

Percutaneous Treatment of Hepatic Hydatid Cysts using Betadine and Hypertonic Saline

Vivek Patre¹, Vibha Patre², Anand Masih Lakra³, Shipra Sharma⁴, Rabia Parveen Siddiqui⁵, Harsh Shah⁶

¹Associate Professor, Department of Radiodiagnosis, Pt. JNM Medical College, Raipur, Chhattisgarh, India, ²Senior Registrar, Department of Radiodiagnosis, Pt. JNM Medical College, Raipur, Chhattisgarh, India, ³Associate Professor, Department of Anesthesia, Pt. JNM Medical College, Raipur, Chhattisgarh, India, ⁴Associate Professor, Department of General Surgery, Pt. JNM Medical College, Raipur, Chhattisgarh, India, ⁵Associate Professor, Department of Pathology, Pt. JNM Medical College, Raipur, Chhattisgarh, India, ⁶Post-graduate Student, Department of Radiodiagnosis, Pt. JNM Medical College, Raipur, Chhattisgarh, India

Abstract

Introduction: Hydatid disease of the liver is an endemic disease in the rural areas of the cattle rearing countries of the world like India. Many treatment options are available for the same including surgery and medical therapy. The introduction of modified puncture aspiration, injection of scolicidal agent, and reaspiration (PAIR) under sonographic guidance in recent years has provided a new treatment option.

Purpose: The purpose of this study was to evaluate the efficacy of percutaneous treatment of hepatic hydatid cysts under sonographic guidance using betadine (10% povidone iodine + 1% free iodine) and hypertonic saline (20%).

Materials and Methods: A total of 48 patients are having Gharbi Type I and II cysts underwent modified PAIR procedure under ultrasound guidance with the use of local anesthesia. 18G needle was used for the puncture of the cysts, and scolicidal agent was introduced. The scolicidal agents used were hypertonic saline in 24 patients and betadine in 24 patients which was allowed to act for a period of 30 min. The cysts were allowed to drain using a pigtail catheter which was left *in situ*. The patients were followed up for a period of 12 months. The therapeutic response was assessed by using serial ultrasound scans in all patients every 3 months for 1 year. Reduction in size, pseudomass formation, and wall calcification were used as assessment parameters.

Results: Reduction in size, pseudomass formation, and wall calcification was seen in 46 patients. Two patients treated using hypertonic saline showed recurrence at 6 months who were then treated with betadine.

Conclusion: Modified PAIR therapy is a cost-effective, safe, well tolerated, and minimally invasive treatment for the treatment of Gharbi Type I and Type II hepatic hydatid cysts. The betadine is a preferred scolicidal agent compared to hypertonic saline.

Key words: Echinococcosis, Hepatic, Hypertonic saline solution, Povidone-iodine, Ultrasonography

INTRODUCTION

Cystic echinococcosis is an infestation caused by the larval form of *Echinococcus granulosus* which is an endemic disease found in the cattle rearing areas of South East Asia namely India.¹ The clinical features of the disease depend on factors such as the size and site of

the cyst. The patients can be asymptomatic or present with abdominal fullness or vague abdominal pain.^{2,3} Surgical management in the form marsupialization and tube drainage, omentoplasty, or hepatectomy was the mainstay of treatment.⁴ Medical management with benzimidazole compounds proved to be effective against the larval forms. Reports of accidental puncture of cysts without any complications led to the development of the percutaneous treatment with the use of scolicidal agent.⁵ In the year 1985, Mueller *et al.* first reported percutaneous treatment of hepatic hydatid cysts.⁶ Subsequently, puncture-aspiration-injection-reaspiration (PAIR) was recommended by the WHO as an alternative method to surgery.⁷ In recent years percutaneous drainage of hepatic hydatid cysts has emerged as a cost-effective, safe, well

Access this article online



www.ijss-sn.com

Month of Submission : 07-2015
Month of Peer Review : 08-2015
Month of Acceptance : 08-2015
Month of Publishing : 09-2015

Corresponding Author: Dr. Vivek Patre, Department of Radiodiagnosis, Pt. JNM Medical College, Raipur - 492 001, Chhattisgarh, India. Tel.: 91-771-2889161, Fax: 91-771-2523919, Phone: 91-9329399994. E-mail: vivek_patre@yahoo.com

tolerated, and minimally invasive treatment with lack of serious complications like death.^{2,5,8-11}

The purpose of this study was to determine the effectiveness of modified PAIR therapy using hypertonic saline and betadine (povidone-iodine) as scolicidal agents.

