

## External Tube drainage Versus Omentoplasty In the Management of Residual Hepatic Hydatid Peri-cyst Cavity in Children

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### ABSTRACT

**Introduction:** Management of the residual pericyst cavity after hepatic hydatid cyst surgery is a major determinant of postoperative morbidity. Several options are available, but this aspect of treatment is not well studied in children. This study aimed to compare the outcome of external tube drainage (ETD) and omentoplasty (OP) in the hepatic hydatid cyst residual cavity, the two most commonly used methods.

**Material and Methods:** This study was a prospective randomized study. Children with hydatid cyst liver were divided into two groups by simple randomization method. In one group ETD was performed and in another OP was done. The groups were matched for age, sex, location of cysts, number of cysts, size of cysts, type of cysts, and methods of surgical access.

**Results:** Sixty patients were included in the study with 30 patients [total number of cysts (37)] in the ETD group and 30 patients [total number of cysts (37)] in the OP group. There was no statistically significant difference in mean operative time, return to full orals, ambulation, and bowel movement. Pain scores were significantly lower in OP as compared to ETD. The hospital stay was comparatively less with OP. The overall complication rate was higher in ETD (30.0%) as compared to OP (10.0%).

**Conclusion:** Omentoplasty should remain the preferred option in the management of residual hepatic hydatid cyst cavity in children whenever possible as it is associated with short hospital stay, less postoperative morbidity compared to external tube drainage.

**Keywords:** Hepatic Hydatid Cyst, Omentoplasty, External tube drainage

JMS: 2020; 23(4):5-19 DOI: <https://doi.org/10.33883/jms.v23i4.788>

### INTRODUCTION

Hydatid disease is a commonly encountered disease in highly endemic countries like India, and often in other countries with increasing travel. In high endemicity areas like India, the disease affects a significant number of children. The liver is the most commonly involved site in children<sup>1</sup>, though nearly equal incidences (41%-43%) of hydatid cyst in lung and liver in pediatric patients is also reported<sup>2</sup>. Surgery remains the only definitive treatment as it completely removes the parasitic cysts. In children, conservative surgical methods of management of hepatic hydatid cyst are used which leave a residual pericyst cavity. The major cause of postoperative morbidity is related to the management of the residual cavity. Various options available for managing the residual cyst cavity are; leaving

the cavity open, simple closure, marsupialization, external tube drainage, introflexion, capitonnage, omentoplasty, partial captionnage with omentoplasty, Roux-en-Y cystojejunostomy, and radiofrequency ablation; with external tube drainage (ETD) and omentoplasty (OP) being most popular and promising<sup>3-9</sup>. Proponents of ETD claim that it is technically easier to perform, takes lesser time, and identifies biliary leaks. Proponents of OP claim its superiority because it results in decreased postoperative stay, complications and is associated with a lesser rate of recurrence and residual infection<sup>10-14</sup>. The data available in

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### Access this article online



**Website:**  
[www.jmsskims.org](http://www.jmsskims.org)

**DOI:**  
<https://doi.org/10.33883/jms.v23i4.788>

**How to cite this article:** Mufti G, Pirzada FM, Sheikh K, wani sajad, Baba A, Bhat N. External Tube drainage Versus Omentoplasty In the Management of Residual Hepatic Hydatid Peri-cyst Cavity in Children. JMS 2020;23(4):5-19

Received: 2020-09-10 Accepted: 2020-12-25



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the pediatric population regarding this aspect of management is scarce. We endeavored to compare the outcomes of external tube drainage and omentoplasty in the management of residual cavity in hydatid liver disease in the pediatric population to help the surgeons choose a better option.

#### MATERIAL AND METHODS

The study was conducted prospectively over 5 years from Jun 2014 to Jun 2019 in the Department of Paediatric Surgery at Sher-i-Kashmir Institute of Medical Sciences, Srinagar, Kashmir, India. This area is endemic for hydatid disease and our institute is an apical healthcare facility with dedicated pediatric surgical services. Children with hepatic hydatid were divided into two groups by simple randomization. In one group, the residual cavity was managed by external tube drainage and in another group, omentoplasty was used. The two groups were compared concerning operation time, intraoperative complications, postoperative pain, postoperative complications, time to ambulate, time to return to full orals, total hospital stay, and recurrence of hydatid cysts. In group A, open was done in 17 patients and 13 patients were managed laparoscopically. In

group B, open was done in 19 patients and 11 patients were managed laparoscopically.

