Effect of laparoscopic cholecystectomy and open cholecystectomy on liver function and immune function in patients

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ABSTRACT

Objective: To investigate the effect of laparoscopic cholecystectomy and open cholecystectomy on liver function and immune function in patients. Methods: The clinical data of 100 cases of cholecystectomy in our hospital from November 2013 to November 2015 were retrospectively analyzed. According to the operation method was divided into OC group (laparoscopic cholecystectomy) and LC group (laparoscopic cholecystectomy), two groups were in general anesthesia, tracheal intubation, 1D, 1D, 5D fasting peripheral venous blood collection, serum total bilirubin (TBIL), alanine aminotransferase (ALT), aspartate aminotransferase (GGT), IgA, IgG, IgM, CD4+, CD8+, CD3+, GGT, AST, and calculated CD4+/CD8+ ratio AST. Results: preoperative TBIL, ALT, GGT, AST no statistical significance (1D), postoperative indicators were significantly higher than preoperative levels, the index basically recovered to preoperative level, but the two groups were not statistically significant (1D) IgG two groups IgM each index level were lower than preoperative OC group, postoperative 5D indicators have recovered, LC group, CD8+, 1D, CD4+, two groups CD3+, 1D, 5D groups, 1D, 1D groups, OC, 1D two groups, IgA LC, CD4+/CD8+ no statistical significance, postoperative 1D two group CD4+, CD8+, CD4+/CD8+ compared with preoperative 1D decreased, CD8+ increased, there was statistical significance ($P<0.05$), postoperative 5D index LC There was no statistical significance between the group and the preoperative 1D, but the OC group had statistical significance. Conclusion: LC cholecystectomy is a minimally invasive surgery with little trauma, little impact on the body, fast recovery and so on, which reflects the advantages of minimally invasive surgery, it is worthy of clinical application.

1. Introduction

Gallbladder stones in the Department of general surgery is more common, acute exacerbation of cholecystitis with severe abdominal pain, nausea, vomiting, etc., such as not completely cure often repeated attacks, clinical treatment often require cholecystectomy[1]. Current clinical use of open cholecystectomy (OC) and laparoscopic cholecystectomy (LC) for treatment, OC is the most commonly used surgical procedures in the Department of hepatobiliary surgery, but can destroy the gallbladder function, trauma larger[2]. LC is a minimally invasive surgery, trauma, postoperative body recover faster, has become the gold standard surgical treatment for patients with benign gallbladder diseases, but the LC to establish CO2 pneumoperitoneum, cause some pressure on the abdominal organs, liver function and immune function of whether there has had a great influence on controversy[3]. The clinical data of 100 patients with cholecystectomy in our hospital from November 2013 to November 2015 were retrospectively analyzed, and the influence of LC and OC on liver function and immune function were analyzed.
2. Clinical data

2.1 General information

Retrospective analysis of the clinical data of 100 cases of cholecystectomy in our hospital from November 2013 to November 2015, according to the surgical methods were divided into LC group and OC group. LC group 60 cases, male 28, female 32; age 25-60 years old, average (47.5±10.2) years old; course of disease 6-48 months, average (15.3±10.5) months. OC group 40 cases, male 19, female 21; age 24-61 years old, average (47.3±10.5) years old; course of disease 6-47 months, average (15.5±10.2) months. There was no statistical significance (P>0.05) in the two groups.

2.2 Inclusion and exclusion criteria

Preoperatively by ultrasonography or CT were diagnosed with the disease, and in line with the gallbladder calculi clinical diagnosis standard[4], the patients and their family members informed and signed consent; exclusion of chronic liver disease, abnormal liver function, gallbladder gangrene perforation, blood diseases, cardiovascular and cerebrovascular diseases, severe coagulation disorder, malignant tumor, excluding patients with immunosuppressive therapy, eliminate accompanied by jaundice or bile duct, intrahepatic bile duct stone patients, pregnant and lactating women.

2.3 Method

The two groups were performed under general anesthesia and tracheal intubation. OC group right upper quadrant abdominal subcostal incision, separation of exposing field of operation, the anatomy of Calot's triangle of the surrounding tissue, cut the cystic artery and cystic duct and gallbladder resection. LC group in conventional CO₂ pneumoperitoneum was established, between the two groups (Mean ± SD) said that by t test; count data with χ² test; differences (P<0.05) are statistically significant.

2.4 Observation index

Before the operation, 1D, 1D and 5D were collected to collect peripheral venous blood, and the serum was separated. Total bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and gamma alanine aminotransferase (GGT) were measured. Serum immunoglobulin IgA, IgG and IgM levels were measured by immuno assay. The levels of CD₄⁺, CD₈⁺ and T in peripheral blood CD₄⁺ lymphocyte subsets were measured by flow cytometry, and the CD₄⁺/CD₈⁺ ratio was calculated.

2.5 Statistical analysis

Analysis of SPSS 18.0 statistical software measurement data to (Mean ± SD) said that by t test; count data with χ² test; differences (P<0.05) are statistically significant.

