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# COMPARATIVE RESULTS OF SURGICAL TREATMENT OF PRIMARY ECHINOCOCCOSIS OF THE LIVER

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**Abstract.** Despite the large number of methods of antiparasitic treatment of the cyst cavity, the frequency of complications and relapses remains almost at the same level. The comparative analysis was carried out taking into account the study of the results of the immediate period, the long-term period and the assessment of the quality of life after various types of echinococcectomy. When analyzing the average duration of the operation and the duration of the hospital period, it was noted that in the main group, the duration of the operation on average corresponded to 120.8 minutes, and in the comparison group-104.2 minutes. The proposed tactical aspects of surgical treatment of EP, taking into account the peculiarities of physical and chemical treatment of the residual cavity and the extended use of its elimination by complete or partial suturing, including large or complicated cysts, reduced the need for drainage of the residual cavity from 63.8% to 36.6%.

**Key words:** residual cavity; suppurated echinococcal cyst; comparative results; drainage of the residual cavity.

**Introduction.** The largest number of publications and the majority of dissertation studies on the surgical treatment of liver echinococcosis (LE) address the problem of treatment of residual cavities. Despite the large number of methods of antiparasitic treatment of the cyst cavity, the frequency of complications and relapses remains almost at the same level [2, 5, 8, 10]. Improving the tactical and technical aspects of laparoscopic echinococcectomy surgical treatment made it possible to decrease the incidence of complications from residual cavity (RC) from 9.7% to 4.4% [12].

The lack of unity of views regarding the option of eliminating RC gives rise to the emergence of new and new methods of its treatment. Some authors in their research prove the ineffectiveness of traditional and long-term means of treating RC, others offer new options, mainly with a chemical antiparasitic reagent or its combination with physical exposure [1, 3, 4, 7, 9, 11].

Currently, it has been established that echinococcal scolexes can be located in microcracks of the fibrous capsule at a distance of 1.5 cm from its surface [6], which further aggravates the problem of their disinfection.

The comparative analysis was carried out taking into account the representative division between the main group of patients who underwent various types of elimination of RC, taking into account their pretreatment with an antiseptic in combination with ultrasound, and the comparison group whose patients underwent the same type of interventions with pretreatment of RC by traditional methods.

**Material and methods.** The nature of the operations performed in the compared groups

included: complete elimination of residual cavities; partial elimination of residual cavities; drainage of residual cavities; abdominization of residual cavities.

The comparative analysis was carried out taking into account the study of the results of the immediate period after various types of echinococcectomy.

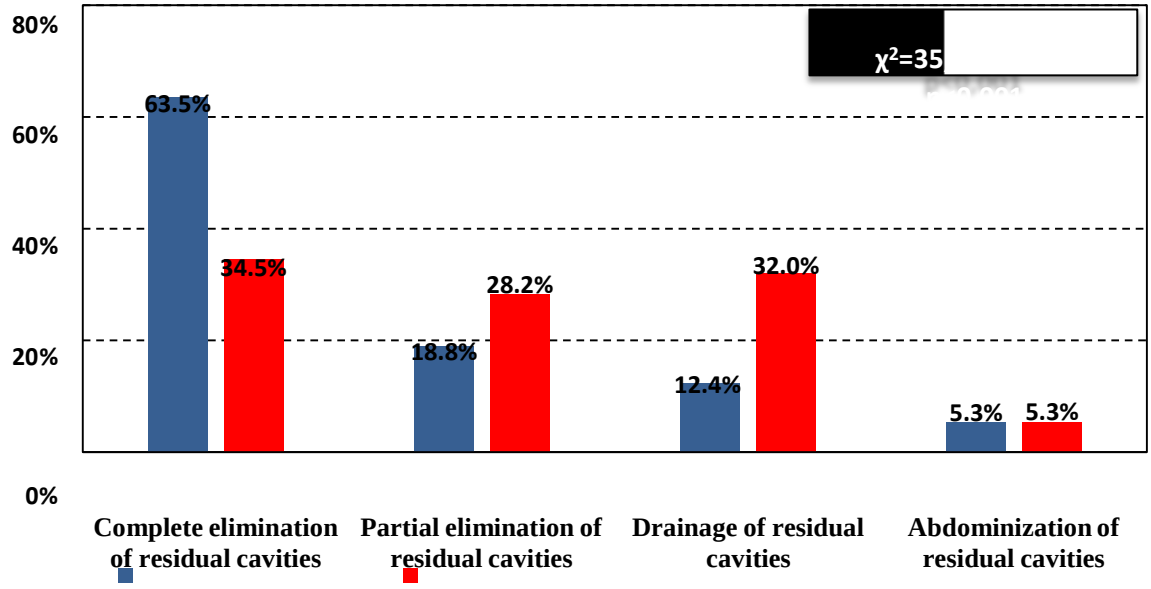
Table 1 shows the summary results of the distribution of patients according to the method of RC treatment after echinococcectomy. As can be seen from the table, complete elimination of RC was performed in 115 (56.9%) patients from the main group and 71 (29.6%) patients from the comparison group; partial elimination of RC was performed in 48 (23.8%) patients from the main group and 66 (27.5%) patients from the comparison group; drainage of RC was performed 26 (12.9%) patients from the main group and 87 (36.3%) patients from the comparison group; abdominization of RC was performed in 13 (6.4%) patients from the main group and 16 (6.7%) patients from the comparison group.

