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Laparoscopic hepatectomy and open hepatectomy in the treatment of hepatocellular carcinoma

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Abstract: Objective To explore the perioperative situation and liver function in patients with hepatocellular carcinoma (HCC) treated with two different surgical methods, laparoscopic hepatectomy and open hepatectomy. **Methods** A retrospective analysis was conducted on 85 patients with HCC who visited the Department of Biliary and Pancreatic Surgery, Shanxi Bethune Hospital from January 2020 to December 2022. According to their surgical methods, the patients were divided into open group (open liver resection, n=53) and laparoscopic group (laparoscopic liver resection, n=32). Both groups of patients were followed up for one month after discharge. Compare the general information, intraoperative conditions, postoperative complications, and liver function indicators between two groups of patients. **Results** Compared with the open group, the laparoscopic group had shorter hospitalization time [(14.19±3.02)d *vs* (16.36±3.30)d, t=3.032, P=0.003] as well as shorter time for the first postoperative anal evacuation [(2.30±0.77)d *vs* (2.75±0.49)d, t=3.291, P=0.001] and less intraoperative bleeding [(395.63±70.25)mL *vs* (440.38±62.42)mL, t=3.054, P=0.003]. Serum TBIL, ALT and AST levels were lower in the observation group than in the control group at 3 days postoperatively, and the difference was statistically significant. In the 1-month postoperative period, the total incidence of postoperative complications in the laparoscopic group was slightly lower than that in the open group, but the difference was not statistically significant (15.63% *vs* 16.98%, χ^2=0.916, P=0.339). **Conclusion** For patients with hepatocellular carcinoma, the application of laparoscopic hepatectomy is safe and feasible, and it can reduce the impact on liver function, shorten hospitalization time, and promote early recovery.

Keywords: Hepatectomy; Laparoscopic hepatectomy; Hepatocellular carcinoma; Liver function; Alpha fetoprotein
Fund program: Research Project of Shanxi Provincial Health Commission (2021149); Shanxi Province Basic Research Program (202103021224361); Shanxi Province's "136" Medical Revitalization Project

Liver cell carcinoma is an invasive tumor associated with chronic liver disease and ranks among the most common malignancies worldwide, being the third leading cause of global cancer-related deaths [1]. In China, the incidence of liver cell carcinoma is increasing. Liver cell carcinoma is closely linked to chronic liver disease and cirrhosis, with liver resection surgery being the primary curative approach for these patients [2-4]. However, traditional open liver resection surgery is associated with significant trauma, substantial blood loss, prolonged hospital stays, and slow postoperative recovery [5]. Over the past two decades, laparoscopic surgery for treating liver cell carcinoma has shown promising results [6-7], with a significant exponential increase in patients undergoing laparoscopic liver resection [8-9]. This study aims to compare and analyze the short-term efficacy of laparoscopic versus traditional open liver resection surgery for liver cell carcinoma patients, further exploring the clinical application value of laparoscopic liver resection.

1 Material and methods

1.1 General information

This study included 85 patients diagnosed with liver cell carcinoma who visited the Third Hospital of Shanxi Medical University from January 2020 to December 2022. Patients were divided into open surgery group and laparoscopic surgery group based on the surgical procedure. There was no significant difference between the two groups in general characteristics (age, sex), tumor diameter, TNM staging, Child-Pugh score, HBsAg infection status, or presence of cirrhosis (P > 0.05). **Refer to Table 1.** The study protocol was approved by the Ethics Committee of Shanxi Bethune Hospital (YXLL-2020-042).

1.2 Inclusion and exclusion criteria

Inclusion criteria: (1) histopathologically confirmed liver cell carcinoma post-surgery; (2) no prior intervention

therapy, no anesthesia contraindications, and no surgical contraindications; (3) age < 75 years; (4) TNM stages I to II; (5) absence of severe underlying diseases or well-controlled current conditions [10]. **Exclusion criteria**: (1) inability to tolerate general anesthesia; (2) severe underlying diseases or poor liver function preoperatively; (3) distant organ metastasis of the primary tumor; (4) palliative surgery required.

Tab.1 General data of patients (case)

Indicator	Laparoscopic group(n=32)	Open surgery group (n=53)	*t*/χ2	*P*
Age [a](years)	60.09±6.51	60.66±8.42	0.326	0.745
Male/female	25/7	37/16	0.699	0.403
Lesion diameter [a] (cm)	5.72±2.00	5.35±1.11	1.096	0.276
TNM stage (I/II)	20/12	33/20	0.983	1.000
Child-Pugh grade (A/B)	21/11	36/17	0.048	0.827
HBsAg positive	27	40	0.948	0.33
Cirrhosis	26	42	0.050	0.823

Note: [a] represented as $\bar{x} \pm s$.