MATERIALS AND METHODS

Patient Selection

The study was carried out from March 2004 to July 2015 in the Department of Radio-Diagnosis, Pt. JNM Medical College, Raipur, India. Inclusion criteria were patients having single or multiple Gharbi Type I (Figure 1) and Type II hepatic hydatid cysts of size more than 5.0 cm. Exclusion criteria were patient unwilling for treatment, Gharbi Type III-V, cysts with biliary communication, and inaccessible cysts. The total of 48 patients underwent the procedure during this period after undertaking a written and informed consent. 20 were female, and 28 were male in the age group of 12-65 years. 35 cysts were Gharbi Type I and 13 cysts were Gharbi Type II. The cyst diameter varied between 5 and 13 cm with average cyst size being 7.3 cm. 38 cysts were in the right lobe while 10 cysts were in the left lobe. 37 patients presented with abdominal pain, 6 patients presented with abdominal discomfort, 2 patients presented with breathing difficulty while 3 patients were asymptomatic.

Procedure

The diagnosis was established using ultrasound machine (Prosound-4000, Aloka, Japan and Aplio-MX, Toshiba, Japan) and serological tests namely ELISA and classification of the hepatic hydatid cysts was done using Gharbi classification. By this classification, Type I cyst refers to a simple cyst without septae, floating membranes, and daughter cysts, Type II cyst refers to a cyst with floating membranes; Type III cyst is a hydatid cyst with daughter cysts, Type IV cyst is a cyst with internal echoes and solid areas, and Type V cyst refers to areas of calcification in the cysts. Communication with the biliary tree was ruled out by examining the cyst fluid for bile pigments and salts. Routine hemogram and liver function tests were performed prior to the procedure. Prophylactic oral albendazole 400 mg twice daily was started 7 days prior to the procedure for all patients to avoid anaphylaxis. Oral albendazole was continued for a period of 1 month after the procedure. After an overnight fast for at least 6 h patients underwent sonographic evaluation for ascertaining the depth of the cyst. Before starting the procedure, emergency tray containing drugs such as adrenaline, atropine, hydrocortisone, and chlorpheniramine maleate was kept ready for anaphylaxis in the form of laryngeal

edema, asthma, hypotension, or shock. After administering local anesthetic (2% lignocaine), the hepatic cysts were punctured using 18 gauge needle (Figure 2) and fluid was aspirated using 8 French or 10 French pigtail catheter (Blue Neem, India) leaving behind only a small amount of fluid to visualize the catheter tip. The aspirated fluid was examined for bile pigments and salts to rule out biliary communication. The scolicidal agent (20% hypertonic saline used in 24 patients and 10% betadine used in 24 patients) was injected into the cyst and left *in situ* for 30 min after clamping the catheter (Figure 3). The scolicidal agent injected was two-thirds of the aspirated volume. The scolicidal agent was reaspirated after 30 min, and the pigtail was left *in situ* (Figure 4). Vital monitoring was done during the entire procedure and for 24 h after the procedure for any feature of anaphylaxis. The catheter was connected to a drainage bag and removed after the 24 h aspirate was <20 ml which was in the range of 2-7 days. The entire procedure lasted for a range of 35-50 min. The patients were followed up for 1 year by ultrasound examination in every 3 months.



Figure 1: Gharbi Type I hepatic hydatid cyst

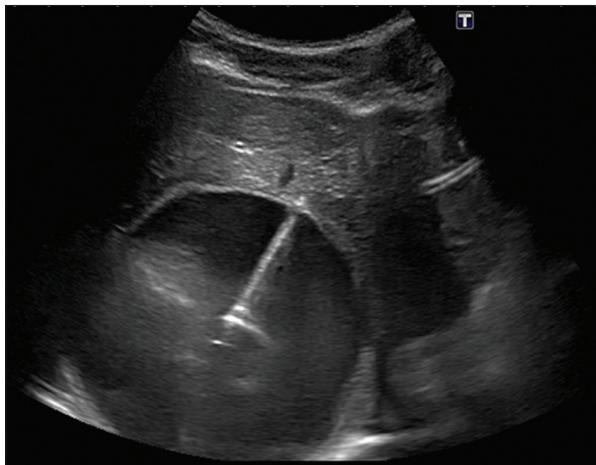


Figure 2: Puncture needle within the cyst

RESULTS

All the 48 patients showed a response to treatment at 3 months follow-up sonography in the form of a reduction in the size