**Table 1**

**Distribution of patients according to the method of treatment of residual cavities after echinococcectomy**

| Treatment of residual cavities | Main group | | Comparison Group | |
|---|---|---|---|---|
| | Abs. | % | Abs. | % |
| Complete elimination of residual cavities | 115 | 56,9% | 71 | 29,6% |
| Partial elimination of residual cavities | 48 | 23,8% | 66 | 27,5% |
| Drainage of residual cavities | 26 | 12,9% | 87 | 36,3% |
| Abdominization of residual cavities | 13 | 6,4% | 16 | 6,7% |
| Total | 202 | 100,0% | 240 | 100,0% |
| | Criteria $\chi^2$=43,545; df=3; p<0,001 | | | |

The next stage of comparison was the distribution of patients according to the method of RC treatment, taking into account the clinical course of echinococcosis (complicated and uncomplicated), which is reflected in Fig. 1 and Fig. 2.



**Main group** **Comparison Group**

**Fig. 1. Distribution of patients according to the method of treatment of residual cavities after surgery for uncomplicated echinococcosis**

Thus, the distribution of patients according to the method of treatment of RC with uncomplicated LE (Fig. 1) showed that complete elimination of RC was performed by 108 (56.9%) patients from the main group and 71 (29.6%) patients from the comparison group; partial elimination of RC was performed by 32 (18.8%) patients from the main group and 58 (32.0%) patients from the comparison group; drainage of the residual cavity was performed in 21 (12.4%) patients from the main group and 66 (32.0%) patients from the comparison group; abdominization of the RC was performed in 9 (5.3%) patients from the main group and 11 (5.3%) patients from the comparison group. The reliability of the difference in the compared groups was determined within $\chi 2=35,514$; df=3; p<0,001.

The distribution of patients according to the method of treatment of residual cavities with complicated LE is shown in the diagram Fig. 2.