1.3 Methods

Both the two groups followed the same surgical principles according to the Chinese expert consensus on liver resection and relevant surgical guidelines [2,11]. Different liver blood flow occlusion methods were used based on tumor location, surgical approach, and intraoperative blood loss. Patients with uncontrollable massive bleeding during laparoscopic liver resection were converted to open surgery. The tumor was removed by enlarging the abdominal incision, placing it in a specimen bag, routine abdominal drainage was performed, and the excised specimen was sectioned and the maximum tumor diameter and resection margins measured. Both groups of patients received routine postoperative treatments including anti-infection and analgesia. Patients were followed up for 1 month postoperatively.

1.4 Outcome measures

Perioperative outcome measures included operative time, margin distance, time to postoperative flatus, total hospital stay, and intraoperative blood loss [12]. Liver function tests included levels of total bilirubin (TBIL), alanine aminotransferase (ALT), aspartate aminotransferase (AST), albumin (ALB), and alpha fetoprotein (AFP) measured preoperatively, on postoperative day 3, and one month postoperatively.

1.5 Statistical methods

Statistical analysis was performed using SPSS 19.0 software. Categorical variables were presented as case, and chi-square tests were used for comparison. Continuous variables following a normal distribution were presented as $\bar{x} \pm s$, and independent sample *t*-tests were used for comparison. Continuous variables at different time points were compared using analysis of repeated measurement data variance. A significance level of $P < 0.05$ was considered statistically significant.

2 Results

2.1 Comparison of perioperative conditions

Compared to the open surgery group, the laparoscopic group showed significantly shorter hospital stays and time to postoperative flatus, and lower intraoperative blood loss ($P<0.05$). There was no statistically significant difference between the two groups in terms of operative time, margin distance, transfusion requirement, or hepatic portal vein occlusion time ($P > 0.05$). **Refer to Table 2.**

Tab.2 Perioperative indicators ($\bar{x} \pm s$)

Indicator	Laparoscopic group(*n*=32)	Open surgery group (*n*=53)	t/χ^2	*P*
Operative time (min)	198.44±30.98	204.15±29.87	0.842	0.402
Intraoperative blood loss (mL)	395.63±70.25	440.38±62.42	3.054	0.003
Transfusion (case)	5	10	0.144	0.704
Margin distance (cm)	2.58±0.53	2.53±0.47	0.450	0.654
Time to postoperative flatus (d)	2.30±0.77	2.75±0.49	3.291	0.001
Hospital stays (d)	14.19±3.02	16.36±3.30	3.032	0.003
Hepatic portal vein occlusion time (min)	21.63±3.30	22.75±3.66	1.429	0.157

2.2 Comparison of liver function levels

There was no significant inter-group effect for TBIL, ALT, AST, ALB, or AFP ($P > 0.05$). There was significant time effects for TBIL, ALT, AST, and AFP ($P < 0.05$), with TBIL, ALT, and AST peaking on postoperative day 3 and decreasing by one month postoperatively, while AFP decreased over time. ALB showed no time effect ($P > 0.05$). There were interactions for TBIL, ALT, and AST ($P < 0.05$), but no interactions for ALB and AFP levels ($P > 0.05$). Comparisons between groups showed that only TBIL, ALT, and AST levels were significantly lower in the laparoscopic group compared to the open surgery group on postoperative day 3, with statistical significance ($P < 0.05$); other differences were not statistically significant ($P > 0.05$). **Refer to Table 3.**

2.3 Incidence of Complications

Within one month postoperatively, the overall incidence of complications was 15.63% in the laparoscopic group (including 1 case of wound infection, 2 cases of lung infection, 1 case of pleural effusion, and 1 case of abdominal effusion) and 16.98% in the open surgery group

Tab.3 Serum level of pre- and post-operative AFP ($\bar{x}$ ±s)

Group	Case	Preoperative	3 d after surgery	1 month after surgery
Laparoscopic group	32	306.38±36.82	99.69±32.81[a]	51.59±8.50[b]
Open surgery group	53	318.68±35.19	111.13±36.95[a]	53.47±8.89[b]
***F/P*$_{group}$ value**			6.13/0.06	
***F/P*$_{time/}$ value**			583.38/<0.01	
***F/P*$_{interaction}$ value**			0.07//0.46	

Note: Compared with preoperative, [a]P<0.05; compared with 3 d after surgery, [b]P<0.05.

(including 2 cases of wound infection, 3 cases of lung infection, 1 case of pleural effusion, 2 cases of bile leakage, 1 case of abdominal hemorrhage, and 2 cases of abdominal effusion). There were no cases of liver failure or postoperative deaths in either group. There was no statistically significant difference in the incidence of postoperative complications between the two groups (χ^2=0.916, P=0.339).

