

Postoperative complications after liver resection in patients with focal lesions

Nurbek Ilyassov^{1, 2}

¹Department of General and Thoracic Surgery, National Scientific Medical Center, Nur-Sultan city, Republic of Kazakhstan

²№2 Department of Surgical Diseases, Medical University Astana, Nur-Sultan city, Republic of Kazakhstan



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Corresponding Author: Nurbek Ilyassov, Department of General and Thoracic Surgery, National Scientific Medical Center. Address: 42, Abylai-Khan avenue, Nur-Sultan city, 010000, Republic of Kazakhstan. Email: ylyasov@inbox.ru

Abstract

Aims: To study the main complications in the immediate postoperative period after resection of the liver of various sizes in patients with focal diseases. To conduct a comparative analysis of the frequency of complications depending on the volume of surgical intervention and the assessment of prognostic factors for the timely detection of post-resection complications.

Material and methods: A retrospective analysis was performed in 97 patients with focal liver diseases who were undergoing surgical treatment from 2010 to 2016. Of 97 patients undergoing liver resection, 26 noted various complications in the immediate postoperative period.

Results: The most common complication is suppuration of the surgical wound (37.1%), pleural effusion (22.6%), liver failure (19.5%), persistent ascites (7.2%), less common complications included biliary fistulas (2%), thrombophlebitis (2%) and intra-abdominal bleeding (1%). An important point affecting the results of surgical treatment was the volume of the resected liver, respectively, and the complication rate reached in 33.3% - 50% of cases.

Conclusion: A connection was found between the use of extensive liver resection, a change in the immunological status and the occurrence of various complications, despite the standard management of patients.

Key words: infections, postoperative complications, liver resection, risk factors

ОШАҚТЫ ЗАҚЫМДАНУЫ БАР НАУҚАСТАРДЫҢ БАУЫР РЕЗЕКЦИЯСЫ ОПЕРАЦИЯСЫНАН КЕЙІНГІ АСҚЫНУЛАР

Н.К. Ильясов^{1, 2}

¹Жалпы және торакальді хирургия бөлімі, Ұлттық ғылыми медициналық орталық, Нұр-Сұлтан қаласы, Қазақстан Республикасы

²№2 Хирургиялық аурулар бөлімі, Астана медициналық университеті, Нұр-Сұлтан қаласы, Қазақстан Республикасы

ТҰЖЫРЫМДАМА

Мақсаты: Фокустық аурулары бар науқастарда әр түрлі мөлшердегі бауыр резекциясынан кейінгі операциядан кейінгі кезеңде негізгі асқынуларды зерттеу. Хирургиялық араласу көлеміне және резекциядан кейінгі асқынуларды уақытында анықтау үшін болжамдық факторларды бағалауға байланысты асқынулар жиілігіне салыстырмалы талдау жүргізу.

Әдістері: 2010 жылдан 2016 жылға дейін хирургиялық емдеуден өткен бауырдың ошақты аурулары бар 97 пациентке ретроспективті талдау жасалды. Бауыр резекциясы жасалынған 97 пациенттің 26-ы операциядан кейінгі кезеңде әр түрлі асқынуларды атап өтті.

Нәтижелері: Ең жиі кездесетін асқыну - хирургиялық жараның іріндеуі (37,1%), плевра қуысының сұйықтығы (22,6%), бауыр жеткіліксіздігі (19,5%), тұрақты асцит (7,2%), өт жолдарының жыланкөзі (2%) тромбофлебит (2%) және іш ішілік қан кету (1%). Хирургиялық емдеудің нәтижелеріне әсер ететін маңызды сәт, сәйкесінше, қалпына келтірілген бауырдың көлемі болды, ал асқыну 33,3% - 50% жағдайға жетті.

Қорытынды: Науқастарды стандартты басқаруға қарамастан, бауырдың кең резекциясын қолдану, иммунологиялық мәртебенің өзгеруі және әртүрлі асқынулардың арасында байланыс табылды.