3. Results

3.1 Comparison of liver function before and after operation

Preoperative 1D two groups ALT, AST, GGT, TBIL were not statistically significant (P>0.05), postoperative 1D index was significantly higher than the preoperative, postoperative 5D index basically recovered to the preoperative level, there was statistical significance (P<0.05), but there was no statistical significance between the two groups (P>0.05). See table 1.

3.2 Comparison of immunoglobulin levels before and after surgery

Preoperative 1D two groups IgG, IgA, IgM levels were not statistically significant (P>0.05), the level of each index was lower than preoperative 1D, OC group was lower than LC group, there was statistical significance (P<0.05), postoperative 5D indicators were restored, LC group recovered to preoperative 1D level, better than OC group, there was statistical significance (P<0.05). See table 2.

3.3 Comparison of peripheral blood T lymphocyte subsets in peripheral blood before and after operation

Preoperative 1D, CD₄⁺, CD₈⁺, CD₄⁺, CD₈⁺/CD₄⁺ were not statistically significant (P>0.05); postoperative 1D two group CD₄⁺, CD₈⁺, CD₄⁺/CD₈⁺ compared with preoperative 1D reduction, CD₈⁺ increased, there was statistical significance (P<0.05); postoperative 5D index LC group and preoperative 1D was not statistically significant (P>0.05), and OC group compared with preoperative 1D was statistically significant (P<0.05). See table 3.

Table 1

Comparison of liver function before and after operation in two groups

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>TBIL (umol/L)</th>
<th>ALT (U/L)</th>
<th>AST (U/L)</th>
<th>GGT (U/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC group</td>
<td>60</td>
<td>Preoperative 1D</td>
<td>8.66±3.72</td>
<td>14.17±7.22</td>
<td>14.37±5.27</td>
<td>21.25±5.55</td>
</tr>
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<td></td>
<td></td>
<td>Postoperative 1D</td>
<td>29.25±5.72</td>
<td>38.69±4.55</td>
<td>37.51±10.22</td>
<td>56.57±9.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative 5D</td>
<td>8.98±5.25*</td>
<td>15.45±4.64</td>
<td>15.32±4.54*</td>
<td>22.74±6.52*</td>
</tr>
<tr>
<td>OC group</td>
<td>40</td>
<td>Preoperative 1D</td>
<td>8.75±3.66</td>
<td>14.21±6.58</td>
<td>15.01±3.71</td>
<td>22.07±5.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative 1D</td>
<td>28.57±4.51#</td>
<td>40.12±3.55#</td>
<td>39.22±9.75#</td>
<td>57.13±5.31#</td>
</tr>
</tbody>
</table>

Note: compared with OC group, *P>0.05, compared with preoperative 1D, postoperative fifth D, #P<0.05
**Comparison of two groups before and after surgery**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>IgA (mg/L)</th>
<th>IgG (g/L)</th>
<th>IgM (mg/L)</th>
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<tbody>
<tr>
<td>LC group</td>
<td>60</td>
<td>Preoperative 1D</td>
<td>2 785.77±73.65</td>
<td>11.55±1.70</td>
<td>1 560.32±225.17</td>
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<tr>
<td></td>
<td></td>
<td>Postoperative 1D</td>
<td>2 522.14±130.45*#</td>
<td>10.21±1.21*#</td>
<td>1 475.51±165.51*#</td>
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<tr>
<td></td>
<td></td>
<td>Postoperative 5D</td>
<td>2 762.31±80.16*</td>
<td>11.52±1.37*</td>
<td>1 557.75±232.45*</td>
</tr>
<tr>
<td>OC group</td>
<td>40</td>
<td>Preoperative 1D</td>
<td>2 762.58±70.61</td>
<td>11.62±1.75</td>
<td>1 558.88±241.17</td>
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<tr>
<td></td>
<td></td>
<td>Postoperative 1D</td>
<td>2 431.71±102.42#</td>
<td>9.23±1.20#</td>
<td>1 395.52±173.21#</td>
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<td></td>
<td>Postoperative 5D</td>
<td>2 635.71±98.25△</td>
<td>10.61±1.75△</td>
<td>1 456.27±241.02△</td>
</tr>
</tbody>
</table>

Note: compared with group OC, *P<0.05, and 1D before the operation, after fifth D, #P<0.05; compared with 1D before surgery, P<0.05

**Table 3**

Comparison of T lymphocyte subsets in peripheral blood before and after operation in two groups

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Time</th>
<th>CD3+ (%)</th>
<th>CD4+ (%)</th>
<th>CD8+ (%)</th>
<th>CD4+/CD8+</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC group</td>
<td>60</td>
<td>Preoperative 1D</td>
<td>60.25±3.21</td>
<td>39.55±6.71</td>
<td>26.32±3.52</td>
<td>1.40±0.27</td>
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<td></td>
<td>Postoperative 1D</td>
<td>52.18±4.54#</td>
<td>33.17±5.44#</td>
<td>28.48±6.51#</td>
<td>1.25±0.17#</td>
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<tr>
<td></td>
<td></td>
<td>Postoperative 5D</td>
<td>59.37±5.81*</td>
<td>38.46±4.53*</td>
<td>27.11±2.37*</td>
<td>1.38±0.25*</td>
</tr>
<tr>
<td>OC group</td>
<td>40</td>
<td>Preoperative 1D</td>
<td>59.76±4.25</td>
<td>39.47±6.52</td>
<td>27.15±3.16</td>
<td>1.39±0.29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative 1D</td>
<td>50.71±5.88#</td>
<td>32.47±6.11#</td>
<td>28.92±4.45#</td>
<td>1.21±0.22#</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Postoperative 5D</td>
<td>55.62±4.27#</td>
<td>35.37±4.41#</td>
<td>28.31±2.17#</td>
<td>1.27±0.16#</td>
</tr>
</tbody>
</table>

