

Anesthesia and Perioperative Management of Hepatic Metastases to CRC Patients in Liver Resection. Our Experience.

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Abstract

Background: The patients with colorectal adenocarcinoma very often developed hepatic metastases. Resection of them still remains the best treatment of disease. Hepatectomy carried about 20% mortality rate. The most important intraoperative factor is major hemorrhage and hypotension and postoperatively the main reasons are hemorrhage, coagulopathy, renal failure, pulmonary, and cardiac disturbance till biliary fistula and liver failure. Anesthesia and perioperative management have resulted in diminished value of mortality and morbidity at the same time.

Aim: The aim of this study is to submit our experience in anesthesia and perioperative management in liver resection of hepatic metastases in CRC patients.

Material and Methods: In that retrospective study we enrolled 6 patients ASAII- III, from January to July 2019. All patients treated for liver malignancy diagnosis after colorectal carcinoma in elective surgery and received general anesthesia with fentanyl 1-2µg/kg/h, propofol 4.0µg/kg/min via target-controlled infusion and vecuronium 0.001mg/kg/min and sevofluran 2%. All patients are monitored with continuous central venous pressure(CVP). We recorded mean artery pressure (MAP), heart rate (HR), CVP, amount of transfusion, incidence of complications and discharge from intensive care and hospital.

Results: Female/male report was 66,6% vs. 33.4%. The ages of patients were 53-72 years with a mean ± SD age of 65.1 ± 9.5 years. CVP was 0-5. Amount of blood was 2.5 unite during intervention. Average of days in intensive care was 3.83. Renal compromised was 3%. Ascites and edema were 50%. All patients were discharged home after 14.66 days.

Conclusions: Optimizing hemodynamic and fluid administration and reduced the administration of blood therapy using low CVP (0-5).

Keywords: blood transfusion, CVP, CRC, liver surgery, perioperative management

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Full Text

Introduction

Recently colorectal carcinoma (CRC) is a main cause of morbidity and mortality in many countries all over the world. It is the fourth most incident of death from cancer in Europe ¹ and the 3rd leading cause of cancer in male and the 2nd leading cause of cancer death in female according to the American institute for cancer research.² The liver is often first place of metastatic disease and sometimes may be the solitary site of spread in 30-40% of patients with advanced disease (Weiss et al, 1986; Hugh et al, 1997a).³ According to the literature the resection of CRC liver metastases after the colorectal surgery is the best option and has a well documented improvement in survival, 3.3%-6.1% of them have five-year survival after hepatic resection.⁴ In Höhn's classifications ⁵, liver resection is considered a major abdominal surgery. The resection of colorectal cancer liver metastasis (CRLM) is performed an open approach commonly under general anesthesia (GA) alone or in combination with epidural analgesia and have inherent risks to the patients. During intraoperative period of surgery patients have risks of major hemorrhage and followed by hypotension while in postoperatively period of operation the patients must development ongoing hemorrhage, systemic coagulopathy, acute renal failure, pulmonary and

cardiac disturbance in addition to inherent complications of liver resections till biliary fistula and liver failure.⁶ Anesthesia and perioperative management have resulted in diminished value of mortality and morbidity at the same time. Many of surgical and anesthesia techniques aimed to prepared patient with CRLM in operating rooms are to reducing blood loss during surgery as reducing as well acute blood loss anemia requiring blood product transfusion with all kind of manners. Blood transfusion ought to associated with very poor surgical outcomes, early cancer development and recurrence and maybe reduce survival for this kinds of patients.⁷ Blood loss in surgery for liver resection occurs from different factors, but we can mention two as the most important: it is the largest internal organ blood volume and is related and is crossed by large vessels. There are a number of articles that have shown a direct relationship between units transfused to a patient and postoperative complications. For this reason, over the last 20 years it has developed an intensive research in order to drastically reduce bleeding in this type of intervention.⁸ The liver is the body's largest solid mammalian organ that is located in the right quadrant of the abdomen and is divided into four lobes: right, left, square and caudate. The right and left lobes are divided into segments, defined by the

distribution of the arterial vessels and biliary tree. Liver perfusion is organized by a double movement: portal vein (PV) and hepatic artery (AH). The AH with smaller caliber, delivering about 30% of the hepatic blood flow with 60% of oxygen available to the body. The PV complements 40% of the total oxygen available to 70% of

the liver.⁹ Assessment of liver function is made according to the Child-Pugh clinical total scoring system. Child-Pugh total score A, 5-6 points; B, 7-9 points; C, 10-15 points (*table 1*). It had been suggested that liver resections surgery ought to perform in patients with Child-Pugh total score A.¹⁰

