Analysis of surgical and anesthetic problems

Dr. Ahmed Faisal Hussein¹, Dr. Rana Akram Rashad², Dr. Baydaa Tawfeeq Mahmeed³
¹, ², ³Ministry of Health / Salahuddin Health Department/Iraq

Abstract
Bile duct surgery is one of the most performed in the world. Although, in the context of oncology, tumors in this area can be resectable, in many of them, due to their presentation and late diagnosis, surgery passes into the background as first-line treatment. In this case, the patient undergoes therapeutic endoscopic studies to reduce symptoms and lengthen survival as much as possible. On the other hand, liver tumors are related to long-standing pathologies, such as cirrhosis and coinfection with hepatitis B and C viruses, predisposing etiological agents for primary tumors, although most tumors are metastatic. Pancreatic tumors are also of late diagnosis and often without surgical treatment. However, in our country and in institutional medicine, many of these criteria are expanded and surgery is performed as the definitive treatment. Next we will make a reminder of the general considerations that should be taken for patients with tumors of the bile duct, liver and pancreas. Suggested anesthetic management will be shown to optimize the patient before, during and after surgery. Finally we will emphasize the key points to consider.

Key words: Anesthesia, surgery, cholecystectomy.

Introduction:
We will begin this paper by reviewing the perioperative management of patients with some type of chronic liver dysfunction, symptomatic or not. Most of the patients who come to oncology for primary liver tumors have a chronic disease due to HBV or HCV coinfection. Also due to long-standing cirrhosis of different etiologies (alcoholic, etc.) although they tend to be less frequent. While the vast majority of patients arrive with a diagnosis of unknown primary cancer or under study, or metastatic tumor. After all, the patient no longer has normal liver function and the appearance of a primary tumor has also been added. Therefore, it is important to consider for anesthetic management that our patient is not working properly.[2]

Anesthesia will then be aimed at optimizing the patient prior to surgery through pre-anesthetic assessment and a medication plan will be made for the type of anesthesia selected. Age of the patient, comorbidities, current medication, duration of the surgery to which he will undergo, are probably, in the opinion of the author, the most important risk factors prior to the administration of anesthesia.[3] The primary objective is, therefore, to avoid the occurrence of more dysfunction than the existing one, that it resists the surgical procedure and that its survival is lengthened depending on the histological lineage of the tumor and the functional reserve of the patient.[4] At this point, the patient needs an anesthetic management that reduces the potentially hepatotoxic insults of medications typical of pre-existing comorbidities or that were previously administered for tumor management. Likewise, the management will ensure the sufficiency of oxygen supply during surgery to avoid intraoperative deterioration.[5]

Methodology:
In order to carry out this work, a bibliographic review was carried out, so that not only the characteristics of the lesions could be described, but also the different actions of the surgeon in the face of the situation that may arise before, during and after a surgical procedure.

Anesthetic Management in Donor Hepatectomy Operations:
The intraoperative approach in patients undergoing hepatectomy for liver transplantation is similar to patients undergoing hepatic surgery. Standard anesthesia method is applied (volatile anesthetics can be used for induction maintenance with propofol or thiopental, fentanyl or remifentanil and cisatracurium or vecuronium).
In some centers, preoperative thoracic epidural catheters are placed for postoperative pain management. In some centers, analgesia is performed using the intravenous patient-controlled analgesia method. In some centers, the epidural catheter is used both for postoperative pain management and for administering general anesthesia together with intraoperative epidural anesthesia. However, there is a risk of developing epidural hematoma due to thoracic epidural catheter. Coagulopathy, which may develop especially in a large liver hepatectomy, may pose a risk for epidural hematoma. In many studies, it has been reported that the epidural catheter can be used safely.

