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The role of the anesthesiologist in laparoscopic biopsy drainage in geriatric patients with liver abscess and pneumonia

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Abstract. Risk factors for the development of liver abscess include diabetes mellitus, hepatic cirrhosis, male gender, elderly, immunocompromised state, and those with proton pump inhibitor use. Patients usually have fever, complain of chills, night sweats, malaise, nausea or vomiting, right upper quadrant pain, and anorexia. Diagnosis was made based on anamnesis in the form of complaints of abdominal pain throughout the abdomen since 3 days before admission to the hospital, the initial pain was felt in the upper right abdomen since 9 days ago then moved to the entire abdomen, persisted and got heavier, nausea was present, vomiting was absent, fever was present, complaints of shortness of breath were present, the patient came in a state of tightness using respiratory support NRM 10 liters Spo2 83%, laboratory examination was low Eosinophils 1.1% and high Neutrophils associated with infection. Microbiological examination found Escherichia Coli bacteria (ESBL+) which is a common cause of Bronchopnemonia.

1 Introduction

Liver infection characterized by pus surrounded by fibrous tissue in the liver parenchyma is known as liver abscess, which is very dangerous if not treated properly. The three most common types of liver abscess are pyogenic (associated with bacterial infection), amebic (associated with protozoan infection of the Entamoeba species), and fungal (associated with fungal infection) (1). Suppurative bacteria that invade the liver cause pyogenic liver abscess (PLA), which is an intrahepatic infection that accounts for about 80% of all liver abscesses (2).

Geographically, pyrogenic liver abscesses vary greatly and are most common in tropical nations. Owing to issues including inadequate nutrition, overcrowding, and poor sanitation, India has the second-highest incidence of the disease in the world. Study results from Central and South America, India, and tropical regions of Asia and Africa indicate that the disease is more common in endemic areas, with a 5–10% higher prevalence rate. Taiwan reports 17.6 instances per 100,000 people, compared to 3.6 cases per 100,000 persons in the United States

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each year. About two-thirds of cases in developing countries are of amebic origin, while three-quarters of cases in developed countries are of pyogenic liver abscess (3).

Studies from Central and South America, India, and tropical regions of Asia and Africa show that the disease is 5–10% more common in endemic areas, with a 55% prevalence rate. In Taiwan, there are 17.6 instances per 100,000 persons annually, compared to 3.6 cases per 100,000 in the United States. In underdeveloped nations, amoeba causes approximately two-thirds of instances, but in developed nations, pyogenic liver abscesses cause three-quarters of cases (3).

Symptoms of a K. pneumoniae liver abscess typically include fever, chills, and stomach ache. All these indications are vague, though. Patients should be evaluated for the risk of a liver abscess, particularly if they have diabetes mellitus, meningitis, endophthalmitis, or other extrahepatic diseases in addition to K. pneumoniae (k. pneumoniae) bacteremia. For improved management, prompt pathogen diagnosis is therefore crucial. But conventional techniques, including bacterial culture, are less accurate and require more time to discover infections. The positive rate of traditional methods is influenced by various factors such as the quantity and quality of specimens, antibiotics administered to patients, the severity of infection, and the suitability of the laboratory (4).

Unruptured liver abscesses can cause peritonitis and shock. Unruptured liver abscesses can also cause chronic pain and discomfort in the right upper quadrant, which can sometimes accompany fever at night. Complications may also occur after drainage. These may include liver or kidney failure, intra-abdominal injury, infection, or recurrent liver abscess (5).

Liver abscess formation is associated with multiple risk factors, including but not limited to diabetes mellitus, liver cirrhosis, male gender, advanced age, weakened immune system, and usage of proton pump inhibitors. Frequent symptoms reported by patients include fever, chills, night sweats, lethargy, nausea, vomiting, discomfort in the right upper quadrant, and anorexia.

The imaging of liver abscesses varies depending on the type and stage. Abscesses can be categorized as pre-suppurative or suppurative. Heterogeneous, hypodense masses with irregular contours are found in the pre-suppurative phase. They may have irregular margins and appear tumor-like, especially if they are large or small. During the suppurative phase, the lesions have multiloculation, well-defined rounded borders, and a thick capsule. They seem hypo- or anechoic. The ultrasonography is typically hypoechoic with different degrees of internal echo, depending on the internal septa and gas. The Indian Journal of Surgery might have a hyper- or hypoechoic appearance (3).

