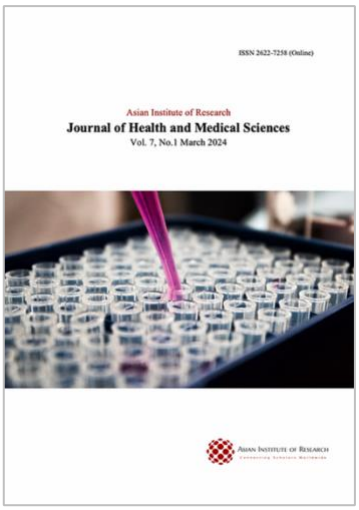

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Clinical Study and Surgical Management of Alveolar Echinococcosis (AE)

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Abstract
Background: Hepatic alveolar echinococcosis (HAE) is a serious zoonotic infection that affects humans. It may have a tumor-like appearance at times. Percutaneous treatment of HAE patients is extremely relaxing for them. HAE is a significant human zoonotic infection caused by the fox tapeworm Echinococcus Multilocularis larvae. It possesses the characteristics of an invasive tumor-like lesion due to its infiltrative growth pattern and protracted incubation period. The disease is endemic over central Europe, Asia, and North America. Objective: To determine the clinical study and Surgical management of alveolar Echinococcosis (AE). Methods: A cross-sectional study was conducted at the First Affiliated Hospital of Xinjiang Medical University, Urumqi, Xinjiang, P.R China, which was performed between September 2018 and December 2023. The total number of patients in our study was 142. The number of Male patients in our study was 67 and female patients were 75. In 142 consecutive patients who underwent for blood tests and surgical Procedures. We took preoperative and postoperative blood tests for all operated patients. I take PNM staging for all patients and we took a brief history from all patients. Data was tabulated and analyzed by SPSS version 25. Results: A total of 142 patients were enrolled with a mean±SD age of 37.32±13.90. The mean±SD of Preoperative WBC was 6.85±1.76. The mean±SD of Preoperative NE was 6.85±1.76. The mean±SD of Preoperative HB was 1.33.7±23.5. The mean±SD of Preoperative Platelets was 288.21±94.1. The mean±SD of the frequency of PNM staging P1N0M0 was 21 and its percentage was 14.8. The frequency of PNM staging P2N0M0 was 59 and its percentage was 41.5. The frequency of PNM staging P3N0M0 was 29 and its percentage was 20.4. The frequency of PNM staging P4N0M0 was 33 and its percentage was 23.2. The frequency of Jaundice before surgery was 19 and its percentage was 13.4. The frequency of Laparoscopic / Laparotomy in abdominal dissection was 119 and its percentage was 83.8. The frequency of laparoscopy was 23 and its percentage was 16.2. In all cases, P-value was <0.05. Conclusion: Hepatic resection is considered safe and the only curative treatment for Hepatic alveolar echinococcosis (HAE), when the lesion can be removed completely. The advantages of this technique for AE treatment need to be compared further with the classical open approach. Laparoscopy appears as a feasible and safe approach for patients with PNM stages alveolar echinococcosis without impact on early disease recurrence. Hepatic alveolar echinococcosis will improve the treatment results by avoiding non-radical surgery associated with the development of complications after further radical surgical treatment. Liver resection remains the gold standard for AE. In our study females were more as compared to males. PNM staging of P2N0M0 patients was more in our study as compared to other stages. In our study, there was no major complication noted after the surgical procedure.