Tab.4 Serum level of pre- and post-operative liver function ($\bar{x}$ ±s)

Group	TBIL(μmol/L)			ALT（u/L）		
	Preoperative	**3 d after surgery**	**1 month after surgery**	**Preoperative**	**3 d after surgery**	**1 month after surgery**
Laparoscopic group	26.31±5.03	28.19±5.52[ab]	22.72±2.90[c]	55.97±9.18	113.63±38.69[ab]	55.38±8.91[c]
Open surgery group	28.11±5.54	31.19±4.96[b]	22.68±4.29[c]	54.55±8.78	136.83±51.74[b]	56.34±9.12[c]
***F/P*$_{group}$ value**	3.46/0.07			4.02/0.05		
***F/P*$_{time/}$ value**	75.64/<0.01			167.52/<0.01		
***F/P*$_{interaction}$ value**	3.53/0.04			4.78/0.03		

Group	AST（u/L）			ALB（g/L）		
	Preoperative	3 d after surgery	**1 month after surgery**	**Preoperative**	**3 d after surgery**	**1 month after surgery**
Laparoscopic group	56.78±8.40	120.53±40.42[ab]	56.16±8.52[c]	38.44±6.72	36.88±4.91	36.53±4.80
Open surgery group	55.57±8.74	148.04±54.96[b]	57.03±8.14[c]	38.04±6.03	36.75±4.75	36.55±5.01
***F/P*$_{group}$ value**	5.76/0.02			0.05/0.83		
***F/P*$_{time/}$ value**	180.02/<0.01			2.60/0.08		
***F/P*$_{interaction}$ value**	5.70/0.02			0.041/0.96		

Note: Compared with open surgery group, [a]P<0.05; compared with preoperative, [b]P<0.05, compared with 3 d after surgery, [c]P<0.05.

3 Discission

Laparoscopic liver resection involves surgical procedures performed under laparoscopic guidance to visualize lesions from various angles and avoid disturbing surrounding organs as much as possible [12-13]. It facilitates precise anatomical dissection and accurate tumor removal by enhancing visibility of hepatic vessels and bile ducts, aiming to minimize damage to surrounding tissues, reducing intraoperative bleeding, and the incidence of various postoperative complications [14]. At the same time, it maximizes the sealing of the patient's abdominal cavity, avoids prolonged contact with the external environment, and reduces the incidence of abdominal infection. Early mobilization after laparoscopic surgery may help reduce pneumonia and pleural effusion, and promote the recovery of postoperative gastrointestinal function. Patients have an early postoperative exhaust time, which not only achieves disease treatment but also accelerates their postoperative recovery speed [8]. Liver function is an important indicator for evaluating the effectiveness of surgical treatment, and serum TBIL, ALT, AST, and ALB can directly reflect the degree of liver tissue damage [15]. The results of this study showed that the levels of TBIL, ALT, and AST increased after traditional open liver resection and laparoscopic liver resection compared to preoperative levels, while the levels of ALB decreased, indicating that different surgical methods have caused a certain degree of damage to the liver function of patients. Based on the results of postoperative liver function tests, it is shown that the recovery of liver function indicators in patients undergoing laparoscopic surgery is better than that of traditional open surgery, indicating that laparoscopic liver resection has a smaller impact on liver function in patients, which is more conducive to reducing the possibility of postoperative liver failure. The postoperative anal exhaust time and hospital stay in the laparoscopic group were shorter than those in the open surgery group, with less intraoperative bleeding and lower incidence of postoperative complications. This result is consistent with the research results of multiple doctors in China [5,16]. Therefore, compared to traditional open hepatectomy, laparoscopic hepatectomy has a smaller wound size, significantly reduces interference and damage to abdominal organs, reduces the stress response caused by surgery to the patient's body, and increases the safety of hepatectomy surgery. However, laparoscopic liver resection also has some shortcomings. Firstly, surgeons cannot touch the tumor, which may affect the distance between the surgical margins. During all surgical procedures, ultrasound monitoring of the tumor's resection edge is required; Secondly, there is a high demand for laparoscopic surgical skills from the surgeon. Improper hemostasis under laparoscopy can easily lead to bleeding and result in the inability to complete laparoscopic surgery.

In summary, laparoscopic liver resection is safe and feasible for patients with hepatocellular carcinoma, and can reduce the impact on liver function, shorten hospitalization time, and promote early recovery of patients. With the development of laparoscopic technology and the improvement of instruments, the safety of laparoscopic liver resection surgery will be further improved and the incidence of complications will be reduced. However, the number of patients in this study was relatively small. Subsequently, the number of patients should be expanded to further extend the observation time,

in order to further explore the efficacy of laparoscopic and open hepatectomy in the treatment of hepatocellular carcinoma patients.

The authors report no conflict of interest

References

[1] Wang XX, Qi QG. Research progress in the treatment of primary liver cancer[J]. World Latest Med Inf, 2019, 19(96): 52-53. **[In Chinese]**

[2] Chen JZ, Jia CK. Progress in surgical treatment of primary liver cancer[J]. Zhejiang Med J, 2023, 45(4): 439-443.

[3] Zhang SG, Yu LX. History, present situation and future of laparoscopic hepatectomy[J]. J Laparosc Surg, 2015, 20(4): 241-245. **[In Chinese]**

[4] DuBray BJ Jr, Chapman WC, Anderson CD. Hepatocellular carcinoma: a review of the surgical approaches to management[J]. Mo Med, 2011, 108(3): 195-198.