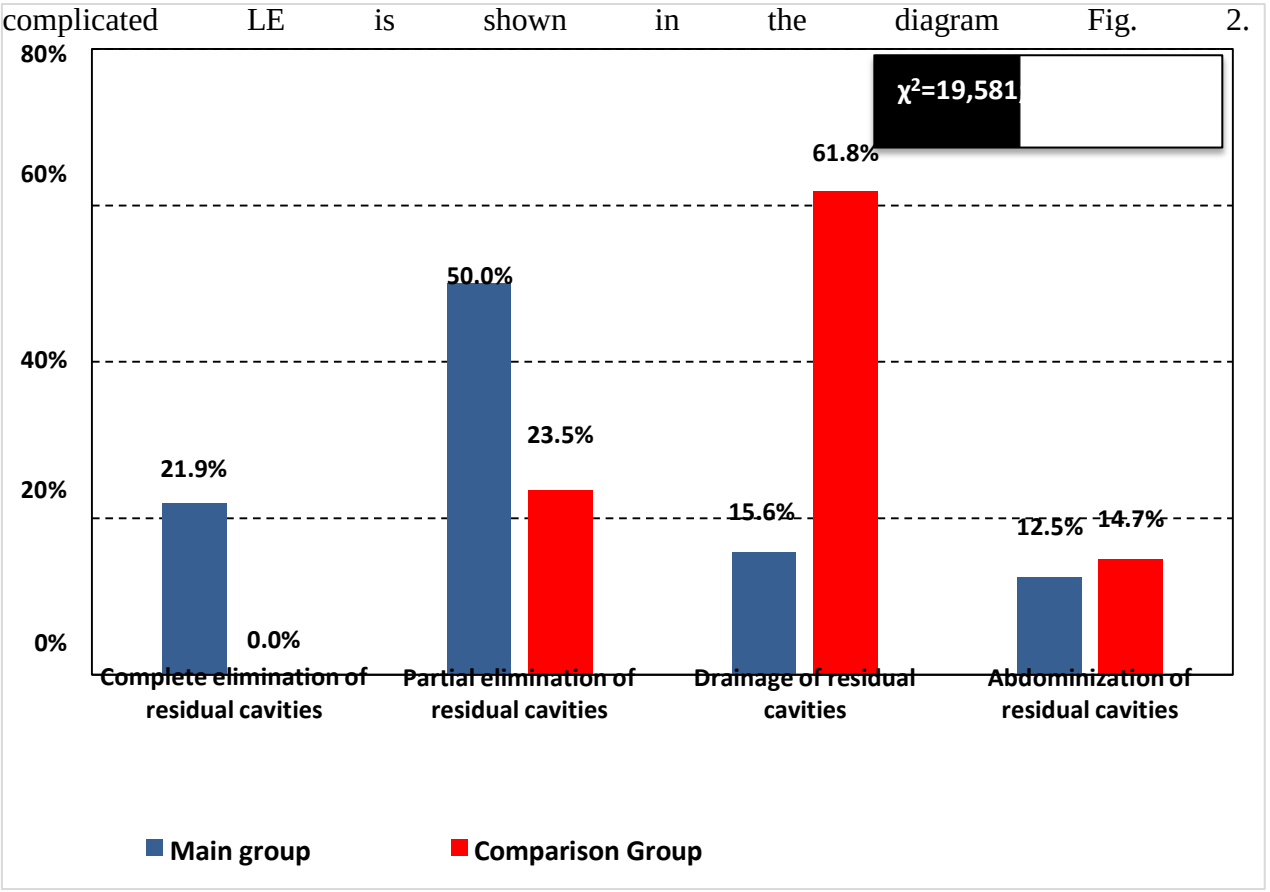



**Fig. 2. Distribution of patients according to the method of treatment of residual cavities after surgery for complicated echinococcosis (all complications)**

As can be seen from the diagram (Fig. 2), complete elimination of RC was performed only in 7 (21.9%) patients from the main group; partial elimination of RC was performed in 16 (50.0%) patients from the main group and 8 (23.5%) patients from the comparison group; drainage of the RC was performed in 5 (15.6%) patients from the main group and 21 (61.8%) patients from the comparison group; abdominization of the RC was performed in 4 (12.5%) patients from the main group and 5 (14.7%) patients from the comparison group. The reliability of the difference in the compared groups was determined in the range of $\chi 2=19.581$; df=3; p<0.001.

A more detailed distribution was performed in patients with complicated LE, taking into account the presence of a cystobiliary fistula, shown in Fig. 3.

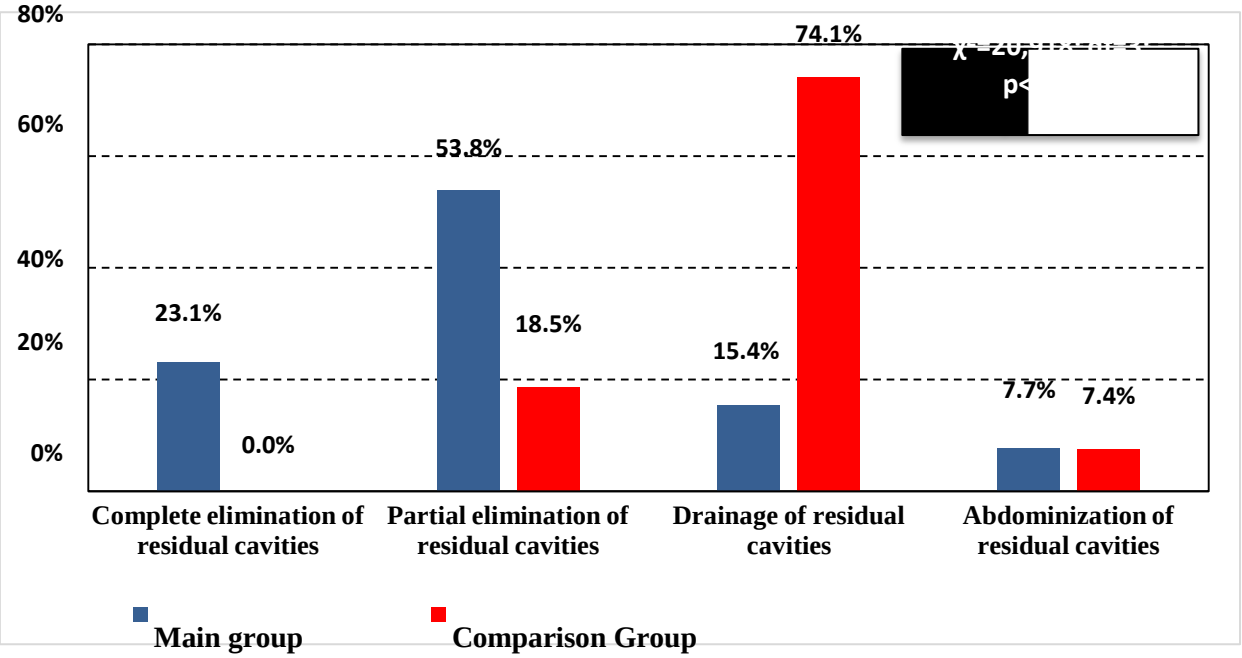



**Fig. 3. Distribution of patients according to the method of treatment of residual cavities after surgery for echinococcosis complicated by cystobiliary fistula and (or) suppuration**