In the intraoperative period, the patient is placed in the supine position, with both arms abducted to either side or one arm to the side. An orogastric or nasogastric tube is placed to decompress the stomach. In order to prevent heat loss, heating blankets are used to the patient, heat blankets are used for the body parts outside the surgical area, and intravenous fluids are given by heating. Wide-lumen intravenous line and invasive arterial pressure monitoring are performed in many centers. However, since high CVP values during transsection are thought to be the main causes of liver parenchymal hemorrhage and graft edema, central venous pressure (CVP) monitoring is performed with a central venous catheterization to ensure low CVP values. CVP values below 5 cmH2O are required to prevent optimal bleeding from the liver parenchyma and graft edema. In some centers, autotransfusion system is used for these patients, 1-2 units of blood are donated from the patients in the preoperative period and this blood is given to the patient himself if necessary.

The patients are followed up in the intensive care unit on the first postoperative day and then they are taken to the ward.

Factors affecting the level of anesthesia:

1- Sufficient number of dermatomes must be affected to provide appropriate anesthesia/analgesia conditions with epidural block. Factors affecting the level of anesthesia/analgesia:[6]

2- Volume and concentration of local anesthetic solution

The appropriate dose can be determined as 1-2 mL of anesthetic for each spinal segment to be anesthetized. Repeated doses should be injected when the block regresses and the patient begins to feel pain. When two-segment regression occurs at the sensory level, 1/3-1/2 of the initial dose should be re-injected .[7]

3- Pharmacological structure of local anesthetic

It is important in terms of time and quality. The addition of vasoconstrictor prolongs the time and increases the quality. Increasing the pH (pH 3.5-5.5 of local anesthetics) can accelerate the onset of block and increase the intensity of the block. The addition of opioids affects the quality of the block more.[8]

4- Location of the injection

Injection at the level of the segment that fits in the middle of the area to be anesthetized is the appropriate approach. Since the width of the epidural space gradually decreases cranially, more segments are blocked in the thoracic region than in the lumbar region with the same amount of local anesthetic. L5-S1 level nerves are thick. It is difficult to block in the epidural space.

5- Position of the patient

Dose injection in the sitting position increases the probability of successful block in procedures involving large nerve roots (L5-S1-S2). The position of the patient after the injection makes the spread to the related side clear.

6- Patient's height

As the length increases, the amount of local anesthetic to be given per segment to be blocked increases. While 1 mL of local anesthetic per segment to be blocked is sufficient in short patients, 2 mL per segment may be required in tall patients.

7- Age of the patient

As age increases, the amount of local anesthetic needed per segment to be blocked decreases.

8- Clinic of the patient

In cases of increased intra-abdominal pressure (such as pregnancy, intra-abdominal mass and ascites), venous return is distributed from the lower regions to the vertebral and epidural plexuses. Thus, the volume of the epidural space narrows and the diffusion of the drug increases.
Complications of Epidural Anesthesia:
Complications related to epidural anesthesia and analgesia may develop depending on the drug or the technique applied.

1. Accidental dural perforation and total spinal block
   Spinal block is an important complication because the probability of cardiac and respiratory arrest is very high. Due to this serious complication, the necessary conditions must be observed and followed during the procedure. First, the test dose should be administered, 1-2 ml of local anesthetic agent should be given, waiting for 5 minutes and if spinal block does not develop, the remaining amount of local anesthetic agent should be given.

2. Entering the epidural veins
   If the local anesthetic agent is not given intravenously, it may not be considered as an important complication. In the case of intravascular administration, it may cause systemic toxic reactions.

3. Epidural abscess
   It generally presents with severe back pain, local tenderness, leukocytosis, compression findings on myelogram, and high fever.

4. Epidural hematoma
   It is a complication that can occur in patients with bleeding disorders and those receiving anticoagulant therapy. Paralysis may develop if the hematoma compresses the spinal cord.

5. Massive subdural spread
   It is a condition that occurs before the arachnoid membrane is damaged, and it does not pose a serious problem, except that it is an asymmetrical analgesia.