[5] Zhang X, Qian HX. Therapeutic effect study of liver cancer resection between laparoscopic surgery and open surgery[J]. J Mod Oncol, 2017, 25(13): 2086-2088. **[In Chinese]**

[6] Yang Y, Wang RH. Efficacy and safety evaluation of laparoscopic hepatectomy in patients with primary liver cancer[J]. Syst Med, 2022, 7(24): 144-147. **[In Chinese]**

[7] Zhou K, Liu SG. Clinical efficacy of laparoscopic hepatectomy on primary liver cancer[J]. Surg Res N Tech, 2022, 11(1): 25-27. **[In Chinese]**

[8] Xiang L, Li J, Chen J, et al. Prospective cohort study of laparoscopic and open hepatectomy for hepatocellular carcinoma[J]. Br J Surg, 2016, 103(13): 1895-1901.

[9] Hua XB, Lu ZL, Xia YL, et al. Short-term prognosis of left hemihepatectomy under laparoscopic ultrasound in treatment of primary liver cancer and its influence on liver function[J]. Chin J Gen Surg, 2021, 30(7): 780-788. **[In Chinese]**

[10] Wang YZ, Fu XF, Li XM. Application of enhanced recovery after surgery concept in perioperative period of hepatectomy for liver cancer[J]. China Med Pharm, 2022, 12(22): 12-15. **[In Chinese]**

[11] Abu Hilal M, Aldrighetti L, Dagher I, et al. The southampton consensus guidelines for laparoscopic liver surgery: from indication to implementation[J]. Ann Surg, 2018, 268(1): 11-18.

[12] Rodrigues TFDC, Silveira B, Tavares FP, et al. Open, laparoscopic, and robotic-assisted hepatectomy in resection of liver tumors: a non-systematic review[J]. Arq Bras Cir Dig, 2017, 30(2): 155-160.

[13] JIN B, CHEN M T, FEI Y T, et al. Safety and efficacy for laparoscopic versus open hepatectomy: A meta-analysis [J]. Surg Oncol, 2018, 27(2): A26-A34.

[14] Yoshida H, Taniai N, Yoshioka M, et al. Current status of laparoscopic hepatectomy[J]. J Nippon Med Sch, 2019, 86(4): 201-206.

[15] Huang YX, Gao CG, Ren WB, et al. Hand-assisted laparoscopic surgery versus open surgery in D2 radical gastrectomy[J]. Chin J Clin Res, 2023, 36(9): 1312-1316, 1327. **[In Chinese]**

[16] Lan DT, Li MD, An X, et al. Effect of laparoscopic regular hepatectomy on levels of serum AFP, Hcy and quality of life in postoperative patients with primary liver cancer[J]. J Mod Oncol, 2019, 27(7): 1176-1180. **[In Chinese]**

[17] Zhu HG, Liu DS, Jia KQ. Efficacy and safety of laparoscopic precise hepatectomy and conventional laparoscopic hepatectomy for primary liver cancer[J]. Chin J Integr Tradit West Med Liver Dis, 2022, 32(7): 648-650. **[In Chinese]**

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·论　著·

腹腔镜肝切除术与开放式肝切除术治疗肝细胞癌的近期疗效对比

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摘要：目的　探究肝细胞癌患者采用腹腔镜下肝切除术或传统开放式肝切除术两种不同术式治疗时，其围术期情况及对肝功能的影响。**方法**　回顾性分析 2020 年 1 月到 2022 年 12 月就诊于山西白求恩医院胆胰外科的肝细胞癌患者 85 例，根据其手术方式分为开腹组（开放式肝切除术，$n=53$）和腹腔镜组（腹腔镜肝切除术，$n=32$）。两组患者均于出院后随访 1 个月。对比两组患者的一般资料、术中情况及术后并发症情况及肝功能指标。**结果**　腹腔镜组与开腹组相比，住院时间［（14.19±3.02）d *vs*（16.36±3.30）d，$t=3.03$，$P<0.01$］以及手术后肛门首次排气时间［（2.30±0.77）d *vs*（2.75±0.49）d，$t=3.29$，$P<0.01$］更短，手术中出血量更少［（395.63±70.25）mL *vs*（440.38±62.42）mL，$t=3.05$，$P<0.01$］，差异具有统计学意义。腹腔镜组术后 3 d 血清总胆红素、丙氨酸氨基转移酶、门冬氨酸氨基转移酶水平低于开腹组，差异有统计学意义（$P<0.05$）。术后 1 个月内，两组手术后并发症的总发生率差异无统计学意义（15.63% *vs* 16.98%，$\chi^2=0.92$，$P=0.34$）。**结论**　对于肝细胞癌患者，应用腹腔镜肝切除术是安全可行的，而且可以减轻对肝功能的影响，缩短住院时间，促进患者早期康复。