Thus, when distributing patients with LE complicated by cystobiliary fistula according to the method of treatment of the RC, it was noted that the complete elimination of the RC was performed only in 6 (23.1%) patients from the main group; partial elimination of the RC was performed in 14 (53.8%) patients from the main group and 5 (18.5%) patients from the comparison group; drainage of the RC was performed in 4 (15.4%) patients from the main group and 20 (74.1%) patients from the comparison group; abdominization of the RC was performed in 2 (7.7%) patients from the main group and 2 (7.4%) patients from the comparison group. The reliability of the difference in the compared groups was determined in the range of $\chi 2=20.918$; df=3; $p<0.001$.

Fig. 4 shows the distribution of patients according to the frequency of drainage of residual cavities. At the same time, in the main group, drainage of the residual cavity was performed in 74 (36.6%) patients, and in the comparison group – in 153 (63.8%) patients. The reliability of the difference in the compared groups was determined in the range of $\chi 2=32.284$; df=1; $p<0.001$.

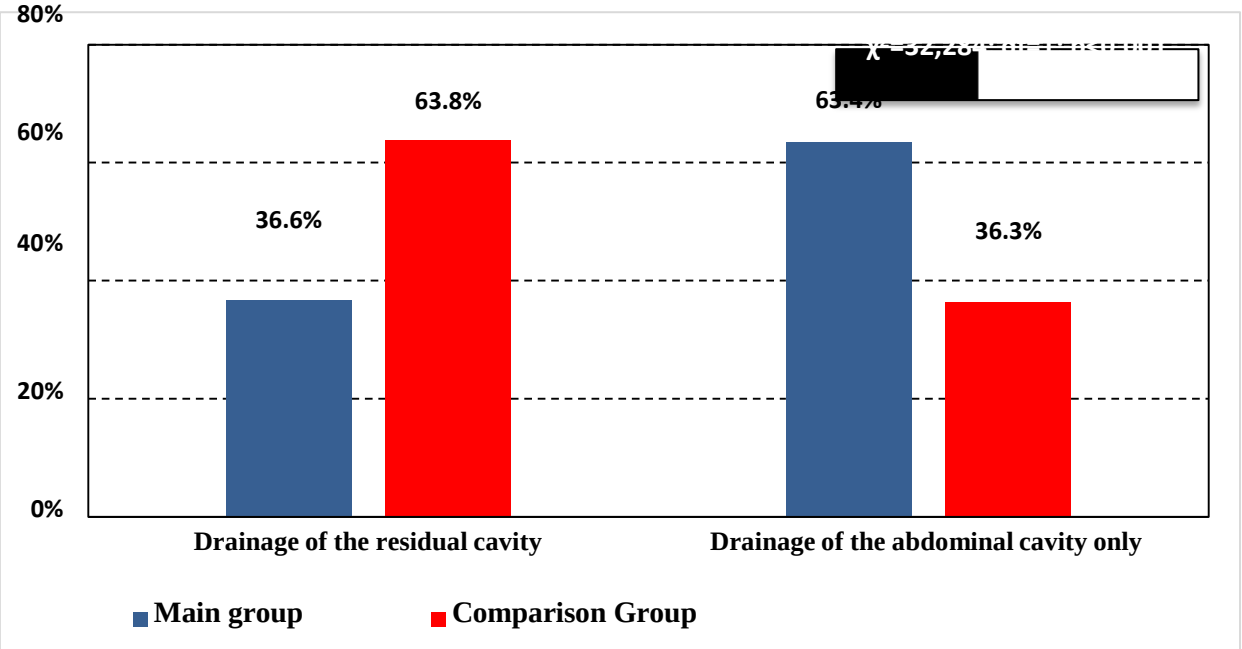



**Fig. 4. Distribution of patients according to the frequency of drainage of the residual cavity**

According to the nature and amount of RC discharge from drainage, which are reflected in Table 2, patients were distributed as follows: serous discharge was observed in 26 (12.9%) patients from the main group, with a maximum (more than 100 ml/day) only in 2 (1.0%) of them; in the comparison group serous discharge was also observed in 26 (10.8%) patients, but with maximum discharge in 5 (2.1%) of them. Serous hemorrhagic discharge occurred in 36 (17.8%) patients from the main group, with maximum discharge in 2 (1.0%) of them; in the comparison group - in 82 (34.2%) patients, with maximum discharge in 5 (2.1%) of them. The purulent nature of the discharge was noted in only 3 (1.5%) patients from the main group, with a discharge of up to 100 ml / day in 1 (0.5%) of them; in the comparison group – in 19 (7.9%) patients, with a maximum discharge in 1 (0.4%) of them. Bile discharge was observed in 9 (4.5%) patients from the main group, with maximum discharge in only 1 (0.5%) of them; in the comparison group – in 26 (10.8%) patients, with maximum discharge in 6 (2.5%) of them.