6. Headache due to dural puncture
   Its incidence varies between 40% and 80%. It develops as a result of the puncture of the dura by thick needles such as 16-18 gauge and leakage of cerebrospinal fluid. It can be seen 1-2 days after the puncture. Pain is in the frontal and occipital region. It increases with sitting, coughing, straining, decreases or goes away when lying down. Bed rest, 3 L/day intravenous fluid and analgesics are applied in the treatment. If the pain is very severe, an epidural blood patch (blood patch) should be made with approximately 15 mL of venous blood, using the same aseptic technique (75,76).

Results:
Not only is the patient affected, the doctor remains involved indefinitely as in a malignant disease, but in this, the surgeon is art and part from beginning to end. The prestige of surgical institutions and of surgery in general is also affected.
The quality of life of the patient is deeply deteriorated by the endless studies, controls and procedures. The surgical procedure, cholecystectomy, is further discredited if it is laparoscopic.
It is certain that preventing a LIVB will not make us as famous as achieving a successful repair of it, but it is also certain that for each one we avoid we will avoid an ordeal for many patients, family members, doctors, relatives and institutions.
Achieving a successful LIVB repair is nowhere near the number of people who benefit from LIVB prevention, the mechanism of surgery failure:
1) Linked to anatomical disposition: Most lesions during cholecystectomy are caused by confusing the main bile duct with the cystic duct. Especially when the main bile duct is thin, facilitated by excessive traction on the gallbladder added to the presence of a short cystic duct. This confusion can lead to partial section, ligation, lacerations, thermal burns, and their subsequent progression to stenosis.
2) Conditioned by local pathology: Acute cholecystitis can mask many biliary and vascular structures, lipomatosis, scleroatrophic gallbladder, local hemorrhage, cholecysto-digestive fistulas, liver cirrhosis, and portal hypertension.
3) Pure technical factors and therefore dependent on the surgeon: An increase in the incidence of injuries is motivated by the inexperience of the surgeon due to the short learning period of this technique. The maximum incidence of lesions occurs in the first 15 cholecystectomies (2.2%), to descend to a minimum in the number 50 (0.1%).
Table (1): Diseases that lead to death due to anesthesia

<table>
<thead>
<tr>
<th>Groups</th>
<th>Cases</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>The person is in good health.</td>
<td>2%</td>
</tr>
<tr>
<td>Group 2</td>
<td>A patient has a mild illness.</td>
<td>5%</td>
</tr>
<tr>
<td>Group 3</td>
<td>A patient who has a severe organic disease but does not cause a patient to have a health disability.</td>
<td>11%</td>
</tr>
<tr>
<td>Group 4</td>
<td>A patient has a very severe organic disease, which leads to a threat to her life.</td>
<td>30%</td>
</tr>
<tr>
<td>Group 5</td>
<td>A patient is dying and is expected to live 24 hours</td>
<td>88%</td>
</tr>
</tbody>
</table>

Classification according to the World Health Organization:
Strasberg proposed a classification for laparoscopic PVB lesions, which can be applied in the management of such lesions.
Type A: bile leakage in a small duct in continuity with the common liver.
Type B: partial occlusion of the biliary tree. This unilateral duct is almost always the result of an aberrant right hepatic canal.
Type C: leak from a duct in communication with the common liver. It is also due to an aberrant right liver.
Type D: lateral extrahepatic duct injury. Due to inadvertent annulation of the hepato-choledocus during the performance of the cholangiography.
Type E: circumferential lesion of the major bile ducts. It corresponds to the Bismuth classification of bile duct stenosis (type 1 to 5).
The causes of laparoscopic biliary injury can be divided into:
  • Identification error
    1) Of bile ducts as cystic duct
    2) Of the common bile duct as cystic duct
    3) Of an aberrant right as a cystic duct
  • Technical causes
    1) Failure to ensure closure of the cystic duct
2) Dissection plane too deep in the gallbladder bed
3) Abuse of thermal energy when dissecting, haemostasis control, or tissue sectioning
4) Injuries due to excess traction of the cystic duct
5) Lack of judgment in the use of clips to control bleeding
6) Injuries due to inadequate technique during ductal exploration