Keywords: Hepatic Alveolar Echinococcosis (HAE), PNM Staging, Alveolar Echinococcosis (AE)

1. Introduction

China is one of the countries seriously affected by hepatic alveolar echinococcosis (HAE), accounting for 91% of the global burden of new HAE cases every year. One of the worst zoonoses, human hepatic alveolar echinococcosis (HAE), is very common in rural Western China (Torgerson et al., 2010; Zhang al et al., 2015). The larval stage of Echinococcus multilocularis is the cause of human hepatic alveolar echinococcosis (HAE) (McManus et al., 2011). Because of its distinctive infiltrative growth, hepatic alveolar echinococcosis (AE), a chronic proliferative parasite illness, has a poor natural prognosis (Torgerson et al., 2010). After ten to fifteen years of diagnosis, death in individuals with AE who are not treated or are not treated enough has been reported to reach 90% (Vuitton et al., 2020; Aji al et al., 2018; McManus al et al., 2012). HAE is sometimes known as "parasitic liver cancer" since it typically shows signs of malignant progression. HAE progresses slowly; it may take up to ten years. Although there is a substantial chance of recurrence, radical hepatic resection at the early and middle stages of the disease can produce excellent results (Wen et al., 2019). The only treatments available are liver transplantation or palliative medication therapy if the lesion spreads, in which case there is a significant risk of mortality (Giraudoux et al., 2013). The first organ impacted by a larval invasion is the liver. In seven out of ten instances, hepatic lesions are limited to the right hepatic lobe; in forty percent of cases, there is also involvement of the liver hilus. Out of 10 instances, only two have an infestation in both hepatic lobes (Kern et al., 2006). Usually, in the early stages of the infection, patients have no symptoms. Cholestatic jaundice and upper abdomen discomfort are possible initial symptoms. There is a five to fifteen-year incubation period (Heyd et al., 2000). In advanced stages of the disease, complications such as portal hypertension, bleeding esophageal varices and biliary obstruction have been reported. These complications are attributed to the invasive expansion of the E. multilocularis lesion in the liver (Craig et al., 2003). Endoscopic retrograde cholangiopancreatography (ERCP) is a commonly used treatment for biliary fistulae. Cystic echinococcosis, which is caused by E. granulosus, has an incidence of 1% to 25% and can result in biliary complications like intrabiliary rupture in conjunction with obstructive jaundice (Sezgin et al., 2005; Erzurumlu al et al., 2005). The rate of curative resection can only be increased by early discovery, which is verified by serologic markers and imaging techniques (Sharma et al., 2012; Buttenschoen al et al., 2009). endoscopic and percutaneous procedures as therapeutic alternatives for those for whom surgery has intolerable risks or for whom it is not possible to completely remove the AE lesion (Kern et al., 2000; Kern al et al., 2010).

An uncommon and dangerous parasite disease called human alveolar echinococcosis (AE) is caused by infection with the echinococcus multilocularis larval stage (Cakmak et al., 2013). When paired with the outcomes of immunodiagnosis (specific serology) and epidemiological data, imaging techniques including ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI), and 18F fluorodeoxyglucose (FDG)-positron emission tomography (PET) are used to diagnose AE lesions (Kern et al., 2017; Kratzer al et al., 2015). More precisely than ultrasonography, CT scans can show the characteristic calcifications and can also indicate the form, number, size, and location of lesions (Schweiger et al., 2012). When total resection is possible, early diagnosis is thought to be the most crucial aspect in improving the prognosis of HAE (Reuter et al., 2001). It is still debatable how to treat severe HAE, particularly when it comes to the need for aggressive procedures like orthotopic liver transplantation (OLT) and palliative resection (Farrokh et al., 2015; Kawamura al et al., 2011).

If the parasite mass can be removed completely, then curative surgery for AE may be possible. R0 resectability is more common at early stages. Because medical treatment alone produces excellent long-term effects, the usefulness of palliative surgery is questionable. Necrotic tissue, however, is susceptible to bacterial superinfection, which can result in sepsis that is potentially fatal. When alternative methods are ineffective for treating issues, palliative surgery becomes a viable choice (Qin et al., 2016).