**Table 2**

**The nature and amount of drainage discharge from the residual cavity in the early postoperative period**

| The nature and volume of the separated | Main group | | Comparison Group | |
|---|---|---|---|---|
| | Abs. | % | Abs. | % |
| **Serous** | 26 | 12,9% | 26 | 10,8% |
| up to 50 ml | 17 | 8,4% | 9 | 3,8% |
| 50-100 ml | 7 | 3,5% | 12 | 5,0% |
| more than 100 ml | 2 | 1,0% | 5 | 2,1% |
| **Serous hemorrhagic** | 36 | 17,8% | 82 | 34,2% |
| up to 50 ml | 23 | 11,4% | 66 | 27,5% |
| 50-100 ml | 11 | 5,4% | 11 | 4,6% |
| more than 100 ml | 2 | 1,0% | 5 | 2,1% |
| **Purulent** | 3 | 1,5% | 19 | 7,9% |
| up to 50 ml | 2 | 1,0% | 14 | 5,8% |
| 50-100 ml | 1 | 0,5% | 4 | 1,7% |

| | | | | |
|---|---|---|---|---|
| more than 100 ml | 0 | 0,0% | 1 | 0,4% |
| **Bilious** | 9 | 4,5% | 26 | 10,8% |
| up to 50 ml | 6 | 3,0% | 11 | 4,6% |
| 50-100 ml | 2 | 1,0% | 9 | 3,8% |
| more than 100 ml | 1 | 0,5% | 6 | 2,5% |
| **Total patients with drainage of the residual cavity** | 74 | 36,6% | 153 | 63,8% |

A more visual picture of significant differences in the comparative analysis of data on the nature of drainage discharge from the RC in the early postoperative period is shown in the diagram Fig. 5. Thus, the reliability criterion is determined within the limits of $\chi 2$ =11,756; df =3; p=0.009.

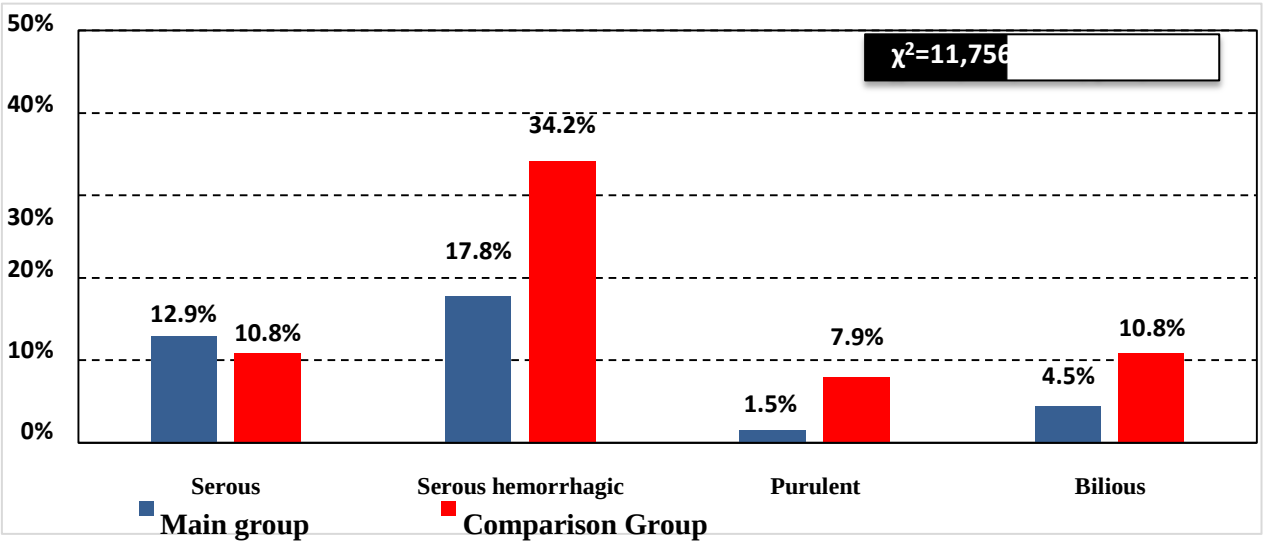



**Fig. 5. Comparative data on the nature of drainage discharge from the residual cavity in the early postoperative period**

The structure and frequency of postoperative complications are shown in Table 3.

Table 3.