Table (2): Factors of minor and major accidents due to anesthesia:

<table>
<thead>
<tr>
<th>Frequency per 10</th>
<th>197a (n = 39748)</th>
<th>197b (n = 44372)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>623.4</td>
<td>665.8</td>
</tr>
<tr>
<td>Back pain</td>
<td>8.4</td>
<td>24.9</td>
</tr>
<tr>
<td>Venous</td>
<td>9.3</td>
<td>29.7</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>3.2</td>
<td>1.7</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>31.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Other</td>
<td>9.2</td>
<td>32.7</td>
</tr>
</tbody>
</table>

The strategy that is put into consideration is based on the knowledge of the cause that originates the presence of this complication, based on this experience we can suggest that the surgeon has 3 important times, before reaching the performance of a cholecystectomy and that if he takes considering the following tips, the probability of a complication with this technique would be minimal or simply no longer exist.

Surgeon's Attitude before Surgery:
Among the main suggestions that can be mentioned to the patient and his family before the operative act we have:
• Do not schedule cholecystectomies (one after another).
• Consider a male patient with overweight and acute cholecystitis or scleroatrophic gallbladder at particular risk.
• Not scheduling important activities after surgeries
• Systematize when to convert
• Not aim for cholecystectomy at all costs
Always explain the eventualities of biliary surgery to the patient, in relation to the possibility of conversion, which means providing security and not a failure or complication of the procedure.

The patient is convinced that laparoscopic biliary surgery "has no risks". This concept must be changed, before leaving the query. This will easily understand if the risks of not operating are put on the other side of the scale.

Iatrogenic injuries to the bile ducts (LIVB) are an infrequent contingency, with very important clinical, economic, judicial, occupational and social repercussions. This makes it imperative to have a very clear concept about its clinical presentation, diagnosis, classification, complexity and adequate treatment; but above all, the way to prevent them.

Bile duct injury is defined as obstruction (ligation, clipping, or scarring) that causes partial or total section of the main bile duct, or aberrant ducts that drain a hepatic sector or segment.

In our country, cholelithiasis is the main cause of morbidity in the general population, according to the INEC, in 2019 it had an incidence of 22.5, representing 17% of the pathologies of that year.

During the present decade, the spread of laparoscopic cholecystectomy has been correlated with an increase in the incidence of LIVB, which is why interest in this topic has been renewed. This complication directly affects the patient and indirectly family members, doctors and the institution.

There is a balance that is too inclined towards studies referring to the diagnosis, classification, treatment and follow-up of LIVB but very little on how to prevent it effectively, which makes evident the need for studies that identify the main risk factors predisposing to this condition.

Conclusions:

Overall, the frequency of bile duct injuries ranges from 0.1 to 0.6%. These lesions are three to four times more frequent during laparoscopic cholecystectomy (0.3-0.6%) than open cholecystectomy (0.1-0.3%).

The diagnosis can be made intraoperatively, which occurs in a percentage between 12-46%. If performed in the postoperative period, the treatment becomes more difficult.

The use of routine cholangiography remains controversial. The lesion should be suspected intraoperatively due to the presence of bile during the examination of the operative field, complemented with the examination of the gallbladder when finding a fragment of the bile duct.

Surgery is a battle won by surgeons. The trophy is a patient without postoperative complications. The mandate is: eradicate the complication in gallbladder surgery.

The responsibility of achieving this lies with all surgeons, but especially with the surgeons of tomorrow and future surgeon trainers.

The key to the success of preventing the complication of gallbladder surgery is to apply a strategy based on the cause. We present an efficient and applicable strategy, we propose to disseminate it.

References:


www.turkjphysiotherrehabil.org