Figure 3: Injection of scolicidal agent producing internal echoes using pigtail drainage catheter



Figure 4: Pigtail catheter *in situ* post reaspiration



Figure 5: Pseudomass formation at 3 months follow-up

of the cyst. The average size of the cysts after 3 months was 3.5 cm in diameter. Resolution of the presenting symptoms of abdominal pain, abdominal discomfort, and breathlessness was noted in all the patients at the end of 3 months. 41 patients at 6 months follow-up showed pseudomass formation (Figure 5) while 5 patients showed wall calcification. Two out of the 24 patients treated using hypertonic saline as a scolicidal agent showed recurrence on 6 months follow-up sonography. They were subsequently treated using betadine as a scolicidal agent. No recurrence was noted in them on follow-up sonography, and pseudomass formation was noted at the end of 6 months. 37 patients showed wall calcification at the end of 1 year on sonography. Further reduction in cyst size was noted in all patients at the end of 1 year with the average size of 2.6 cm. A hospital stay of the patients ranged from 2 to 9 days with an average stay of 5 days. Severe complications like anaphylaxis and death were observed in none of the patients. Pain at the injection site was the most common complication noted in 17 patients which was managed using non-steroidal anti-inflammatory drugs. Febrile illness was noted in 9 patients which was managed using intravenous ceftriaxone for a period of 3 days (Table 1).

DISCUSSION

The hydatid disease is an endemic disease in the cattle rearing areas of South-East Asia namely India and is a major health problem. Until recent times, surgery has been the preferred modality for hepatic hydatid cysts. However, surgery is associated with mortality in up to 6% of the cases.¹² Recurrence rates after surgery has been reported to be from 2% to 25%.¹³⁻¹⁵ Minimally, invasive methods such as PAIR along with oral anti-helminthic therapy is effective with better outcome than surgery in the Gharbi Type I and II cysts with the added advantage of less morbidity, cost effectiveness, and reduced hospital stay. In our study, we classified hepatic

Table 1: Injections of Scolicidal Agent

Parameters	Scolicidal agent		Total
	Betadine	Hypertonic saline	
Appearance of cysts			
At 3 months			
Reduction in size	24	24	48
At 6 months			
Pseudomass formation	23	18	41
Wall calcification	3	3	6
Recurrence	-	2	2
At 12 months			
Reduction in size	24	24	48
Wall calcification	20	17	37
Recurrence	-	-	-
Complications			
Pain at injection site	9	10	19
Febrile illness	1	7	8
Hospital stay (average)	4.6 days	5.4 days	5 days

hydatid cysts sonographically using Gharbi classification¹⁶ and treated Gharbi Type I and II cysts. We performed the procedure under sonographic guidance using the transhepatic route for the puncture with the help of a 18G needle. The pigtail catheter was introduced and left *in situ* for the purpose of aspiration, injection, and reaspiration. Various scolicidal agents have been used by various investigators such as 20% hypertonic saline, 95% alcohol, betadine (10% povidone iodine; 1% free iodine).¹⁷⁻¹⁹ WHO recommends the use of hypertonic saline as a scolicidal.⁷ In this study, both 20% hypertonic saline and betadine were used in a randomized manner in an equal number of patients. We observed a reduction in the cyst size in all the patients at 3 months follow-up. It was noted that 2 patients treated with hypertonic saline showed recurrence at the end of 6 months. They were subsequently treated with betadine which showed no recurrence. All the patients treated using betadine showed no recurrence. At the end of 1 year follow-up, all the patients showed a reduction in cyst size while pseudomass formation was noted in 43 patients and wall calcifications in 37 patients. Thus, betadine was 100% effective whereas hypertonic saline was 92% effective which led us to conclude that betadine was a better scolicidal agent. In our study, oral albendazole 400 mg twice daily was administered to all the patients before the procedure and continued for a period of 1 month after the procedure to prevent anaphylaxis and recurrence. Many studies show that modified PAIR is as effective as surgery with lower complication rates.^{11,20-22}

CONCLUSION

Results show that modified PAIR therapy is cost effective, safe, well tolerated, and minimally invasive treatment of Gharbi Type I and II hepatic hydatid cysts with a reduction in hospital stay. In our study, we also concluded that betadine is a better alternative to hypertonic saline.

REFERENCES

- Ustünsöz B, Akhan O, Kamiloglu MA, Somuncu I, Ugurel MS, Cetiner S. Percutaneous treatment of hydatid cysts of the liver: Long-term results. AJR Am J Roentgenol 1999;172:91-6.