**Structure and frequency of early postoperative complications**

| Complication | Main group (n=202) | | Comparison Group (n=240) | |
|---|---|---|---|---|
| | abs. | % | abs. | % |
| Inadequate drainage of the residual cavity (accumulation of fluid) | 2 | 1,0% | 9 | 3,8% |
| Bronchopulmonary | 6 | 3,0% | 16 | 6,7% |
| Bleeding from the liver parenchyma | 1 | 0,5% | 4 | 1,7% |
| Biliary fistula | 9 | 4,5% | 26 | 10,8% |
| Abscess of the abdominal cavity | 1 | 0,5% | 7 | 2,9% |
| Patients with complications | 11 | 5,4% | 30 | 12,5% |
| | Criteria $\chi^2$=21,469; df=1; p<0,001 | | | |

In total, there were 11 (5.4%) patients with complications in the main group and 30 (12.5%) patients in the comparison group. From the nature of complications, it was noted that the accumulation of exudate in the RC associated with inadequate drainage of the latter was observed in 2 (1.0%) patients from the main group and in 9 (3.8%) patients from the comparison group; bronchopulmonary complications were observed in 6 (3.0%) patients from the main group and in 16 (6.7%) patients from the comparison group; bleeding from the liver parenchyma was noted in 1 (0.5%) patient from the main group and in 4 (1.7%) patients from the comparison group; biliary fistula was observed in 9 (4.5%) patients from the main group and in 26 (10.8%) patients from the comparison group; abdominal abscess was diagnosed in 1 (0.5%) patient from the main group and in 7 (2.9%) patients from the comparison group. The reliability of the difference in the compared groups was determined in the range of $\chi 2=21.469$; df=1; $p<0.001$.
Treatment of complications in the immediate postoperative period consisted in conservative treatment, in combination with the latter with puncture drainage of the residual cavity, relaparotomy. Table 4 shows the methods of treatment of complications and the cause of reoperations.

**Table 4**
**Treatment of complications and re-operation in the immediate postoperative period**

| Elimination of complications | Main group (n=202) | | Comparison Group (n=240) | |
|---|---|---|---|---|
| | абс. | % | абс. | % |
| Allowed conservatively | 9 | 4,5% | 24 | 10,0% |
| Relaparotomy for bleeding | 1 | 0,5% | 2 | 0,8% |
| Relaparotomy for an abscess | 0 | 0,0% | 2 | 0,8% |
| Puncture drainage of the residual cavity | 1 | 0,5% | 2 | 0,8% |
| Total reoperations | 2 | 1,0% | 6 | 2,5% |

A summary analysis of the results of the immediate postoperative period (Fig. 5) showed that 94.6% (191) patients from the main group were discharged without complications, whereas this indicator in the comparison group was noted in 87.5% (210) cases; conservative therapy for complicated course was applied to 4.5% (9) patients from the main group and 10.0% (24) patients from the comparison group; re-operation for complications was performed in 2 (1.0%) patients from the main group and 6 (2.5%) patients from the comparison group. The reliability of the difference in the compared groups was determined within $\chi 2=6,500$; df=2; p=0,039.