The majority of the gram-positive or gram-negative bacteria that cause pyogenic liver abscesses (PLA) are found in the gut microbiota. The two most prevalent pathogens are Klebsiella pneumococcus and Escherichia coli. The 1980s saw the discovery of Klebsiella pneumoniae in Taiwan, and this pathogen is now thought to be the cause. This illness, particularly pneumonia serotypes K1 and K2.K., has become one of the most frequent causes of liver abscess in most Asian nations. The West is seeing an increase in this risky circumstance as well. The disease exhibits a viscous hypermucous phenotype as a result of elevated extracapsular polysaccharide synthesis. Both serums complement destruction and phagocytosis cannot cure the illness. The illness typically has a high rate of complications and is cryptogenic in origin. Among these include endophthalmitis, bacteria (48–72%), and infections.

In older patients, POCD may result from the patient's inflammatory reaction in addition to anesthesia or analgesia. In a 2014 clinical research, sevoflurane-based GA (33.3%) or propofol (29.7%) did not increase the prevalence of POCD seven days after radical rectal resection in 200 elderly patients with mild cognitive impairment. Sevoflurane, as opposed to

propofol, had a greater impact on cognitive function in 2015 clinical research involving ninety-nine elderly patients who were scheduled for esophageal cancer resection (6).

2 Case history

2.1 Anamnesis

A 73-year-old man weighing 50 kg came with complaints of right abdominal pain, the patient came from the HCU using NRM 10 Liter respiratory assistance with SPO2 83%. The patient will undergo a lap surgery. Drainage biopsy, based on the patient's clinical examination history, the patient was diagnosed with Liver Abscess. ASA 4 patient because the patient has a history of uncontrolled Diabetes, abnormal heart, Pneumonia, Right Bronchopneumonia DD. Pulmonary TB, Abnormal Kidneys. The patient has no history of allergies and has a smoking habit. Patients with edema in the hands and feet. The therapy currently being given is 0.9% RL infusion, Anbacim 1gr IV, Ketorolac 30mg IV, Ondansetron 4mg IV.

Based on the results of laboratory examinations, Hemoglobin 10.4 g/dl, Leukocytes H 38090 /uL, Erythrocytes L 3.29 Million/Ul, Hematocrit L 31.6%, MCHC L 32.9 g/dL, RDW-CV H 18.4%, low Eosinophils 1.1% and High Neutrophils are associated with infection. The results of the Microbiology examination found Escherichia Coli bacteria (ESBL+) which are a common cause of Bronchopneumonia, Lymphocytes L 7.9%, Urea H 46.0 mg/dl, Creatinine H 1.86 mg/dl, Random Blood Sugar L 16 mg/dl DM itself is a trigger for PLA. Despite the brief course of DM, mucosal damage in DM patients is believed to hasten PLA development (7), Albumin L 1.25 g/dl. Based on the results of the microbiology examination, Escherichia Coli bacteria (ESBL +) were found. Based on the results of the ECG examination, the results were Extreme Tachycardia, Couplet Premature Ventricular Contractions, Premature Atrial Contractions, Complete Right Bundle Branoh Block.

Table 1. The Results of the CT-Scan

Inspection	Results	Unit	Normal Value
HEMATOLOGY			
Complete Blood			
Hemoglobin	10.4 L	14-18	g/dL
Leukocytes	38090 H	4000-10000	/uL
Platelets	319	150-400	Thousand/uL
Erythrocytes	3.29 L	4.5-6.0	Million/uL
Hematocrit	31.6 L	37-54	%
MCHC	32.9 L	33-36	g/dL
RDW-CV	18.4 H	11-16	%
Leukocyte Type Count			
Eosinophil	1.1 L	2-4	%
Neutrophils	85.4 H	54-73	%
Lymphocytes	7.9 L	18-34	%
CLINICAL CHEMISTRY			
Kidney Function			
Urea	46.0 H	15-45	mg/dL
Creatinine	1.86 H	0.6-1.1	mg/dL
Liver Function			

Albumin	1.25 L	3.4-4.8	g/dL
Blood sugar			
Random blood glucose	16 L	<140	mg/dL
IMMUNOLOGY			
Tumor Markers			
CEA	3.2	<=5.0	ng/mL

The results of the CT-Scan examination of the abdomen showed right bronchopneumonia DD. Pulmonary TB, Right diaphragm elevation, and no cardiomegaly. In addition, no other abnormalities were found in this examination.