Points	1	2	3
Ascites	None	Small or diuretic controlled	Tense
Encephalopathy	Absent	Mild	Significant
Albumin (g litre ⁻¹)	>35	28-35	<28
Bilirubin (µmol litre ⁻¹)	<34	34-50	>50
PT sec> control	<4	4-6	>6
INR	<1.7	1.7-2.3	>2.3

Table 1: Child-Pugh Score

Major surgery is common pathophysiological situation. Handling colloids and crystalloids, hemodynamic stability, hypothermia control, decreased surgical stress and inflammation, preventive ventilation, pain control and other vital techniques such as acid base homeostasis ground state they are universal behavior. The anesthesiologist must therefore implement sufficient and adequate monitoring to facilitate the

Aim of study

The aim of this study is to submit our experience in treatment of anesthesia and perioperative management in liver

control of these techniques and rapid recovery.¹¹ Specific characteristics of anesthetic technique for hepatic resections based to:

1. Using of anesthetic drugs that do not alter the hepatic blood flow.
2. Reduction of PVC to reduce bleeding and the last but not the least
3. Using of vasoactive drugs to avoid hypotension.^{8,9,10,11}

resection of hepatic metastases in patients with CRC and their outcomes.

Material and methods

In that retrospective study we enrolled 6 patients ASAII- III, during January to July 2019 timeframe. All patients treated for liver malignancy diagnosis in elective surgery after colorectal resection carcinoma either elective or emergency, in the first clinic of general surgery, Department of Surgery at the university hospital center "Mother Theresa" Tirana, Albania. We have excluded patients who performed liver resection due to hepatocarcinomas or other reasons. Important data for this study were: age, sex, chronic disease, liver function tests, albumin, and renal function tests. Assessment of liver function is made according to the Child-Pugh total scoring system. Other relevant data were time duration in minutes of the surgery, blood loss during intervention, intraoperative and postoperative blood transfusion. We recorded mean artery pressure (MAP), heart rate (HR) and continuous central

venous pressure (CVP). All patients are monitored in incidence of complications and discharged from intensive care and hospital. In 6 patients we applied general anesthesia with fentanyl 1-2 μ g/kg/h, propofol 4.0 μ g/kg/min via target controlled infusion and vecuronium 0.001mg/kg/min and inhalator anesthesia was with sevofluran till 2%. We used in all patients at the moment of started parenchymal hepatic resection tranexamic acid. We recorded all the presented data as means values in % and \pm standard deviation. $P < 0.05$ was considered significant.

Results

The study included 6 patients treated for liver malignancy diagnosis after colorectal carcinomas (*figure 1*) operated in the first clinic of general surgery at the University hospital center "Mother Theresa" Tirana, Albania.

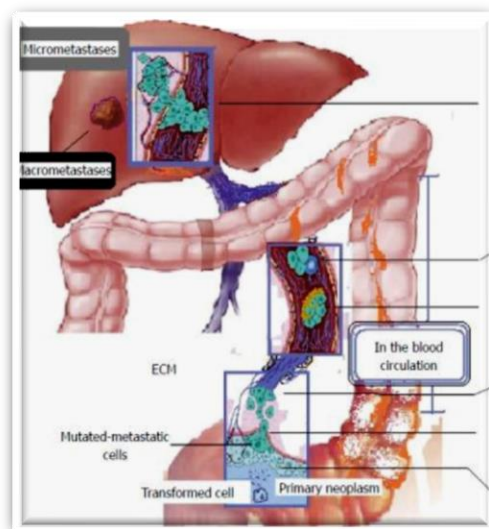


Figure 1

From 6 patients which were subject of our study 66,6% (4) were females and 33.4% (2) were males. Age of patients was 53-72 years with a mean \pm SD age of 65.1 ± 9.5 years. A patient was insulin dependent diabetic and another had ischemic heart disease as co morbidity.

In all patients, the following hepatic resection were performed: 3 Right sided resections (5-8 segment) , 2 left sided resections (2-4 segment) and in one patient was performed segmentektomi (5, 6 segment).The anatomy of liver is depicted figure 2.