Негізгі сөздер: инфекциялар, операциядан кейінгі асқынулар, бауырдың резекциясы, қауіп факторлары

ПОСЛЕОПЕРАЦИОННЫЕ ОСЛОЖНЕНИЯ ПРИ РЕЗЕКЦИИ ПЕЧЕНИ У ПАЦИЕНТОВ С ОЧАГОВЫМИ ОБРАЗОВАНИЯМИ

Н.К. Ильясов^{1, 2}

¹Отделение общей и торакальной хирургии, Национальный научный медицинский центр, город Нур-Султан, Республика Казахстан

²Кафедра хирургических болезней №2, Медицинский университет Астана, город Нур-Султан, Республика Казахстан

РЕЗЮМЕ

Цель: Изучить основные осложнения в ближайшем послеоперационном периоде после резекции печени различного объема у пациентов с очаговыми заболеваниями. Провести сравнительный анализ частоты встречаемости осложнений в зависимости от объема оперативного вмешательства и оценку прогностических факторов для своевременного выявления пострезекционных осложнений.

Материал и методы: Проведен ретроспективный анализ у 97 пациентов с очаговыми заболеваниями печени, находившихся на оперативном лечении с 2010 по 2016 гг. Из 97 пациентов, перенесших резекцию печени, у 26 отмечены различные осложнения в ближайшем послеоперационном периоде.

Результаты: Наиболее частым осложнением является нагноение операционной раны (37,1%), плевральный выпот (22,6%), печеночная недостаточность (19,5%), стойкий асцит (7,2%), реже отмечались желчные свищи (2%), тромбоз флегбит (2%) и внутрибрюшное кровотечение (1%). Важным моментом, влияющим на результаты оперативного лечения, явились объём резецируемой печени, соответственно и частота осложнений достигла в 33,3% - 50% случаях.

Заключение: Выявлена связь между применением обширной резекции печени, изменением иммунологического статуса и возникновением различного рода осложнений, несмотря на стандартное ведение пациентов.

Ключевые слова: инфекции, послеоперационные осложнения, резекция печени, факторы риска

Introduction

The introduction of new technologies in surgical hepatology has achieved some success in treating patients with focal lesions [1,2,3,4]. At the same time, the high incidence of postoperative infectious complications in liver resection, where the main factor is the increase in microbial resistance to antibacterial drugs and immune imbalance, are an urgent problem requiring analysis of complications and the search for prognostic factors for their timely diagnosis.

Material and methods

The medical histories of patients with focal liver diseases were retrospectively analyzed in the period from 2010 to 2016. The exclusion criteria from the study were: age older than 80 years or younger than 18 years, the presence of malignant neoplasms. Clinical, laboratory and instrumental examinations were carried out according to the protocol of diagnosis and treatment of this category of patients. Patients underwent liver resection depending on the extent of the lesion. All the results of the examination were recorded in medical records. Statistical

processing was performed using Student T-test.

All patients were informed about the purpose of the study, informed consent was received. In order to protect patient confidentiality, all identifying information was hidden (first name, last name).

Results

Of 179 patients diagnosed with liver formation, 97 (54.1%) were subjected to resections of various scopes (Table 1). The age of patients ranged from 22 to 79 years (average 45 years). Of these patients women - 58 (59.79%), men - 39 (40.20%). Due to the severity of the pathological process (capture of more than 5 segments) or the small size of the formation - for 82 (45.8%) patients another treatment method was chosen - HIFU therapy (High Intensity Focused Ultrasound).

The largest amount of liver resection was performed for echinococcosis 69 (71.13%), the smallest amount for liver abscess - 3 (3.09%).

The nature and frequency of complications after liver resection are presented in Table 2.