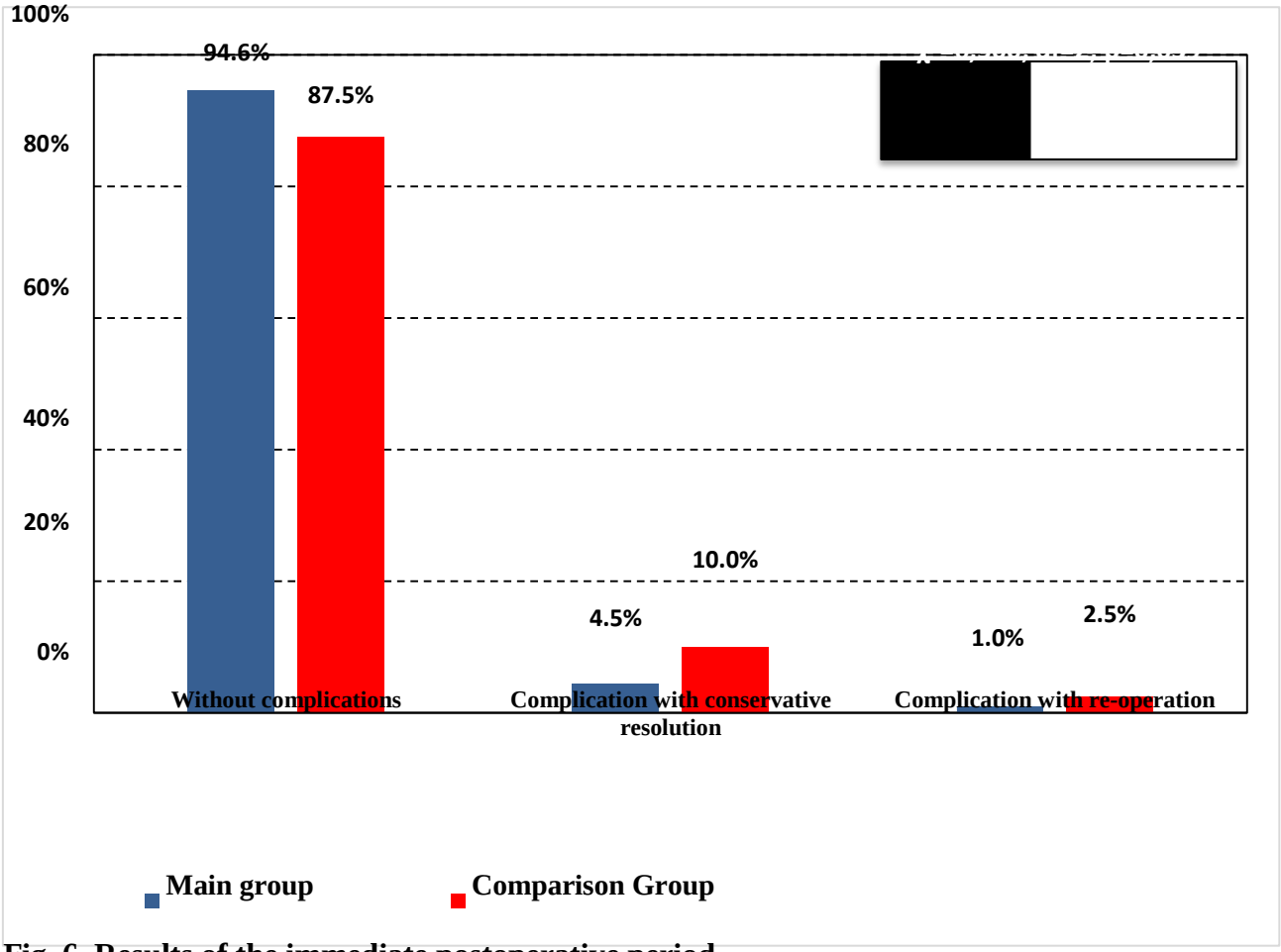



**Fig. 6. Results of the immediate postoperative period**

Figure 7 shows the number of patients discharged with drains.

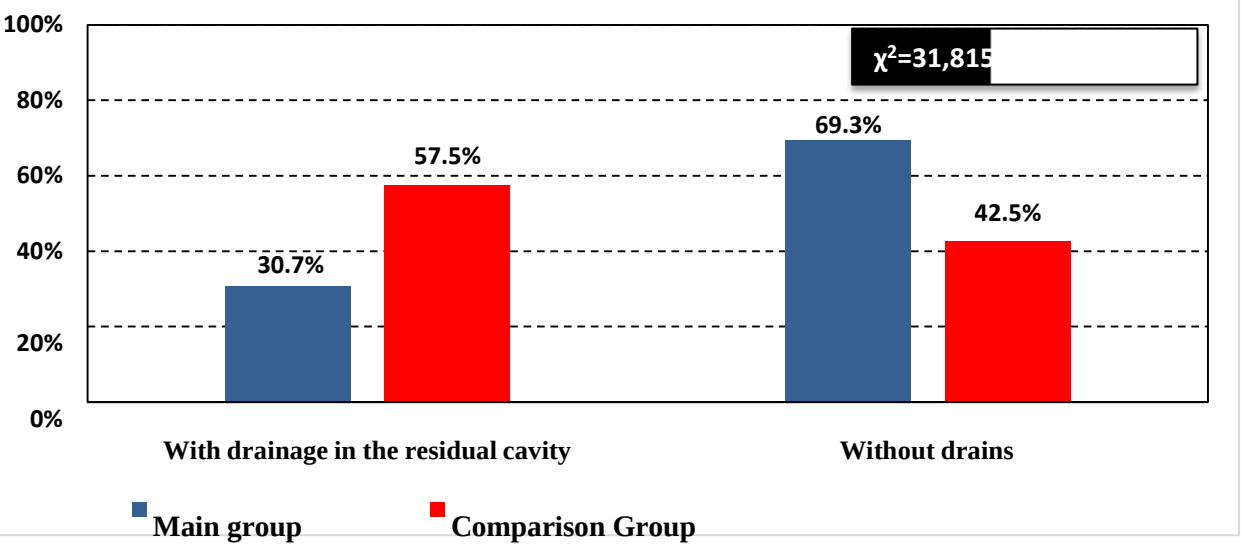



**Fig. 7. The proportion of patients discharged with drainage in the residual cavity**

Thus, 62 (30.7%) patients from the main group and 138 (57.5%) patients from the comparison group were discharged with drainage in the residual cavity. Accordingly, 140 (69.3%) patients from the main group and 102 (42.5%) patients from the comparison group were discharged without drainage.