2. Materials and Methods

A cross-sectional study was conducted at 1ST Affiliated Hospital of Xinjiang Medical University, Urumqi, Xinjiang, P.R China, which was performed between September 2018 and December 2023. The total number of patients in our study was 142. The number of Male patients in our study was 67 and female patients were 75. In 142 consecutive patients who underwent for blood tests and surgical Procedures. We took preoperative and postoperative blood tests for all operated patients. We took PNM staging for all patients and we took a brief history from all patients. Data was tabulated and analyzed by SPSS version 25

3. Results

Table 1: Mean value of different characteristics of all the enrolled patients (*n=142*)

Variables	Mean±SD
Age (Years)	37.32±13.90
Preoperative WBC	6.85±1.76
Preoperative NE	56.05±9.7
Preoperative HB	133.7±23.5
Preoperative Platelets	288.21±94.1
Preoperative protein	38.6±4.16
Preoperative T-Bil	17.17±25.2
Straight forward	6.39±14.12
Preoperative AST	40.40±53.06
Preoperative ALT	47.44±68.2
Operative time (mint)	345.38±132.8
Intra Operative blood loss (ml)	464.08±506.41
WBC on the 1ST day after surgery	15.52±4.57
HB on the 1ST day after surgery	120.29±26.14
Platelets on the 1ST day after surgery	263.55±271.13
AST on the 1ST day after surgery	399.63±420.0
ALT on the 1ST day after surgery	397.73±366.94
T BIL on the 1ST day after surgery	28.76±27.97
PROTEIN on the 1ST day after surgery	31.62±4.73
WBC on 3rd postoperative day	8.859±2.54
NE on 3rd postoperative day	75.11±7.11
HB on 3rd postoperative day	106.52±21.3
PLATELETS on 3rd postoperative day	205.69±70.72
AST on 3rd postoperative day	104.87±101.7
ALT on 3rd postoperative day	220.20±196.4
T BIL on 3rd postoperative day	28.13±28.56
PROTEIN on 3rd postoperative day	31.50±5.24

Post-Operative Time (days)	1.57±0.61
Extubation Time	8.49±8.1
Expenses (yuan)	68517.8±25742.6
Post-operative hospital stays	10.64±7.51

Total of 142 patients were enrolled with mean±SD age of 37.32±13.90. The mean±SD of Preoperative WBC was 6.85±1.76. The mean±SD of Preoperative NE was 6.85±1.76. The mean±SD of Preoperative HB was 1.33.7±23.5. The mean±SD of Preoperative Platelets was 288.21±94.1. The mean±SD of Preoperative protein was 38.6±4.16. The mean±SD of Preoperative T-Bil was 17.17±25.2. The mean±SD of straight forward was 6.39±14.12. The mean±SD of Preoperative AST was 40.40±53.06. The mean±SD of Preoperative ALT was 47.44±68.2.

The mean±SD of operation time (min) was 345.38±132.8. The mean±SD of Intra operative blood loss (ml) was 464.08±506.41. The mean±SD of WBC on the ist day after surgery was 15.52±4.57. The mean±SD of HB on the ist day after surgery was 120.29±26.14. The mean±SD of Platelets on the ist day after surgery was 263.55±271.13. The mean±SD of AST on the ist day after surgery was 3.99.63±420.0. The mean±SD of ALT on the ist day after surgery was 397.73±366.94. The mean±SD of T-BIL on the ist day after surgery was 28.76±27.97. The mean±SD of protein on the ist day after surgery was 31.62±4.73. The mean±SD of WBC on the 3rd postoperative day was 8.859±2.54. The mean±SD of NE on 3rd postoperative day was 75.11±7.11. The mean±SD of HB on 3rd postoperative day was 106.52±21.3. The mean±SD of platelets on 3rd postoperative day was 205.69±70.72. The mean±SD of AST on 3rd postoperative day was 104.87±101.7.

The mean±SD of ALT on 3rd postoperative day was 220.20±196.4. The mean±SD of T-BIL on 3rd postoperative day was 28.13±28.56. The mean±SD of Protein on 3rd postoperative day was 31.50±5.24. The mean±SD of Post-operative time (day) was 1.57±0.61. The mean±SD of Extubation time was 8.49±8.1. The mean±SD of Expenses in (Yuan) was 68517.8±25742.6. The mean±SD of Post-operative hospital stay was 10.64±7.51.

In all cases P-value was <0.05.