Table 1 Focal liver disease

The nature of focal lesion	Number of patients	
	N	%
Echinococcosis	69	71,13%
Alveococcosis	11	11,34%
Hemangioma	9	9,27%
Simple cysts	5	5,15%
Abscesses	3	3,09%
TOTAL	97	100

Table 2 The nature and frequency of complications after liver resection

Complication	Frequency of complications			
	Number of patients		Mortality	
	n	%	N	%
Pleural effusion	22	22,6%	-	-
Liver failure	19	19,5%	-	-
Ascites	7	7,2%	-	-
Free fluid in the abdominal cavity	4	4,1%	-	-
-Under diaphragm				
-Under liver				
-Liver abscesses	5	5,1%	-	-
	-	-	-	-
Intraabdominal bleeding	1	1,0%	-	-
Biliary fistulas	2	2,0%	-	-
Pneumonia	3	3,0%	-	-
Pulmonary embolism	-	-	-	-
Thrombophlebitis	2	2,0%	-	-
Wound suppuration	36	37,1%	-	-
Hemorrhagic shock	-	-	-	-
Number of complications	91			
Number of patients with complications	26	26,8%	-	-

The dependence of the type of surgical intervention and the frequency of complications is shown in Table 3. It is noted that the larger the volume of liver resection, the more complications develop in the postoperative period. For example, after extended right-sided hemihepatectomy and right-sided hemihepatectomy, complications were detected in 50% and 33.0% of cases, respectively. Significantly less often, they were observed after atypical bisegmentectomy (14.5%).

Table 3 The frequency of complications depending on the type of surgical intervention

Type of surgery	Number of patients	Complications		Mortality	
		N	%	N	%
Extended right-sided hemihepatectomy	4	2	50%	-	-
Right-sided hemihepatectomy	6	2	33,3%	-	-
Left-sided hemihepatectomy	1	-		-	-
Atypical resection (bisegmentectomy)	48	7	14,5%	-	-
Atypical resection (trisegmentectomy)	23	5	21,7%	-	-
Atypical resection (more than trisegmentectomy)	15	3	20%	-	-
TOTAL	97	19	19,5%	-	-

Discussion

A significant factor affecting the results of the operation was the volume of liver resection. The most common complications were with extensive resections (66% and 72.2%). The paper presents the frequency of complications of liver resection and factors affecting their occurrence.

Of 97 patients, 26 (26.8%) patients had various complications in the immediate postoperative period; no fatal outcome was observed (0%) (Table 2). In 26 patients, 91 complications were observed. As can be seen from the data in the table, suppuration of the postoperative wound was most often observed (37.1%). In the second place was pleural effusion (22.6%), in the third - hepatic cell failure (19.5%). The least common complications were abdominal postoperative bleeding (1.0%), suppuration of the wound (1.8%), bile fistula (2.0%) and thrombophlebitis of the vessels of the lower extremities (2.0%).

Suppuration of a postoperative wound after a liver resection is the most common complication, the diagnosis of which does not present any special difficulties. It was noted in 36 patients. The frequency of infection is not uncommon for this category of patients. In all cases, the described complications were cured.

According to the literature, these complications occur in 14% (5-22%) of cases [4,5,6,7]. One of the reasons for the accumulation of fluid after resection is the presence of necrotic liver tissue, as well as the accumulation of fluid in sloping places. Abdominal ultrasound performed for 9 patients on 3-5-7 days after surgery allowed to establish the nature and dynamics of changes in the postoperative side. Computed tomography made it possible to accurately determine the localization of the pathological process. In 2 patients, hemobilomas were diagnosed, in 1 patient it was resolved after conservative therapy, and in another patient, puncture aspiration was applied.

According to the literature, pleural effusion occurs in approximately 30% (9% -73%) of cases and is recognized by most authors as the most frequent complication after liver

resection [8,9,10,11]. In most patients, effusion in the pleural cavity are asymptomatic and are rarely eliminated by repeated pleural punctures.