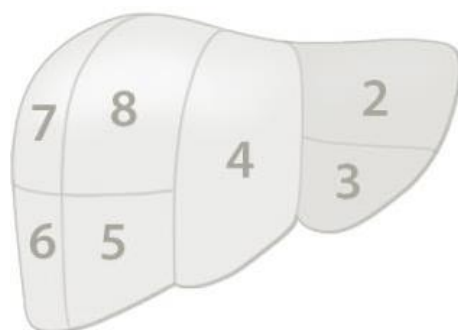


Figure 2

CVP was 0-5cm H₂O. Systolic, diastolic and mean blood pressures were kept in normal value. Amount of blood was 2.5 unite during surgery. Average of days in intensive care was 3.83. Renal compromised was 3%. Ascites and

edema were 50%. All patients were discharged home after 14.66 days. The length of hospitalization varied from eight days to twenty-four days in a case of complication. Some of the data are recording in the table nr 2.

Case number	6	ASD	p-value
Age, mean \pm SD, yo	65.1 \pm 9.5	0.338	0.002
Sex, male/female(n)	2/4		0.31
Male	33.4%.(2)		
Female	66,6%(4)		
Tumor location% (n)	6	0.038	0.25
Right sided resection	3	50%	
Left sided resection	2	33.3%	
Segment resection	1	16.6%	
Intraoperative hemorrhage	725-2300ml		
Postoperative hemorrhage	200-600 ml		
The child-purge scoring system	A (5-6)		
Ascites & edema	3	50%	
Temperature & infection	4	66.6%	0.26

<i>CVP & fluid administration</i>	<i>0-5cm H₂O</i>	<i>0.001</i>
<i>Procedures time, mean± SD</i>	<i>150-260 min</i>	
<i>Days in intensive-care</i>	<i>3.83±2.9</i>	
<i>Discharged home</i>	<i>14.66 days±3.5</i>	

Table 2

Discussion

Surgical resection of colorectal liver metastases has a well-documented improvement in survival. Working together regarding surgical manipulations and management of hemodynamic between anesthetist and surgery is a very important component of positive outcomes. Preoperative assessment should be value for each patient, based on comorbidities and hepatic function. These patients have increased risk of multiorgan dysfunction. Two of our patients had received and chemotherapy and they present a challenge of operative stuff. The majority of our patients schedule for liver resection had normal hepatic parenchyma. All surgeries are performed under standard general anesthesia involving endotracheal intubation and controlled ventilation that not damages the liver. All patients after standard monitoring should have a large bore intravenous access G 16 for CVP monitoring which allows us hemodynamic control. Hypoglycemia is a real concern during vascular occlusion and should monitor and kept in normal value too, with applied ordinary insulin or dextrose. Hypothermia because can causes vasoconstriction and

coagulopathy and it avoid with caring of staff. Our duties during operations were reduced intraoperative bleedings. As we know coagulopathy may be induced by acidosis, hypothermia and hypocalcaemia and we had treated according to acid-basic gas analyses. At the moment happened parenchymal resection hepatic inflow occlusion, the main source of bleeding is backflow from the hepatic veins without valves. The control of central and thus hepatic venous pressure is crucial to reduce the blood loss. It has been well documented that a CVP of >5 cm H₂O significantly increases hemorrhages.¹² However, the risks of maintaining a low CVP include cardiovascular instability and air embolism, but the theoretical risk of increasing postoperative renal dysfunction does not appear to be clinically important.¹³ High CVP can be treated with diuretics or nitrate infusion. After the resection phase, circulating blood volume can be restored as the risk of bleeding, while still present, is much reduced. Surgical access to posterior liver tumours may involve transient compression of the inferior vena cava, which can cause profound hypotension. Fluid transfusion will maintain blood

pressure during these episodes but will also elevate CVP and promote bleeding. The best management of this situation involves cautious fluid transfusion and close communication with the surgical team. Positive end expiratory pressure not only reduces lung atelectasis but also elevates CVP and reduces liver blood flow, so should be avoided during the resection process. Blood transfusion had been shown in liver resection surgery reduced by tranexamic acid.¹⁴

Conclusions

As we know liver resection for colorectal metastasis has a high risk for heavy blood loss and massive blood transfusions, in perioperative period. The goal of anesthesiologists and surgeons is crucial to minimize the blood loss and hemotransfusions. Particular attention will be given to perioperative strategies to decrease the need for transfusion. The anesthetists are due to optimized hemodynamics and fluid administration to anesthesia, reducing the administration of blood therapy using CVP < 5 cm H₂O, using tranexamic acid and keeping normal coagulopathy. Coagulopathy may be induced or exacerbated by acidosis, hypothermia, and hypocalcaemia, all of which should be monitored and treated. Improvement of surgical technique and coordinated efforts for perioperative

management all the time between anesthesiologist and surgical teams is the key for reduce morbidity and mortality over time.

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