关键词： 肝细胞癌；肝切除术；腹腔镜下；开放式；肝功能；甲胎蛋白

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Laparoscopic hepatectomy and open hepatectomy in treatment of hepatocellular carcinoma

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Abstract: Objective　To explore the perioperative situation of patients with hepatocellular carcinoma (HCC) treated with laparoscopic hepatectomy or open hepatectomy and their effects on liver function. **Methods**　A retrospective analysis was conducted on 85 patients with HCC who visited the Department of Biliary and Pancreatic Surgery, Shanxi Bethune Hospital from January 2020 to December 2022. According to the surgical methods, the patients were divided into open group (open hepatectomy, $n=53$) and laparoscopic group (laparoscopic hepatectomy, $n=32$). Both groups of patients were followed up for one month after discharge. The general information, intraoperative conditions, postoperative complications, and liver function indicators were compared between two groups of patients. **Results**　Compared with the open group, the laparoscopic group had shorter hospitalization time [(14.19±3.02) d *vs* (16.36±3.30) d, $t=3.03$, $P<0.01$], as well as shorter time for the first postoperative anal evacuation [(2.30±0.77) d *vs* (2.75±0.49) d, $t=3.29$, $P<0.01$] and less intraoperative bleeding [(395.63±70.25) mL *vs* (440.38±62.42) mL, $t=3.05$, $P<0.01$]. Serum total bilirubin, alanine aminotransferase, aspartate aminotransferase levels were lower in the laparoscopic group than those in the open group at 3 days postoperatively, and the difference was statistically significant ($P<0.05$). In the

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1-month postoperative period, the difference in the overall rate of postoperative complications between the two groups was not statistically significant (15.63% *vs* 16.98%, $\chi^2 = 0.92$, $P = 0.34$). **Conclusion** For patients with HCC, the application of laparoscopic hepatectomy is safe and feasible, which can reduce the impact on liver function, shorten hospitalization time, and promote early recovery.

Keywords: Hepatocellular carcinoma; Hepatectomy; Laparoscopic; Open; Liver function; Alpha fetoprotein

Fund program: Research Project of Shanxi Provincial Health Commission (2021149); Shanxi Province Basic Research Program (202103021224361); Shanxi Province's "136" Medical Revitalization Project

肝细胞癌是一种与慢性肝病相关的侵袭性肿瘤,它是世界上常见的恶性肿瘤之一,也是全球癌症死亡的第三大原因[1]。在我国,肝细胞癌的发病率越来越高,并且与慢性肝病和肝硬化密切相关,肝切除手术是治愈肝细胞癌患者的主要方法[2-4]。但传统开放式肝切除术引起的创伤比较大,出血量较多,住院时间长,术后恢复较慢[5]。在过去的二十年里,腹腔镜手术治疗肝细胞癌已初见成效[6-7],接受腹腔镜肝切除术的肝细胞癌患者人数呈指数级增长[8-9]。本研究旨在对比并分析腹腔镜下肝切除术及传统开放式肝切除术治疗肝细胞癌患者的近期疗效,进一步探讨腹腔镜肝切除术在临床应用的价值。

1　资料与方法

1.1　一般资料　回顾性选取 2020 年 1 月到 2022 年 12 月山西医科大学第三医院就诊的 85 例诊断为肝细胞癌患者作为研究的对象,根据术式将其分为开腹组($n=53$)和腹腔镜组($n=32$)。两组患者的一般情况(年龄、性别)、病灶直径、TNM 分期、Child-Pugh 分级、乙型肝炎病毒表面抗原(hepatitis B surface antigen, HBsAg)感染情况及是否存在肝硬化相比较差异无统计学意义($P>0.05$)。见表 1。本研究方案经山西白求恩医院伦理委员会批准(YXLL-2020-042)。

1.2　纳入与排除标准　纳入标准:(1) 在行手术之后常规行组织病理检查,病理结果均诊断为肝细胞癌;(2) 术前无介入治疗、无麻醉禁忌证、无手术禁忌证;(3) 年龄<75 岁;(4) TNM 分期Ⅰ~Ⅱ期;(5) 无严重基础疾病或现阶段基础疾病控制良好[10]。排除标准:(1) 无法耐受全身麻醉;(2) 术前存在严重的基础疾病或肝功能比较差;(3) 原发肿瘤存在远处器官的转移;(4) 需行姑息性手术。

1.3　方法　开腹组和腹腔镜组采用相同的手术原则,均根据中国肝切除术专家共识和相关手术指南进行[2, 11]。根据肿瘤的位置、手术方式、术中出血量采用不同的肝血流阻断方法。对于无法控制的大量出血患者,腹腔镜肝切除术转为开腹手术。通过扩大腹部切口将肿瘤整块放入标本袋中取出,常规放置腹腔引流管,将切除的标本切开并测量肿瘤的最大直径和切除边缘。两组患者手术治疗后常规给予抗感染、镇痛等治疗。两组患者术后均随访 1 个月。

