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Original Article

Surgery Section

Open Conservative Surgical Management of Cystic Echinococcosis in a Tertiary Care Hospital, Nepal

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ABSTRACT

Background: Cystic echinococcosis (CE) or hydatid disease caused by *E. granulosus* in Nepal is amenable to surgical treatment.

Aim: Aim of the study is to evaluate the efficacy of surgical treatment of CE, by open partial pericystectomy with albendazole as adjuvant.

Materials and Methods: Material of this prospective study were the consecutive series of 33 patients operated for CE, over a period of 8 years, at a single centre. Clinical examination, ultrasonography (USG) and computed tomography (CT) were used for establishing diagnosis. Patients were prescribed perioperative albendazole. Povidone iodine 10% (betadine) was used as contact scolicidal agent during operation. Cysts were evacuated from livers, lungs, retroperitoneum by partial pericystectomy. CE of mesentery was completely excised. Descriptive statistics was obtained using EPI- info windows version soft ware.

Results: A total of 33 patients were operated for CE; 24 were females and 9 males. Age ranged from 4 years to 80 years. Organs/ site involved were: liver – 24, lungs – 4, combined liver and lungs – 2, retroperitoneum - 2 and mesentery – 1. Complication – bile leak for 2 weeks in an operated CE of liver. There was no mortality. Hospital stay (in days) was – mean 14 (range 7to21). Follow up for 3 years (average 2years) showed no recurrence.

Conclusion: Evacuation of CE by partial pericystectomy is an effective, safe and simple procedure, and gives excellent cure rate with perioperative albendazole therapy.

Keywords: Albendazole, Betadine, CE, Partial pericystectomy

INTRODUCTION

E. granulosus lives as tapeworms in the intestine of dogs (definitive host), its eggs are excreted in feces. Larvae liberated from the ingested eggs form hydatid cysts (CE) mostly in the liver and lungs of men and grazing animals (intermediate host). In Nepal, a certain percentages of goats, sheep [1] buffaloes [2,3] and pigs [4] suffer from CE. Dogs are infested with *E. granulosus* as a result of eating their infected offal [5].

The cysts grow slowly and produce symptoms by compression. The cyst has an outer 1-2 mm thick white laminated membrane and an inner germinal membrane. Thickened host tissue surrounding the cyst forms the pericyst [6]. The laminated membrane separates out easily from the pericyst, so all that is needed for evacuation of the cyst is to simply open the pericyst or excise a small part of it (partial pericystectomy).

Objective of this study is to prove the efficacy of this conservative form of surgery.

MATERIALS AND METHODS

Material of this prospective study were the 33 consecutive patients, operated for CE (n = 33), at Manipal Teaching Hospital, Pokhara, Nepal, from Sep 2006 to Jul 2014. Ethics committee's permission and informed consent of patients were obtained before surgery. The inclusion criterion was cases of CE evacuated by open partial pericystectomy, with no prior history of surgery for CE. Diagnosis of CE were made clinically with the help of X-rays, USG and preoperatively validated by CT. Albendazole was administered perioperatively (400 mg bid for adults and 10mg/kg body weight for children 2 weeks before surgery and minimum 8 weeks after surgery) [7].

The operative field was isolated by betadine soaked packs. The cyst fluid was aspirated and replaced with betadine for a contact period of 10 minutes. After decompression, avoiding spillage, the laminated membrane and all cystic contents were evacuated by partial pericystectomy. Synchronous CE of right lung and right lobe of liver were evacuated by thoraco-phrenotomy in one patient, and synchronous CE of liver and left lung by thoracotomy plus laparotomy in another patient.

Closure of communications – cysto-bronchial communication present in two cases were closed per-operatively, cysto-renal communication present in one case was closed by a DJ stent insertion and the single cysto-biliary communication in the series closed spontaneously two weeks postoperatively.

Obliteration of residual cyst cavity – in lungs was done by capitonnage and in the liver mostly by omentoplasty or by intra-cavitary drain.

STATISTICAL ANALYSIS

All the patients diagnosed and operated for CE were included in the study (n=33). Descriptive and inferential statistics was obtained using EPI- info windows version software. Chi-square test was used to find out the relationship between the variables. A p-value less than 0.05 considered as statistically significant.

RESULTS

Number of patients operated for CE were 33 (n=33); 24 were females and 9 males (sex ratio 2.4:1). Age ranged from 4 to 80 years, median age being 37 year.