All patients were treated with Albendazole 15mg/kg/d for at least 4 weeks preoperatively and continued postoperatively for 3 cycles with each cycle extending up to up to 3 weeks with a 1-week gap in between which was as per the study by Morris et al<sup>15</sup>.

The collected data was analyzed as per standard statistical methods. Categorical data was analyzed by using Pearson's Chi-Square test and Fischer's exact test. Quantitative data was analyzed as per two samples Independent t-test. P-value <0.05 was considered to be statistically significant

#### Operative Technique

In open Surgery, abdominal access was achieved via the right subcostal incision. The operative field was carefully protected from any spillage by using gauze packs soaked in Cetrimide or Povidine iodine as a scolical agent. The decompression of cysts was done by a wide bore needle. Naked eye examination of the fluid for the presence of bile to rule out CBC was followed by injection of 3% hypertonic saline or cetrimide (0.02%) for 10 minutes to ensure the complete killing of the organism. In case of overt signs of

**Table-1: Distribution of hepatic hydatid cysts in two groups.**

| Parameters            |                                             | Tube drain (no of patients =30) | Omentoplasty (no of patients =30) | p-value |
|-----------------------|---------------------------------------------|---------------------------------|-----------------------------------|---------|
| Age                   |                                             | 9.86±2.27                       | 9.93±2.18                         | 0.9     |
| Sex distribution      |                                             |                                 |                                   |         |
|                       | males                                       | 19                              | 15                                | 0.43    |
|                       | females                                     | 21                              | 15                                |         |
| Size(Centimetres)     |                                             | 8.53±3.31                       | 8.33±2.15                         | 0.78    |
| Distribution          |                                             |                                 |                                   |         |
|                       | Location of cyst                            |                                 |                                   |         |
|                       | single right lobe cyst                      | 18 (60.0%)                      | 17 (56.6%)                        | 0.41    |
|                       | double right lobe cyst                      | 4 (13.3%)                       | 2 (6.7%)                          |         |
|                       | Single left lobe cyst                       | 5 (16.7%)                       | 7 (23.3%)                         |         |
|                       | Double left lobe cyst                       | 0 (0.0%)                        | 2 (6.7%)                          |         |
|                       | Single right lobe and single left lobe cyst | 3 (10.0%)                       | 2 (6.7%)                          |         |
| Total number of Cysts |                                             | 37                              | 36                                |         |
| Gharbi Type           |                                             |                                 |                                   |         |
|                       | Gharbi Type I                               | 22                              | 25                                | 0.102   |
|                       | Gharbi Type II                              | 10                              | 9                                 |         |
|                       | Gharbi Type III                             | 3                               | 2                                 |         |
|                       | Gharbi Type IV                              | 2                               | 3                                 |         |
| CBC                   |                                             |                                 |                                   |         |
|                       | No CBC                                      | 31(83.7%)                       | 32 (82%)                          | 0.5     |
|                       | single CBC                                  | 3 (8%)                          | 4 (10%)                           |         |
|                       | Multiple CBC                                | 2 (5.4%)                        | 3 (7.7%)                          |         |
|                       | Occult CBC                                  | 1 (2.7%)                        | 0 (0.0%)                          |         |

cyst-biliary communication, the use of a scolical agent was avoided. The pericyst was opened and the contents were evacuated. Cyst cavity was examined for any CBC. In laparoscopically operated patients, trocars were placed according to the location of the cyst and the same steps were followed as in open surgery. At the end of the procedure, the cavity was examined for any evidence of CBC, which if found was sutured. The residual cavity was managed by either of the two methods.