1.4　观察指标　围手术期的观察指标:记录并分析两组患者的手术时长、切缘距离、术后排气时间、总住院时间、术中出血量[12]。肝功能指标:血清总胆红素(total bilirubin, TBIL)、丙氨酸氨基转移酶(alanine aminotransferase, ALT)、门冬氨酸氨基转移酶(aspartate aminotransferase, AST)、白蛋白(albumin, ALB)水平;并检测甲胎蛋白(alpha fetoprotein, AFP)水平。化验时间:术前、术后 3 d 以及术后1 个月。

1.5　统计学方法　采用 SPSS 19.0 进行统计学数据分析。计数资料采用χ^2 检验;符合正态分布的计量资料采用 $\bar{x}\pm s$ 表示,组间对比采用成组 t 检验;不同时点比较采用重复测量资料方差分析及多重比较的 LSD-t 检验。$P<0.05$ 为差异有统计学意义。

2　结　果

2.1　两组患者围手术期相关情况对比　腹腔镜组与开腹组相比,住院时间以及术后排气时间更短,手术中出血量更少,差异具有统计学意义($P<0.01$)。两组的手术时间、切缘距离、是否输血及肝门阻断时间比较差异无统计学意义($P>0.05$)。见表 2。

表 1　患者一般情况

Tab. 1　General data of patients

项目	腹腔镜组($n=32$)	开腹组($n=53$)	t/χ^2 值	P 值
年龄(岁, $\bar{x}\pm s$)	60.09±6.51	60.66±8.42	0.33	0.74
性别(例, 男/女)	25/7	37/16	0.70	0.40
病灶直径(cm, $\bar{x}\pm s$)	5.72±2.00	5.35±1.11	1.10	0.28
TNM 分期(例, Ⅰ/Ⅱ)	20/12	33/20	0.98	1.00
Child-Pugh 分级(例, A/B)	21/11	36/17	0.05	0.83
HBsAg 阳性(例)	27	40	0.95	0.33
肝硬化(例)	26	42	0.05	0.82

2.2　两组患者肝功能水平对比　两组 TBIL、ALT、AST、ALB 及 AFP 均无组间效应($P>0.05$)。两组 TBIL、ALT、AST 及 AFP 水平均存在时间效应($P<0.05$),TBIL、ALT、AST 水平术后 3 d 最高,术后 1 个月降低,而 AFP 随时间降低。ALB 无时间效应($P>0.05$)。两组 TBIL、ALT 及 AST 存在交互效应($P<0.05$),ALB 和 AFP 水平无交互效应($P>0.05$)。两两比较,仅术后 3 d 的 TBIL、ALT、AST 腹腔镜组明显低于开腹组($P<0.05$),其余差异均无统计学意义($P>0.05$)。见表 3、表 4。

2.3　并发症发生情况　术后 1 个月内,腹腔镜组手术后并发症的总发生率为 15.63%(5/32,包括切口感染 1 例,肺部感染 2 例,胸腔积液 1 例,腹腔积液 1 例),对照组并发症发生率为 16.98%(9/53,包括切口感染 2 例,肺部感染 3 例,胸腔积液 1 例,胆漏 2 例,腹腔出血 1 例,腹腔积液 2 例)。两组患者均无肝衰竭或术后死亡。两组术后并发症发生率差异无统计学意义($\chi^2=0.92$, $P=0.34$)。所有患者随访 1 个月,未见因严重并发症需再次入院治疗的情况。

表 2　围手术期指标　($\bar{x}\pm s$)
Tab. 2　Perioperative indicators　($\bar{x}\pm s$)

项目	腹腔镜组 ($n=32$)	开腹组 ($n=53$)	t/χ^2 值	P 值
手术时间(min)	198.44±30.98	204.15±29.87	0.84	0.40
术中出血量(mL)	395.63±70.25	440.38±62.42	3.05	<0.01
输血(例)	5/27	10/43	0.14	0.70
切缘距离(cm)	2.58±0.53	2.53±0.47	0.45	0.65
术后排气时间 (d)	2.30±0.77	2.75±0.49	3.29	<0.01
住院时间(d)	14.19±3.02	16.36±3.30	3.03	<0.01
肝门阻断时间(min)	21.63±3.30	22.75±3.66	1.43	0.16

表 3　术前术后血清 AFP 水平　($\bar{x}\pm s$)
Tab. 3　Serum level of pre- and post-operative AFP　($\bar{x}\pm s$)

组别	例数	术前	术后 3 d	术后 1 个月
腹腔镜组	32	306.38±36.82	99.69±32.81[a]	51.59±8.50[b]
开腹组	53	318.68±35.19	111.13±36.95[a]	53.47±8.89[b]
$F_{组间/时间/交互}$ 值		6.13/583.38/0.70		
$P_{组间/时间/交互}$ 值		0.06/<0.01/0.46		

注:与本组术前比较,[a]$P<0.05$;与本组术后 3 d 比较,[b]$P<0.05$。

表 4　术前术后血清肝功能水平　($\bar{x}\pm s$)
Tab. 4　Serum level of pre- and post-operative liver function　($\bar{x}\pm s$)