Organs/sites involved with CE were – liver-24 (72.73% with CI {57.54% , 87.92%}), lungs-4 (12.12% with CI {0.99%, 23.25%}), combined lung and liver-2 (6.06% with CI {0%, 14.2%}), retroperitoneum- 2 (6.06% with CI {0%, 14.2%}), mesentery-1 (3.03% with CI{0%, 8.88%}) Age, sex and organ involved with CE are given in [Table/Fig-1].

Clinical presentation –patients with CE of liver – 24 (100%) had discomfort in the right upper quadrant, 8 (33%) had mild and 4 (16.5%) had moderate to marked hepatomegaly. Patients with CE of lung – 4 (100%) had cough, mild chest pain and insignificant dyspnea. CE of retroperitoneum and mesentery presented as non tender abdominal lump.

Age Group →			01-10		11-20		21-30		31-40		41-50		51-60		61-70		71-80		Total	Chi-square vale	p-value
Sex →			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
Organs Involved	Liver (lobe)	Right	1	0	1	2	0	1	0	3	0	2	3	0	1	1	0	1	16	8.79	0.844
		Left	0	0	1	1	0	0	0	0	0	2	0	1	0	0	0	0	5		
		Both	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	3		
	Lung (lobe)	Right	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-	-
		Left	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1		
		Both	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1		
	Both Liver & Lung		0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	-	-
	Mesentery		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	-	-
	Retro-Mesentery		0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2	-	-
Total			2	1	2	5	0	5	0	4	0	4	3	3	2	1	0	1	33		

[Table/Fig-1]: Age, sex and organ distribution

Cysts – all cysts were solitary with average diameter being: hepatic – 15 cm (range 12 to 20 cm), pulmonary – 8 cm (range 6 to 10cm), retro-peritoneal and mesenteric – 10 cm (range 8 to 12cm).

Type of operations carried out is given in [Table/Fig-2]

Exposure + main operation		obliteration of residual cavity		closure of communication	
(Liver) Laparotomy + Evacuation of cyst	– 24	Capitonnage Drain Omentoplasty	– 2 – 4 – 18	cysto-biliary communication (closed spontaneously)	1
(Lungs) Thoracotomy + Cystotomies	– 4	Capitonnage Drain	– 1 – 3	cysto-bronchial communication (closed per-operatively)	2
(Combined right liver and right lung Thoraco phrenotomy)	– 1	Drain	– 1		
(Combined right liver and right lung Laparotomy + thoracotomy)	– 1	Drain	– 1		
(Retroperitoneum) Lumbar incision Excision of cyst	– 2			cysto-renal communication (closed by placing DJ stent 1)	1
(Peritoneum) Laparotomy and excision of cyst	– 1				
	33		30		3

[Table/Fig-2]: Operative procedures

Complications – There was bile leak for 14 days in a case of operated CE of liver. There was no mortality. There was no anaphylactic reaction, intra-operative hemorrhage, incomplete evacuation, wound infection or empyema. None needed blood transfusion. Mean hospital stay was – 14 days (range 7 to 21days). Follow up – The patients have been followed for a mean period of 24 months (range 12 to 36 months. No recurrence was detected.

DISCUSSION

Home slaughtering of domestic animals and feeding raw offal to domestic dogs is a common practice in Nepal due to poor economic condition. Thus 2-5% of domestic dogs are found infested with *E. granulosus* [5]. In Nepal, dogs are neither de-wormed nor killed. Slow growth of the cyst gives an asymptomatic incubation period of several years [8], so presenting symptoms are delayed and accounts for wide range of age (4 to 80 years in the series). Inexplicably, like in few other series [9-11] this series had female preponderance.

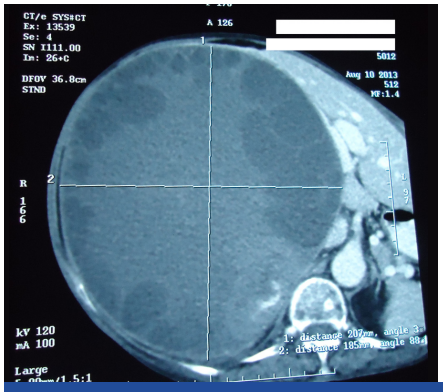
An important observation was that the patients of pulmonary CE had smaller cysts and were younger in age (all 4 cases were below 30 years), whereas patients with hepatic CE had large cysts [Table/Fig-3,4] and presented late (7 patents were between 31 -50 years and 9 were between 50 -80 years), features of presentation remained organ specific. Percentage wise distribution of organs involved in this series was similar to other series [7].