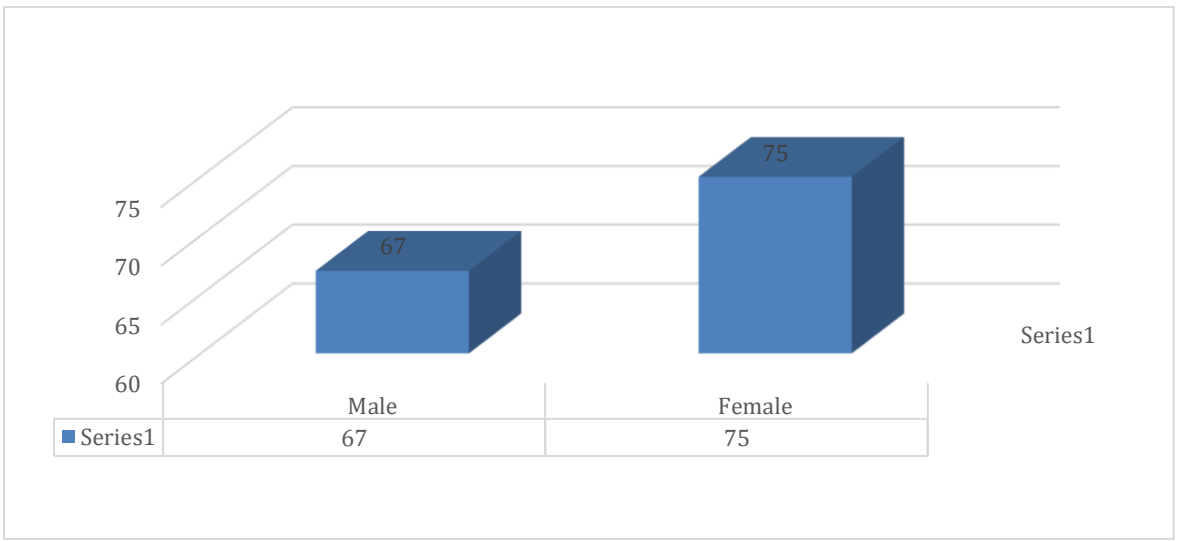

Figure 1: Bar graph showing gender distribution

Figure 1, Bar graph showing gender distribution in which female patients were 75 and male patients were 67. The total number of patients was 142 in our study. In this graph, female patients were more as compared to male patients.

Table 2: Patient characteristics of enrolled patients (n=142)

Variables		
Gender	Frequency	Percentage
Male	67	47.2
Female	75	52.8
Number of Lesions		
Nil	3	2.1
1	123	86.6
2	12	8.5
3	3	2.1
4	1	0.7
PNM Staging		
P1N0M0	21	14.8
P2N0M0	59	41.5
P3N0M0	29	20.4
P4N0M0	33	23.2
Jaundice before surgery	19	13.4
Post-operative complication	110	77.5
Abdominal/pelvic effusion		
not worn	98	68.3
puncture	43	30.3
conservative treatment	2	1.4
Pleural Effusion		
not worn	129	90.8
puncture	13	9.2
Survival	142	99.3
postoperative outcome		
Multiple bone metastases	1	0.7
Bile leakage	1	0.7
get better	136	95.8
liver transplantation	1	0.7
jaundice	1	0.7
Cholangitis	1	0.7
Smoking	5	3.5
Laparoscopy/laparotomy		
abdominal dissection	119	83.8
Laparoscopy	23	16.2

Patient characteristics of enrolled patients in Table 2 were (n=142). The frequency of male patients was 67 and its percentage was 47.2. The frequency of female patients was 75 and its percentage was 52.8. The frequency of number of lesion Nil was 3 and its percentage was 2.1. The frequency of number of lesions 1 was 123 and its percentage was 86.6. The frequency of number of lesions 2 was 12 and its percentage was 8.5. The frequency of number of lesions 3 was 3 and its percentage was 2.1. The frequency of number of lesions 4 was 1 and its percentage was 0.7.

