0
Cefotaxime	0	0	2	2	2	0	1	1	0	0
Ceftazidime	0	0	4	0	2	0	1	1	0	0
Ceftriaxone	0	0	1	3	2	0	1	1	0	0
Cefuroxime	0	0	0	0	0	0	0	0	0	0
Cefepime	0	0	3	0	2	0	2	0	0	0
Cefoperazone/Sulbactam	0	0	0	0	2	0	0	0	0	0
Chlorampenicol	0	0	0	0	0	0	0	0	0	0
Ciprofloxacin	0	1	3	1	0	2	2	0	0	2
Clindamycin	0	1	0	0	1	0	0	0	0	2
Cotrimoxazole	0	1	3	1	1	1	1	1	0	2
Cefmetazole	0	0	0	0	0	0	0	0	0	0
Doxycycline	0	0	0	0	0	0	0	0	0	0
Ertapenem	0	0	0	0	0	0	0	0	0	0
Erythromycin	0	1	0	0	1	0	0	0	0	2
Imipenem	0	0	0	0	0	0	0	0	0	0
Claritomycin	0	0	0	0	0	0	0	0	0	0
Gentamycin	0	1	4	0	2	0	2	0	0	2
Kanamycin	0	0	0	0	0	0	0	0	0	0
Levofloxacin	0	1	3	1	1	1	1	0	0	2
Meropenem	0	0	4	0	2	0	2	0	0	0
Moxifloxacin	0	0	0	0	0	0	0	0	0	0
Metrodinazole	0	0	0	0	0	0	0	0	0	0
Metilmicin	0	0	0	0	0	0	0	0	0	0
Nitrofurantoin	0	0	0	0	0	0	0	0	0	0
Ofloxacin	0	0	0	0	0	0	0	0	0	0
Oxacilin	0	1	0	0	2	0	0	0	1	1
Penicilin	0	0	0	0	0	0	0	0	0	0
Piperacilin	0	0	1	0	0	0	0	0	2	0
Piperacilin-Tanzobactam	0	0	4	0	0	0	1	1	0	0
Tigecyline	0	0	3	0	0	0	2	0	0	0
Colixtin	0	0	0	0	0	0	0	0	0	0
Linezolid	0	1	0	0	2	0	0	0	0	2
Tetracycline	0	1	0	0	0	0	2	0	1	1
Tobramycin	0	0	0	0	0	0	0	0	0	0
Fosfomycin	0	0	0	0	0	0	0	0	0	0
Vancomycin	1	0	0	0	2	0	0	0	2	0

The table above shows that Klebsiella pneumonia is the most common germ. Where Amikacin, Ceftazidime, Gentamicin, Meropenem, and, Piperacilin-Tanzobactam (36.36%) are the most sensitive germs with antibiotics that are often used. The most resistance was found in Ampicillin and Ceftriaxone (36.36% and 27.27%).

Chapter 5
DISCUSSION
5.1. DISCUSSION
In this study it was found that the sample of women was more than men (54.17%). This is consistent with the literature in which women are more exposed to bladder-related diseases (Heshka S. 2001). The most common bacteria were Klebsiella pneumoniae (4 cases; 36.36% of all cases), and the lowest was Enterococcus faecalis (1 case; 9.19% of all cases). In this study, no fungus was found in the skin results. This is not in accordance with previous studies conducted in England where the most fungi are Candida Sp and E. coli (Rodríguez-Beltrán et al., 2012; Shen et al., 2015; Tajeddin et al., 2016; Gutiérrez-Díaz et al. ., 2018; Molinero et al., 2019). This is thought to occur due to differences in the description of germs in Indonesia and the UK (Chen et al. 2014). From this study, it can be seen that the largest population of patients is in the range of 40 to 49 years (79.17%), where men are older than 44 years (25.0%), and women over 45 years (37.5%). . Both of these results are in accordance with the theory that it is more common in women and over 40 years of age (Parigi, Angelo Del, M.D. 2010). From this study, it can be seen that the most germs were found in the age range 40-44 years (72.73%), with Klebsiella pneumonia as the most common cause (36.36%).