How to cite this article: Patre V, Patre V, Lakra AM, Sharma S, Siddiqui RP, Shah H. Percutaneous Treatment of Hepatic Hydatid Cysts using Betadine and Hypertonic Saline. Int J Sci Stud 2015;3(6):99-102.

Source of Support: Nil, **Conflict of Interest:** None declared.

- Aygün E, Sahin M, Odev K, Vatansev C, Aksoy F, Paksoy Y, et al. The management of liver hydatid cysts by percutaneous drainage. Can J Surg 2001;44:203-9.
- Schipper HG, Laméris JS, van Delden OM, Rauws EA, Kager PA. Percutaneous evacuation (PEVAC) of multivesicular echinococcal cysts with or without cystobiliary fistulas which contain non-drainable material: First results of a modified PAIR method. Gut 2002;50:718-23.
- Ekrami Y. Surgical treatment of hydatid disease of the liver. Arch Surg 1976;111:1350-2.
- Akhan O, Ozmen MN, Dinçer A, Sayek I, Göçmen A. Liver hydatid disease: Long-term results of percutaneous treatment. Radiology 1996;198:259-64.
- Mueller PR, Dawson SL, Ferrucci JT Jr, Nardi GL. Hepatic echinococcal cyst: Successful percutaneous drainage. Radiology 1985;155:627-8.
- Department of Communicable Disease, Surveillance and Response. Bulletin of WHO on PAIR therapy. Vol. 74. 1996. p. 213-42.
- Yasawy MI, Mohammed AE, Bassam S, Karawi MA, Shariq S. Percutaneous aspiration and drainage with adjuvant medical therapy for treatment of hepatic hydatid cysts. World J Gastroenterol 2011;17:646-50.
- Khuroo MS, Zargar SA, Mahajan R. *Echinococcus granulosus* cysts in the liver: Management with percutaneous drainage. Radiology 1991;180:141-5.
- Polat KY, Balik AA, Oren D. Percutaneous drainage of hydatid cyst of the liver: Long-term results. HPB (Oxford) 2002;4:163-6.
- Rajesh R, Dalip DS, Anupam J, Jaisiram A. Effectiveness of puncture-aspiration-injection-reaspiration in the treatment of hepatic hydatid cysts. Iran J Radiol 2013;10:68-73.
- Dawson JL, Stamatakis JD, Stringer MD, Williams R. Surgical treatment of hepatic hydatid disease. Br J Surg 1988;75:946-50.
- Lewis JW Jr, Koss N, Kerstein MD. A review of echinococcal disease. Ann Surg 1975;181:390-6.
- Balasegaram M, Kong LF. Surgical treatment of hydatid disease of the liver. Trop Gastroenterol 1982;3:194-200.
- El Mufti M. The simple hydatid cyst. In: Surgical Management of Hydatid Disease. London: Butterworths; 1998. p. 31-107.
- Gharbi HA, Hassine W, Brauner MW, Dupuch K. Ultrasound examination of the hydatid liver. Radiology 1981;139:459-63.
- Saremi F, McNamara TO. Hydatid cysts of the liver: Long-term results of percutaneous treatment using a cutting instrument. AJR Am J Roentgenol 1995;165:1163-7.
- Acunas B, Rozanes I, Celik L, Minareci O, Acunas G, Alper A, et al. Purely cystic hydatid disease of the liver: Treatment with percutaneous aspiration and injection of hypertonic saline. Radiology 1992;182:541-3.
- Keshmiri M, Baharvahdat H, Fattahi SH, Davachi B, Dabiri RH, Baradarani H, et al. Albendazole versus placebo in treatment of echinococcosis. Trans R Soc Trop Med Hyg 2001;95:190-4.
- vanSonnenberg E, Wroblecka JT, D'Agostino HB, Mathieson JR, Casola G, O'Laoide R, et al. Symptomatic hepatic cysts: Percutaneous drainage and sclerosis. Radiology 1994;190:387-92.
- Giorgio A, Tarantino L, de Stefano G, Francica G, Mariniello N, Farella N, et al. Hydatid liver cyst: An 11-year experience of treatment with percutaneous aspiration and ethanol injection. J Ultrasound Med 2001;20:729-38.
- Paksoy Y, Odev K, Sahin M, Arslan A, Koc O. Percutaneous treatment of liver hydatid cysts: Comparison of direct injection of albendazole and hypertonic saline solution. AJR Am J Roentgenol 2005;185:727-34.