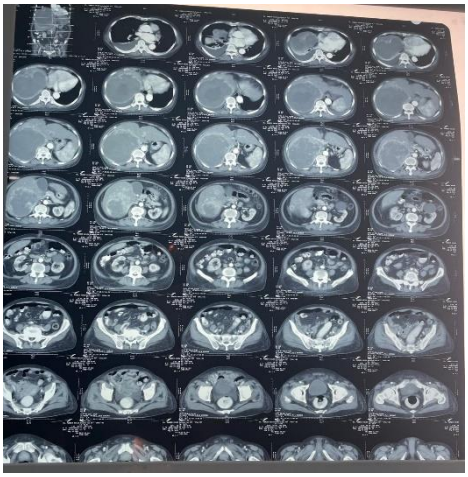

Figure 1. The Results of the CT-Scan

Based on the results of the examination, a diagnosis of Liver Abscess was established. The patient was then planned to undergo a Laparatomy Biopsy Drainage Procedure. No other difficulties or abnormalities were found during the Procedure.

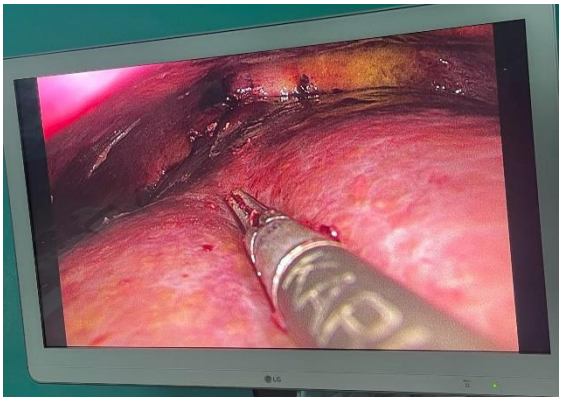

Figure 2. Diagnosis Of Liver Abscess

Before induction BP 130/75mmHg N 80x/minute S 36.5C SPO2 83%. Induction using fentanyl 100mcg, ketamine 100mg, Attrakurium 20mg and using Isoflurane inhalation anesthesia 1.5%. Anesthesia technique using ETT No. 7.0 WITH IPPV mode ventilator with TV : 400 RR : 12 PEEP : 5 F1O2 : 50% TRIGGER : 2 I : E : 1 : 2. O2 : 1.5L, N2O : 2L. N2O is higher than O2 because the patient has a history of bronchopneumonia, as the body compensates since it has become accustomed to low O2 levels. Premedication Loading fluid RL 500ml. After 30 minutes of surgery the patient experienced a decrease in blood pressure of 60/35mmHg then the patient was given Ephedrine 10mg and Tranexamic Acid 1000mg.

Post-operatively the patient will be transferred to the ICU with a ventilator for observation first and to restore the patient's condition. Post-operative instructions for pain management, the patient received Fentanyl 20mcg IV/hour Syringe pump and Midazolam 2mg IV/hour Syringe pump, RL infusion. Ventilator mode SIMV TV: 400 RR: 12 PEEP: 5 F1O2: 50% TRIGGER: 2 I: E: 1: 2. Monitor the patient every 15 minutes post-OP.

3. Discussion

Suppurative bacteria infiltrate the liver and cause pyogenic liver abscess (PLA), an intrahepatic infection that accounts for approximately 80% of all liver abscesses (2).

In both the CNLA and CPLA groups (n = 282, 87%), fever was the most common symptom, occurring in 89.3% and 85.6% of patients, respectively. Patients with CNLA had higher rates of coughing (19.7% vs. 10.9%, p = 0.028). Fever (89%, 80%) brought on by K. pneumoniae and E. coli bacteria was the most common symptom in both groups. Fever was followed by chills (n = 85, 65.9%), stomach pain (n = 62, 48.1%), nausea or vomiting (n = 30, 23.3%), and cough (n = 17, 13.2%). The liver biopsy findings showed that patients with E. coli bacteria had a higher frequency of abdominal discomfort (75% vs. 43.1%, P = 0.009) than patients with K. pneumoniae; however, there was no significant difference between the CNLA and CPLA groups (8).

Perioperative risk refers to the possibility of an undesirable outcome following surgery or anesthesia and reflects the cumulative risk of the surgical procedure, patient premorbidity, age, and other pathological conditions (9). During laparoscopic surgery, general anesthesia can help overcome respiratory and cardiovascular problems caused by the introduction of air during the procedure (10). In these patients, there is extreme variability in heart rate, blood pressure, respiratory rate, and oxygen saturation.