In men, Gentamicin and Meropenem are the most sensitive antibiotics (54.55%). Followed by Ceftazidime, and Cefepime (45.45%), then Amikacin, Ampicilin / Sulbactam, Ciprofloxacin, Cotrimoxazole, Piperacilin-Tanzobactam, and Tigecyline (45.45%). Resistance was found mostly in Ampicillin (27.27%) and tetracycline (18.18%) /, but the resistance ratio decreased to be more sensitive when combined with Sulbactam. It is interesting to find that antibiotics are often found where the sensitivity ratio is greater for Cefotaxime, Ciprofloxacin, Cotrimoxazole, Gentamicin, and Levofloxacin. Then the resistance ratio is as large as the sensitivity only for Ceftriaxone. (Getatchew Assefa; 2008) There were no striking results on the sensitivity of antibiotics for female sex, but resistance was found to the types of antibiotics that are often used, namely Ciprofloxacin, Cotrimoxazole, and Levofloxacin (27.27%). (Stinton L.M, Shaffer E.A; 2012)

Chapter 6
CONCLUSIONS AND SUGGESTIONS
6.1. CONCLUSION
1. The age range is mostly in the range of 40-44 years and it is found that women are more than men.
2. Klebsiella pneumonia is the most common bacteria found in the sample.
3. From this study it was found that Klebsiella pneumonia was the most common germ. Where Amikacin, Ceftazidime, Gentamicin, Meropenem, and, Piperacilin Tanzobactam (36.36%) are the most sensitive germs with antibiotics that are often used. The most resistance was found in Ampicillin and Ceftriaxone (36.36% and 27.27%).

6.2. Suggestion
1. This research can be repeated with a larger number of samples
2. Adding variable lipid profile, uric acid value, blood sugar level, stone type, and BMI.
3. Antibiotics are often used starting to increase the resistance ratio. Further action is needed to prevent resistance.

Lampiran 1. Hasil Analisis Statistik
Frequency Table

Jenis Kelamin

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Laki-Laki	11	45,8	45,8	45,8
	Perempuan	13	54,2	54,2	100,0
	Total	24	100,0	100,0	

Umur

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	1	4,2	4,2	4,2
	41	2	8,3	8,3	12,5
	42	2	8,3	8,3	20,8
	43	1	4,2	4,2	25,0
	44	2	8,3	8,3	33,3
	45	2	8,3	8,3	41,7
	46	3	12,5	12,5	54,2
	47	3	12,5	12,5	66,7
	48	3	12,5	12,5	79,2
	49	1	4,2	4,2	83,3
	57	2	8,3	8,3	91,7
	58	2	8,3	8,3	100,0
	Total	24	100,0	100,0	

Kategori Umur

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-34	1	4,2	4,2	4,2
	40-44	9	37,5	37,5	41,7
	45-49	10	41,7	41,7	83,3
	55-59	4	16,7	16,7	100,0
	Total	24	100,0	100,0	

Ditemukan Bakteri

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ada	13	54,2	54,2	54,2
	Ada	11	45,8	45,8	100,0
	Total	24	100,0	100,0	

Temuan pada Pewarnaan

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ditemukan	13	54,2	54,2	54,2
	Coccus Gram Positif	5	20,8	20,8	75,0
	Batang Gram Negatif	6	25,0	25,0	100,0
	Total	24	100,0	100,0	

Bakteri Aerob

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ada	13	54,2	54,2	54,2
	Ada	11	45,8	45,8	100,0
	Total	24	100,0	100,0	

Jenis Bakteri Aerob

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ditemukan	13	54,2	54,2	54,2
	Enterococcus faecalis	1	4,2	4,2	58,3
	Klebsiella pneumoniae	4	16,7	16,7	75,0
	Staphylococcus aureus	2	8,3	8,3	83,3
	Acinebacter baumanii	2	8,3	8,3	91,7
	Enterococcus galinarum	2	8,3	8,3	100,0
	Total	24	100,0	100,0	

Bakteri Anaerob

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ada	24	100,0	100,0	100,0

Jenis Bakteri Anaerob		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Tidak Ditemukan	24	100,0	100,0	100,0

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