When analyzing the average duration of the operation and the duration of the hospital period, it was noted that in the main group, the duration of the operation on average corresponded to 120.8 minutes, and in the comparison group-104.2 minutes (t=1.76; p>0.05), whereas, the duration of

hospitalization on average corresponded to 8.5 days in the main group, and in the comparison - 10.4 days (t=2.43; p<0.05).

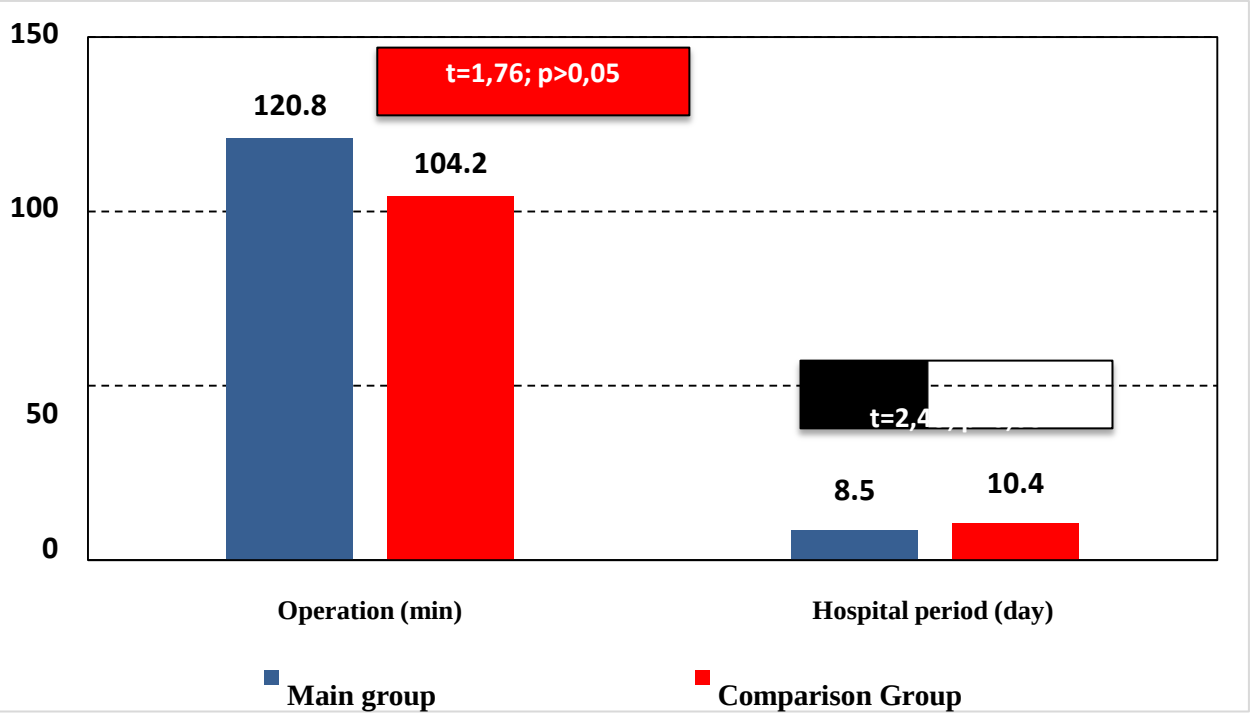



**Fig. 8. Average duration of surgery and hospital period**

Thus, the proposed tactical aspects of surgical treatment of LE, taking into account the peculiarities of physical and chemical treatment of the RC and the extended use of its elimination by complete or partial suturing, including large or complicated cysts, reduced the need for drainage of the RC from 63.8% (153 out of 240 patients in the comparison group) to 36.6% (74 out of 202 patients in the main group; $\chi 2=32.284$; df=1; p<0.001), reduce the frequency of postoperative complications from 12.5% (30 patients in the comparison group) to 5.4% (11 patients in the main group; $\chi 2=21.469$; df=1; p<0.001), and, in general, to increase the proportion of discharged patients without safety drainage from 42.5% (102 patients in the comparison group) to 69.3% (140 patients in the main group; $\chi 2=31,815$; df=1; p<0.001).

**Conclusion.** The proposed tactical aspects of surgical treatment of liver echinococcosis, taking into account the peculiarities of physical and chemical treatment of the residual cavity and the extended use of its elimination by complete or partial suturing, including large or complicated cysts, reduced the need for drainage of the residual cavity from 63.8% to 36.6% ($\chi 2=32.284$; df=1; p<0.001), to reduce the frequency of postoperative complications from 12.5% to 5.4% ($\chi 2=21.469$; df=1; p<0.001) and, in general, to increase the proportion of discharged patients without safety drainage from 42.5% to 69.3% ($\chi 2=31.815$; df=1; p<0.001).

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