The patient came in a state of shortness of breath using respiratory assistance NRM 10 liters Spo2 83%, the patient has a comorbid disease Bronchopnemoni DD. Pulmonary TB, no cough. The patient was continued with a physical examination which was emphasized in this patient found a fever of 38oC, blood pressure 130/75 mmHg, pulse 80 x / minute, respiratory rate 27x / minute, GCS 13 (Apathy). After that, the patient was loaded with 500ml of fluid before surgery to reduce metabolic stress and postoperative insulin resistance. It is expected that the patient's clinical appearance will improve with proper perioperative nutritional therapy (11).

The patient was given fentanyl 100mg induction to relieve pain, ketamine 100mg was given because ketamine is considered safe and effective for use in the emergency department and does not lower blood pressure. Ketamine affects the neural circuits in the prefrontal cortex and hippocampus, areas believed to be responsible for behaviors such as depression (12) The use of ketamine is limited by its undesirable effects on the cardiovascular system and increased secretion due to the lack of bronchodilator and respiratory depressant effects (13).

In addition, the sedative that will be given will suppress the protective reflex of the airway, which may cause aspiration. Therefore, routine fasting is requested before the procedure. According to ASA guidelines, patients should fast for 8 hours before the procedure. This means they should not eat anything fried or fatty 6 hours before the procedure, and clear fluids 2 hours before the procedure (14). then the delivery of 20 mg of Attracurium, a non-depolarizing neuromuscular blocking medication from the benzylisoquinolinium group, to give skeletal muscle relaxation during surgery or mechanical ventilation. Isoflurane 1-1.25 is given to patients in order to provide general anesthesia during surgery. The anticipated outcomes of sedation monitoring during surgery are obtained. General anesthesia can be induced and maintained via a variety of action sites. The most likely locations block the central nervous system's (CNS) GABA, glycine, and N-methyl daspartate (NMDA) receptors, among other neurotransmitter ion channels. The sedation and forgetfulness required for appropriate surgical circumstances are produced in part by inhibition of these receptors. Anaesthesia technique using ETT No. 7.0 WITH IPPV mode ventilator with TV: 400 RR: 12 PEEP: 5 F1O2: 50% TRIGGER: 2 I: E: 1: 2. O2: 1.5L, N2O: 2L. N2O is higher than O2 because the patient has a history of bronchopneumonia, as the body compensates since it has become accustomed to low O2 levels. Patients with severe bronchopneumonia recommend the provision of supplemental oxygen to maintain oxygen saturation between 88% and 92% to prevent hypoxemia and hypercapnia. Therefore, maintaining oxygen saturation below 99% is not appropriate. In emergency situations that require positive pressure oxygen, it is crucial that 100% oxygen should not be discontinued due to the risk of hypoventilation or hypercapnia (13).

N2O has a short elimination half-life and is sensitive to context: regardless of the timing of its administration, its washout from the brain is faster than that of desflurane due to its lower lipid solubility, which means quicker early recovery (15). In patients with TRD, nitric oxide acts as a fast-acting antidepressant (16).

The condition in which there is an excess supply of oxygen in tissues and organs is known as hyperoxia. Oxygen toxicity occurs when the partial pressure of alveolar oxygen (PaO2) is higher than what is normally inhaled (17). To prevent hypoxemia and hyperoxemia, doctors must titrate oxygen therapy. Hypoxia damages the lungs by producing ROS, which leads to oxidative stress with pro-inflammatory and cytotoxic effects (18).

Post anesthesia the patient was sent to the ICU to be monitored for 15 minutes during post op withVentilator Mode SIMV. TV: 400, RR: 12, PEEP: 5, F102: 50%, TRIGGER: 2 I: E: 1:2 (For 24 hours). The patient was given pain management therapy Fentanyl 20mcg IV/Hour Syringe Pump and Midazolam 2mg IV/Hour Syringe Pump.

4. Conclusion

Diagnosis is based on anamnesis, measuring the patient's temperature, blood pressure, and blood glucose levels. Anesthesia procedures are very important in patients with ileus undergoing laparotomy surgery, the selection of anesthetic techniques and anesthetic drugs. Before induction, the anesthesiologist must carefully assess preoperatively and monitor postoperatively.

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