The frequency of PNM staging P1N0M0 was 21 and its percentage was 14.8. The frequency of PNM staging P2N0M0 was 59 and its percentage was 41.5. The frequency of PNM staging P3N0M0 was 29 and its percentage was 20.4. The frequency of PNM staging P4N0M0 was 33 and its percentage was 23.2.

The frequency of Jaundice before surgery was 19 and its percentage was 13.4.

The frequency of Post-operative complications was 110 and its percentage was 77.5. The frequency of Abdominal / Pelvic effusion not worn was 98 and its percentage was 68.3. The frequency of Abdominal / Pelvic effusion puncture was 43 and its percentage was 30.3. The frequency of conservative treatment was 2 and its percentage was 1.4. The frequency of pleural effusion was not worn in 129 patients and its percentage was 90.8. The frequency of pleural effusion was puncture were in 13 patients and its percentage was 9.2.

The frequency of survival in our study was 142 and its percentage was 99.3.

The frequency of postoperative outcome in multiple bone metastases was 1 and its percentage was 0.7.

The frequency of postoperative outcome in bile leakage was 1 and its percentage was 0.7. The frequency of postoperative outcome in get better was 136 and its percentage was 95.8. The frequency of postoperative outcome in liver transplantation was 1 and its percentage was 0.7. The frequency of postoperative outcome in Jaundice was 1 and its percentage was 0.7. The frequency of postoperative outcome in smoking was 5 and its percentage was 3.5. The frequency of Laparoscopic / Laparotomy in abdominal dissection was 119 and its percentage were 83.8. The frequency of laparoscopy was 23 and its percentage were 16.2. In all cases, P-value was <0.05.

4. Discussion

Surgical planning with precision and accurate anatomical evaluation is important factors in choosing the most effective treatment for human hepatic alveolar echinococcosis (HAE). (Buttenschoen et al., 2009; Dong al et al., 2013).

Thus far, ultrasound, CT, and magnetic resonance imaging (MRI) have been the primary methods used for preoperative diagnosis and evaluation of hereditary anemia (HAE). An estimated assessment of the lesion position and a preliminary diagnosis are typically obtained through ultrasound examination. It is frequently necessary to use CT and MRI in conjunction with image post-processing techniques (such as CTA) to further diagnose and assess the invasion of conduits both inside and outside the liver by lesions. Due to the limited 2D presentation of these tests, surgeons must use their clinical expertise and understanding of liver anatomy to recreate 3D spatial images. The extent of lesions ultimately determines the surgical course of treatment (Chen et al., 2010; Fang al et al., 2010). Lesions from AEs nearly always occur in the liver. This infiltration into biliary and circulatory systems is clinically significant in addition to lesion size (Xie et al., 2013).

Despite the fact that radical resection was thought to be the best option for treating HAE, many cases were not identified until the lesion had progressed to the point where it was no longer possible to entirely remove it because of the lengthy clinical latency. There is disagreement over how to treat advanced HAE, particularly over the need for aggressive surgeries (Kawamura et al., 2011).

One of the causes for the decrease in intraoperative bleeding and blood transfusion was the ability to judge and recognize hepatic conduits with greater precision at the same time, allowing for a shorter operation duration. Patients' serum albumin levels varied between the two groups, although not significantly. The incidence of lesion recurrence and surgical complications (He et al., 2015).

5. Conclusion

Hepatic resection is considered safe and the only curative treatment for Hepatic alveolar echinococcosis (HAE), when the lesion can be removed completely. The advantages of this technique for alveolar echinococcosis (AE) treatment need to be compared further with the classical open approach. Laparoscopy appears as a feasible and safe approach for patients with PNM stages alveolar echinococcosis without impact on early disease recurrence. Hepatic alveolar echinococcosis will improve the treatment results by avoiding non-radical surgery associated with the development of complications after further radical surgical treatment. Liver resection remains the gold standard for alveolar echinococcosis (AE). In our study females were more as compared to males. PNM staging

of P2N0M0 patients was more in our study as compared to other stages. In our study, there was no major complication noted after the surgical procedure.

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