Pneumonia after liver resection is a common complication in surgery, associated with a high probability of infection in a weakened body. The liver plays an immunological role, is the site of maturation and activation of various immune components, and liver resection reduces the patient's immune status. A decrease in immunity in turn increases the risks of developing infectious complications. In 3 (3.0%) patients, nosocomial pneumonia was observed which responded well to antibiotic therapy.

Hepatic cell failure observed in 19 (19.5%) patients was the most dangerous complication in the postoperative period, which was restored on 7-10 days after surgery.

In our clinic, from 2010 to 2016, not a single fatal case was registered after liver failure in the postoperative period. Literature data shows that liver failure is observed in 10% of cases (3-75%), of which 90% is the main cause of deaths after liver resection [5, 8, 12, 13, 14]. Some sources say that the high regenerative ability of the liver parenchyma in many cases allows removing 80-90% of the organ without complications [15]. The mechanism of liver failure after liver resection has not been yet elucidated. According to the literature, it is known that after liver resection exceeding 75-80%, liver failure occurs. The maximum resection is considered to be 75–80% [16]. The occurrence of a complication in the part of the liver remaining after resection is associated with an operative trauma, activation of Kupffer cells [17], impaired microcirculation [18], and the action of intestinal endotoxin [19]. To all this, factors such as bleeding, infection, the presence of concomitant liver disease (hepatitis, liver cirrhosis, prolonged clamping of the hepatoduodenal ligament, etc.) reduce the functional reserve of the liver and lead to disruption of regenerative processes, which contributes to the development of liver failure [14,18,19,20].

Persistent ascites was found in 7 (7.2%) patients (with concomitant cirrhosis of the liver - 2, with extensive resections of the organ parenchyma - 5).

Portal hypertension, functional impairment of renal function and a decrease in oncotic pressure are considered to be the main mechanisms of ascites, which are associated with pathogenetic factors: a decrease in the synthesis of albumin and oncotic plasma pressure; damage to the intrahepatic lymphatic vessels, a decrease in the inactivation of antidiuretic hormone in the liver, and an increase water reabsorption in the kidneys, hypovolemia, activation of the renin-angiotensin-aldosterone system and sodium absorption [10, 13, 20, 21].

Biliary fistula, which closed independently, was observed in 2 (2.0%) patients. Intraoperative bleeding, which required emergency relaparotomy, was observed in 1 patient. A relaparotomy was performed, the cause was bleeding from the edge of the liver resection, which required additional ligation of the bleeding vessel, and subsequently developed the syndrome of disseminated intravascular coagulation and liver failure.

According to the results of the analysis of liver resections, complications that occur depend on the volume of the resected part of the organ and the immunological status of the body. The paper presents the frequency of complications of liver resection and factors affecting their occurrence. A significant factor affecting the results of the operation was the volume of liver resection. The most common complications were with extensive resections (66% and 72.2%). Postoperative complications developed in 2 of 4 (50.0%) patients after extensive right-sided hemihepatectomy, in 2 of 6 (33.3%) after right-sided hemihepatectomy, atypical resection (bisegmentectomy) - in 7

of 48 (14.5%), atypical resection (trisegmentectomy) in 5 out of 23 (21.7%), atypical resection (more than 3 segmentectomy) in 3 out of 15 (20.0%) patients. At the same time, in the literature on this issue opinions are mixed. Some authors reliably proved that the smaller the volume of the removed part of the liver, the less complications develop in the postoperative period, the better the survival rate of patients [22,23]. In other studies, there was a statistically significant absence of differences in the number of postoperative complications and mortality in patients who underwent extensive resection and removal of a small part of the liver [5].

Conclusion

The use of advanced surgical methods and various new devices, suture materials significantly improve the quality of surgical intervention on liver. Making the right decision when performing various volumes of surgery on liver, significantly affects the outcome of the operation. Preoperative predicted factors will improve the quality and outcome of surgical intervention in patients with indications for extensive liver resection, taking into account the prevention of both early and late complications.

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