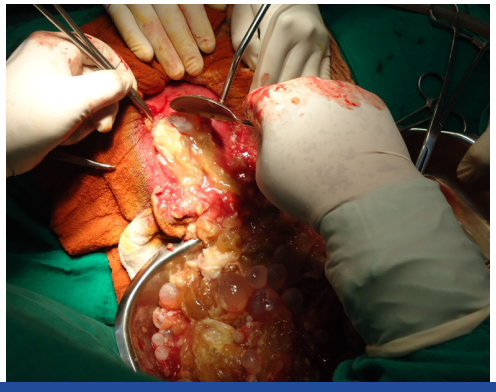
USG was essential, as diagnosis of CE on clinical ground alone has been difficult. Pre operative CT was done for all the cases (100%) for superior visualization and precise location of the cyst.

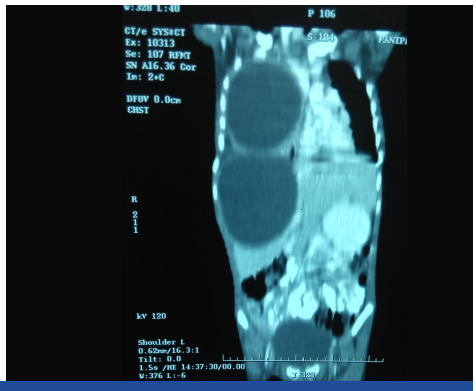
The treatment options, for CE are: 1) percutaneous treatment; 2) surgery; 3) anti-infective drugs; or 4) watch and wait [12]. Despite alternative procedures, open surgery remains the treatment of choice [12], for total cure of CE, by removal of the parasite entirely [13] and by closure of any communication. Omentoplasty was preferred for obliteration of residual cavity in liver [13].

After critical review of literature Butttenschoen K et al., opines that cystectomy and omentoplasty for hepatic CE should be the standard surgical procedure as it is safe, simple and effective, and meets all the criteria of surgical treatment for hydatid disease, and saves healthy tissue [13,14].

Thus partial pericystectomy was safely extended to one stage evacuation of cyst from right lung and right liver [Table/Fig-5] by thoraco-phrenotomy [15-18].







[Table/Fig-3]: CT showing multiple daughter cysts in a large CE of liver **[Table/Fig-4]:** Daughter cysts were removed using a spoon **[Table/Fig-5]:** CT shows involvement of both (R) lobe of liver and (R) lung Both lesions were removed by single stage thoracophrentomy

The second aim of the study was to prevent recurrence and secondary hydatidosis. Albendazole reduces incidence of recurrence [19] so was started 2 week preoperatively and continued for 8 weeks post operatively. Secondary hydatidosis was prevented by per operative use of betadine [20]. This is reflected in follow up of the cases for three years with no detected recurrence.

Endoscopic surgery is restricted to certain type of cysts and has less control over spillage, especially for pulmonary CE. Total pericystectomy avoids spillage but there is blood and tissue loss particularly in large cysts of liver. This form of radical surgery is for selected patient, fit for major surgery with cysts located away from major branches of the portal vein, hepatic vessels and large bile ducts [21]. In a series of 495 cases, closed total pericystectomy was done only in 21 cases (4.242 %) [21].

Compared to total pericystectomy, partial pericystectomy was found to be tissue sparing as only a small portion of the pericyst was excised. Safety and simplicity of open partial pericystectomy allowed dealing with cysts irrespective of the site or type.

Thus conservative surgery is the answer to a benign lesion like CE. We agree with Alexandra KT et al., that CE is a benign disease and therefore, its surgical treatment should be less radical and combined with pre and post operative anthelmintic [11]. An uncomplicated hydatid cyst of liver can be treated by evacuation, scolicidal irrigation and primary closure [22]. Management of uncomplicated hepatic hydatid cysts by conservative surgery with perioperative anthelmintic chemotherapy is as effective as radical surgical procedures but with much less morbidity being more simple and safe [23].

There was no mortality or significant complication in our series, showing that open conservative surgery is safe for CE. Economic constrains of the patients' precluded long follow up, a shortfall of this study.

CONCLUSION

Evacuation of hydatid cyst by partial pericystectomy is a simple and safe procedure and can be done on any type of cyst, an advantage over minimally invasive surgery. It scores over radical surgery in that it is tissue sparing and is not site specific. Albendazole prevents recurrence. Betadine is a safe scolicidal agent against secondary hydatidosis.

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