组别	例数	TBIL(μmol/L)			ALT(u/L)		
		术前	术后 3 d	术后 1 个月	术前	术后 3 d	术后 1 个月
腹腔镜组	32	26.31±5.03	28.19±5.52[ab]	22.72±2.90[c]	55.97±9.18	113.63±38.69[ab]	55.38±8.91[c]
开腹组	53	28.11±5.54	31.19±4.96[b]	22.68±4.29[c]	54.55±8.78	136.83±51.74[b]	56.34±9.12[c]
$F_{组间/时间/交互}$ 值			3.46/75.64/3.53			4.02/167.52/4.78	
$P_{组间/时间/交互}$ 值			0.07/<0.01/0.04			0.05/<0.01/0.03	
组别	例数	AST(u/L)			ALB(g/L)		
		术前	术后 3 d	术后 1 个月	术前	术后 3 d	术后 1 个月
腹腔镜组	32	56.78±8.40	120.53±40.42[ab]	56.16±8.52[c]	38.44±6.72	36.88±4.91	36.53±4.80
开腹组	53	55.57±8.74	148.04±54.96[b]	57.03±8.14[c]	38.04±6.03	36.75±4.75	36.55±5.01
$F_{组间/时间/交互}$ 值			5.76/180.02/5.70			0.05/2.60/0.041	
$P_{组间/时间/交互}$ 值			0.02/<0.01/0.02			0.83/0.08/0.96	

注:与开腹组比较,[a]$P<0.05$;与本组术前比较,[b]$P<0.05$;与本组术后 3 d 比较,[c]$P<0.05$。

3　讨　论

腹腔镜肝切除术是通过腹腔镜显示病灶进行手术操作,可以从各个方位、多种角度去确认肝脏以及腹腔中的情况,尽可能避免牵动周围器官[12-13],并且容易辨认肝内的血管及胆管,达到术中精确解剖和精准操作,准确切除肿瘤,减少对周围组织的干扰和损伤,减少了术中出血量以及各种术后并发症的发生率[14]。同时最大程度的保证了患者腹腔的封闭性,避免腹腔长时间与外界环境接触,降低了腹腔感染率。腹腔镜手术后更早的下地活动,可能有助于减少肺炎和胸腔积液,并促进术后胃肠功能的恢复,患者术后排气时间早,在达到治疗疾病的同时,加快患者术后康复速度[8,15]。肝功能是评价手术治疗效果的重要指标,血清中 TBIL、ALT、AST 以及 ALB 可以直接反映肝脏组织损伤程度[16]。本研究结果显示传统开放式肝切除术及腹腔镜肝切除术后 TBIL、ALT、AST 水平较术前升高,而 ALB 水平降低,说明不同的手术方式均对患者肝功能造成了一定程度的损伤。结合术后肝功能化验结果,表明腹腔镜手术患者的肝功能指标恢复要优于传统的开放式手术,提示行腹腔镜下肝切除术对患者肝功能的影响更小,更有利于降低术后肝衰竭发生的可能性。腹腔镜组手术后肛门排气时间、住院时间较开放组更短,术中出血量更少,术后并发症发生率低,此结果与国内多位医生研究结果相一致[5,17]。因此相较于传统开放式肝切除术,腹腔镜肝切除术的创口较小,对腹腔脏器的干扰和损伤明显减少,降低了手术对患者机体造成的应激反应,

提高了肝切除手术的安全性。但是,腹腔镜肝切除术也有一些不足,一是外科医生无法触摸到肿瘤,这可能会影响手术切缘距离,所有手术过程中需要通过超声波监测肿瘤的切除边缘;二是对术者腹腔镜手术技巧要求较高,腹腔镜下止血操作不当,极易引起出血导致腹腔镜手术无法完成。

综上所述,对于肝细胞癌患者,应用腹腔镜肝切除术是安全可行的,而且可以减少对肝功能的影响、缩短住院时间、促进患者早期康复。随着腹腔镜技术的发展和器械的改进,将进一步提高腹腔镜肝切除手术的安全性并减少并发症的发生。但本研究的患者数量偏少,随后应扩大患者的数量,进一步延长观察的时间,以便更深入探究腹腔镜肝切除术及开放式肝切除术治疗肝细胞癌患者的疗效。

利益冲突　无

参考文献

[1] 王小霞,其其格.原发性肝癌治疗的研究进展[J].世界最新医学信息文摘,2019,19(96):52-53.
Wang XX, Qi QG. Research progress in the treatment of primary liver cancer[J]. World Latest Med Inf, 2019, 19(96): 52-53.

[2] 陈健忠,贾长库.原发性肝癌手术治疗进展[J].浙江医学,2023,45(4):439-443.
Chen JZ, Jia CK. Progress in surgical treatment of primary liver cancer[J]. Zhejiang Med J, 2023, 45(4): 439-443.