### 1. External tube drainage (ETD)

### 2. Omentoplasty (OP)

ETD was done by using a 22-24 F tube drain placed in the cyst cavity and exteriorized through a separate skin wound or any of the laparoscopic port sites if feasible. OP was done by placing a viable pedicle of omentum in the cyst cavity and fixing it to the cyst wall with 2-0 Polyglactin. A 20 F tube drain was placed in the Morrison's pouch in all the patients. The operative time was defined as the time taken from incising the skin or inserting the trocar till the skin/postclosure.

## RESULTS

Sixty patients were included in the study with 30 patients in the tube drainage group (total number of cysts is 37) and 30 patients in omentopexy group (total number of cysts is 36).

There was no statistical difference between the two groups; the patients were comparable in most preoperative and disease parameters Table-1. The mean operative time, time to ambulate, return to full orals, removal of drain was not statistically significant in the two groups (Table-2). Pain severity was less in omentoplasty group than the tube drainage group at 8, 24- and 48-hours post-surgery and was statistically significant. After 48 hours there was no difference in pain scores in the two groups. The mean duration of parenteral analgesics was more in the tube drainage group ( $3.36 \pm 1.10$  days) compared to omentoplasty group ( $2.53 \pm 0.57$  days) and was statistically significant. The postoperative hospital stay was less in omentoplasty group ( $4.76 \pm 1.47$  days) than the tube drainage group ( $6.500 \pm 2.54$ ) and was statistically significant.

Post-operative complications were more in the tube drainage group than omentoplasty group and was statistically significant (Table-3). Post-surgery biliary fistula developed in 6.7% of patients in the tube drainage group and none in the omentoplasty group. Atelectasis was more in tube drainage (13%) probably due to hampering of respiratory effort and more pain. Cavity abscess (3.3%) and wound infection (6.7%) was more in the tube drainage group. None of the patients had a recurrence in either group.

**Table 2:** Intraoperative and Post-Operative Parameters

| Parameters                                 | Tube Drainage      | Omentoplasty       | P-value |
|--------------------------------------------|--------------------|--------------------|---------|
| Operative Time (in minutes)                | 113.50 $\pm$ 23.12 | 110.50 $\pm$ 24.46 | 0.642   |
| Operative time in laparoscopy (in minutes) | 98.3 $\pm$ 7.48    | 106.7 $\pm$ 23.43  |         |
| Operative time in Open (in minutes)        | 128.7 $\pm$ 23.63  | 114.3 $\pm$ 29.51  |         |
| Pain Score (VAS) :                         |                    |                    |         |
| 8 hours                                    | 7.1 $\pm$ 0.95     | 6.06 $\pm$ 1.02    | 0.002   |
| 24 hours                                   | 5.5 $\pm$ 0.82     | 4.03 $\pm$ 0.99    | 0.0001  |
| 48 hours                                   | 3.7 $\pm$ 2.04     | 1.96 $\pm$ 1.79    | 0.0001  |
| Mean Duration of Analgesics (days)         | 3.36 $\pm$ 1.10    | 2.53 $\pm$ 0.57    | 0.001   |
| Post operative Hospital stay (days)        | 6.500 $\pm$ 2.54   | 4.767 $\pm$ 1.47   | 0.002   |
| Full Ambulation (days)                     | 2.03 $\pm$ 0.89    | 1.90 $\pm$ 0.60    | 0.5     |
| Return to Orals (days)                     | 2.27 $\pm$ 0.74    | 2.40 $\pm$ 0.72    | 0.48    |
| Bowel movements (days)                     | 1.36 $\pm$ 0.61    | 1.53 $\pm$ 0.73    | 0.34    |
| Removal of Subhepatic drain (days)         | 3.067 $\pm$ 0.98   | 2.500 $\pm$ 1.59   | 0.102   |