Note: compared with OC group, *P<0.05; compared with preoperative #P<0.05, 1D

### 4. Discussion

Acute calculus cholecystitis attack, causing colicky pain in the right upper quadrant of the abdomen, paroxysmal intensifies, patients often accompanied by nausea, vomiting and other symptoms, to patients bring great pressure, early surgery is the most effective method of treating the gallbladder stones, so fit for surgery in patients with indications should be taken as early as possible effective method of treating the gallbladder stones, so fit for surgery.

Studies have shown that trauma and any external adverse stimuli have an additional burden on the body, which affects the stability of the body and causes a series of stress and immune responses in the body.[5]

OC on liver compression and pull on the liver function will have a certain impact, combined with anesthesia, stress response and other effects of liver blood circulation, also affect the liver function.[9] LC for CO2 pneumoperitoneum, pneumoperitoneum pressure through the change of liver hemodynamics, affecting portal vein, hepatic arterial blood flow affect liver function. And the higher pressure on blood circulation of liver ischemia more serious, cause liver damage more serious, along with the increase of pressure CO2 into the blood circulation, and stimulate the body to produce endocrine hormone, aggravate the liver ischemia, aggravate the liver function injury.[10]

Studies have shown that OC and LC will appear after a transient liver function abnormalities, 1D liver function TBIL, ALT, AST, GGT compared with preoperative significantly increased, postoperative second 3D performance was significantly reduced, indicating that the effect of OC and LC on liver function is a temporary.[11] This study showed that preoperative TBIL, ALT, AST, GGT, no statistical significance (P>0.05), postoperative 1D index was significantly higher than before surgery, the basic recovery to preoperative level, there was statistical significance (P<0.05), but the two groups were not statistically significant (P>0.05), and related research, suggesting that LC and OC will lead to varying degrees of liver function damage, and with the rehabilitation of the indicators corresponding recovery.

Body specific humoral immunity is mainly mediated by B cells, when the specific stimulation, the co stimulatory molecules produce and secrete specific immunoglobulin, to participate in pathogen scavenging activities.[12] Surgery can cause the body immune function disorder and cause immune suppression, the immune function of the immune system is inhibited or defect, mainly to the cell immune function inhibition, into the mature stage of secretion of antibodies to the plasma cell damage, the immune function is significantly inhibited, the operation of the immune globulin has a dual role of excessive consumption and synthesis, reduce
the degree and severity of trauma related[13]. This study showed that preoperative IgA two groups IgG, IgM, 1D levels were not statistically significant ($P>0.05$), the level of each index was lower than preoperative 1D, OC group was lower than LC group, there was statistical significance ($P<0.05$), postoperative 5D indicators were recovered, LC group recovered to preoperative 1D level, better than OC group, there was statistical significance ($P<0.05$). OC abdominal incision, caused by trauma associated with increased, resulting in ischemia and reperfusion and so on have a certain impact on the body, induced stress response, affect cytokines, immune function, suggesting that LC has little impact on the body's stress response, immune function of the body compared to OC light and micro[14].

T lymphocyte subsets were able to respond to the body's immune regulation, surgical trauma caused stress response, causing immune dysfunction, systemic immune response inhibition, the specific immune changes and the degree of trauma was significantly related to[15]. Body immune regulation ability to T lymphocyte subsets to react, $CD4^+$, $CD8^-$ is an important cell subsets, $CD4^+$ cell toxicity, the number of too much can cause damage to the body, the body's immune function decline, the performance of the $CD4^+/CD8^+$ ratio decreased, so the stability of its ratio to the immune function of the body has important significance[16,17]. This study showed that preoperative $CD4^+$ 1D, $CD4^+$, $CD8^-$, $CD4^+$/CD8$^+$, no statistical significance ($P>0.05$); postoperative 1D two group $CD4^+$, $CD8^-$, $CD4^+$/CD8$^+$ compared with preoperative 1D reduction, $CD4^+$ increased, the difference was statistically significant (5D) $P<0.05$ LC group and preoperative 1D comparison of non statistical significance ($P>0.05$), and OC group compared with preoperative 1D was statistically significant ($P<0.05$). LC is a minimally invasive surgery, the body of the post traumatic stress reaction is small, the immune function of the body is small, can be recovered in the short term after operation.

LC cholecystectomy with small trauma, little impact on the body, postoperative recovery and other characteristics, reflecting the superiority of minimally invasive surgery, it is worthy of clinical promotion.

Reference