[3] 张绍庚,余灵祥.腹腔镜肝脏切除术发展的历史、现状与未来[J].腹腔镜外科杂志,2015,20(4):241-245.
Zhang SG, Yu LX. History, present situation and future of laparoscopic hepatectomy[J]. J Laparosc Surg, 2015, 20(4): 241-245.

[4] DuBray BJ Jr, Chapman WC, Anderson CD. Hepatocellular carcinoma: a review of the surgical approaches to management[J]. Mo Med, 2011, 108(3): 195-198.

[5] 张旭,钱海鑫.肝癌腹腔镜及开腹治疗的临床疗效比较[J].现代肿瘤医学,2017,25(13):2086-2088.
Zhang X, Qian HX. Therapeutic effect study of liver cancer resection between laparoscopic surgery and open surgery[J]. J Mod Oncol, 2017, 25(13): 2086-2088.

[6] 杨勇,王人颢.腹腔镜肝切除术治疗原发性肝癌患者的疗效及安全性评价[J].系统医学,2022,7(24):144-147.
Yang Y, Wang RH. Efficacy and safety evaluation of laparoscopic hepatectomy in patients with primary liver cancer[J]. Syst Med, 2022, 7(24): 144-147.

[7] 周凯,刘曙光.腹腔镜肝切除术治疗原发性肝癌的临床疗效观察[J].外科研究与新技术,2022,11(1):25-27.
Zhou K, Liu SG. Clinical efficacy of laparoscopic hepatectomy on primary liver cancer[J]. Surg Res N Tech, 2022, 11(1): 25-27.

[8] Xiang L, Li J, Chen J, et al. Prospective cohort study of laparoscopic and open hepatectomy for hepatocellular carcinoma[J]. Br J Surg, 2016, 103(13): 1895-1901.

[9] 华小斌,卢正磊,夏云连,等.腹腔镜超声下左半肝切除术治疗原发性肝癌的近期预后及对肝功能的影响[J].中国普通外科杂志,2021,30(7):780-788.
Hua XB, Lu ZL, Xia YL, et al. Short-term prognosis of left hemihepatectomy under laparoscopic ultrasound in treatment of primary liver cancer and its influence on liver function[J]. Chin J Gen Surg, 2021, 30(7): 780-788.

[10] 王永泽,付西峰,李孝敏.加速康复外科理念在肝癌肝切除术围手术期中的应用[J].中国医药科学,2022,12(22):12-15.
Wang YZ, Fu XF, Li XM. Application of enhanced recovery after surgery concept in perioperative period of hepatectomy for liver cancer[J]. China Med Pharm, 2022, 12(22): 12-15.

[11] Abu Hilal M, Aldrighetti L, Dagher I, et al. The southampton consensus guidelines for laparoscopic liver surgery: from indication to implementation[J]. Ann Surg, 2018, 268(1): 11-18.

[12] Rodrigues TFDC, Silveira B, Tavares FP, et al. Open, laparoscopic, and robotic-assisted hepatectomy in resection of liver tumors: a non-systematic review[J]. Arq Bras Cir Dig, 2017, 30(2): 155-160.

[13] Jin B, Chen MT, Fei YT, et al. Safety and efficacy for laparoscopic versus open hepatectomy: a meta-analysis [J]. Surg Oncol, 2018, 27(2): A26-A34.

[14] Yoshida H, Taniai N, Yoshioka M, et al. Current status of laparoscopic hepatectomy [J]. J Nippon Med Sch, 2019, 86(4): 201-206.

[15] 黄一雄,高成钢,任伍保,等.手助腹腔镜和开腹胃癌 D_2 根治术临床应用对比[J].中国临床研究,2023,36(9):1312-1316,1327.
Huang YX, Gao CG, Ren WB, et al. Hand-assisted laparoscopic surgery versus open surgery in D_2 radical gastrectomy[J]. Chin J Clin Res, 2023, 36(9): 1312-1316, 1327.

[16] 兰戴天,李茂德,安祥,等.腹腔镜规则性肝叶切除术对原发性肝癌患者术后血清 AFP、Hcy 水平及生存质量的影响[J].现代肿瘤医学,2019,27(7):1176-1180.
Lan DT, Li MD, An X, et al. Effect of laparoscopic regular hepatectomy on levels of serum AFP, Hcy and quality of life in postoperative patients with primary liver cancer[J]. J Mod Oncol, 2019, 27(7): 1176-1180.

[17] 朱惠刚,刘东升,贾楷桥.腹腔镜下精准肝切除术与常规腹腔镜肝肿瘤切除术治疗原发性肝癌的效果及安全性[J].中西医结合肝病杂志,2022,32(7):648-650.
Zhu HG, Liu DS, Jia KQ. Efficacy and safety of laparoscopic precise hepatectomy and conventional laparoscopic hepatectomy for primary liver cancer[J]. Chin J Integr Tradit West Med Liver Dis, 2022, 32(7): 648-650.

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