**Table 3:** Post surgery complications

| Complication    | Tube drainage n=30 | Omentoplasty n=30 | P value |
|-----------------|--------------------|-------------------|---------|
| Atelectasis     | 4 (13.3%)          | 2 (6.7%)          | 0.046   |
| Wound infection | 2 (6.7%)           | 1 (3.3%)          |         |
| Cavity Abscess  | 1 (3.3%)           | 0 (0.0%)          |         |
| Biliary fistula | 2 (6.7%)           | 0 (0.0%)          |         |
| TOTAL           | 9(30.0%)           | 4 (10.0%)         |         |

## DISCUSSION

Surgery remains the standard modality of treatment for pediatric hepatic hydatid cyst. Surgery can be radical (resectional procedures) or conservative. The preferred surgical approach for most of the patients is conservative which involves evacuation of all the contents of the cysts leaving the pericyst behind, followed by irrigation of the cavity with a scolicalid agent and management of the residual pericyst cavity.

Conservative procedures are easier to perform, with no or little risk of bleeding but more complications such as bile leakage, residual cavity infection/abscess, spillage of cystic contents, and anaphylactic shock. The residual cavity can be managed by multiple methods but external tube drainage (ETD) and omentoplasty (OP) are the most popular and promising ones<sup>16</sup>.

Patients managed by OP had operative time less compared to ETD (110.5min vs. 113.5min) but that did not reach a significant level. The same was reported by Malik et al<sup>8</sup> in his study. Suturing of omentum to the cavity wall is challenging with laparoscopy resulting in prolongation of operative times in laparoscopic omentoplasty. Hospital stay is less with omentoplasty compared to ETD (4.7 vs. 6.5 days) which is as per the study of Lotfi and Hashemian<sup>17</sup>, who performed omentoplasty in 12 patients and observed that the average hospital stays in these patients was 10 days. Studies of Sayek et al<sup>18</sup> and Elhamel and Murthy<sup>19</sup> reported good results in patients who underwent omentoplasty and concluded that omentoplasty is the best technique as it is associated with shorter hospital stay and lower incidence of biliary fistula.

Pain scores in the ETD group were significantly higher, maximum at 8 hours following surgery. The pain was minimum with laparoscopic omentoplasty. The same was noted by Wani et al<sup>20</sup>. Long surgical incision, continuous stretch of the wound by the drain, and presence of a portion of the drain in the abdominal cavity were the major causes of postoperative pain in open tube drainage.

External tube drainage (ETD) is associated with more complications. Biliary fistula rates were higher with ETD (6.7%) than omentoplasty (0%). Two patients had a biliary leak, one was treated by open and one was managed by laparoscopically. Kayaalp et al<sup>21</sup> reported a leak rate of 19% in ETD. Higher leak rates in their study compared to ours

were due to the inclusion of a more complex nature of cysts in their study. Agarwal et al<sup>22</sup> reported a 13% incidence of postoperative biliary fistula and the same was noted by Papadimitriou J and Mandrakes<sup>23</sup>. The biliary fistulae were managed as per established protocol in the department, including endoscopic sphincterotomy or stenting when indicated. Both the patients healed well and tube drainage was removed after 16 days in one patient and 13 days in another patient. Lesser leak rate in omentoplasty is due to the vascularised nature of the omental flap which not only obliterates the cavity but also seals small CBC's and absorbs any secretions present there<sup>24</sup>.

One patient in ETD developed a cavity abscess which was managed with percutaneous pigtail drainage with culture revealing Klebsiella. Atelectasis was more in the ETD group (13%) compared to omentoplasty group (6.6%). An additional tube drain in the abdomen in the ETD group interfered with early ambulation and resulted in an increased frequency of basal atelectasis.

Less postoperative pain and absence of an additional tube drain translated into early ambulation, acceptance of orals, and discharge of patients in the OP group. This was also reflected in the earlier resumption of activities of daily life by this group of patients. Similar results were reported by Muftuoglu et al<sup>25</sup> and Utkan et al<sup>26</sup>.

**Conflict of Interest:** None

**Funding Sources:** None

**Written Informed Consent:** Taken

## CONCLUSION

Omentoplasty should remain the preferred option in the management of residual hepatic hydatid pericyst cavity in children. It is associated with a short hospital stay, fewer post-operative complications, and morbidity compared to external tube drainage.

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