A PROSPECTIVE STUDY ON DIAGNOSIS AND MANAGEMENT OF LIVER ABSCESS

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ABSTRACT

BACKGROUND

Though Liver abscess was described as early as 460-377 B.C. by Hippocrates, it still remains a challenging situation. India has 2nd highest incidence of liver abscess in the world. The rising incidence in alcoholics, diabetics & immunocompromised individual has become a matter of grave concern as complication rates are high especially in this sub-group leading to increased morbidity and mortality. Liver abscesses is, even to-day, considered a 'desperate disease' and it is no wonder that many 'desperate' measures have been tried to cure this condition. As more advanced facilities for investigation are now available, a more concrete picture of liver abscesses is slowly evolving. Much work, however, remains to be done. The story has not ended: it has only just begun. The aim of this study is to evaluate various clinical presentations and treatment modalities of liver abscess.

MATERIALS AND METHODS

Patient data will be collected from all patients attending Govt. Royapettah Hospital General Surgery OPD, Casualty and Inpatient department, irrespective of their age/gender/background/socio economic status. Detailed history of patients will be entered in proforma. Complete haemogram, liver function test (LFT), prothrombin time, stool for ova, cyst, serology for amoebic antigen will be sent immediately on presentation. Preliminary Ultrasound (USG) of Abdomen and Pelvis will be done on the same day of presentation. These patients will be evaluated and followed up according to protocol.

RESULTS

This study is based on the reports of 60 patients treated for liver abscess, most common age group affected by Liver abscess was between 41-50 years. The most common symptom was fever, followed by pain abdomen. The right lobe was more commonly affected. Multiple small abscesses and solitary abscess with volume less than 50 ml were managed successfully on conservative antimicrobial therapy alone.

CONCLUSION

Since the Pearson correlation coefficient value is 0.304, there is a positive correlation between both Hospital stay duration and Complication. Also, if less than 50 ml, can be managed conservatively.

KEYWORDS

Amoebic, Pyogenic, Alcoholic, Drainage.

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BACKGROUND

Hippocrates described about liver abscess in 460-377 B.C., still it remains challenging situation because of its highly variable presentation, leading to diagnostic difficulties. Tropical country like India has 400 million people harbouring E. histolytica that causes amoebic liver abscess, it requires immense importance for thorough understanding of the same.

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Among the developing countries worldwide, India has 2nd highest incidence of liver abscess. Liver abscess is term for collection of purulent material in liver parenchyma which is due to bacterial, fungal, parasitic or mixed infection. Among all, pyogenic abscesses accounts for four fifth of liver abscess in developed countries, whereas amoebic liver abscess accounts for two third of liver abscess in developing countries.[1]

Amoebiasis is presently the third most common cause of death from parasitic disease. The condition is endemic in India because of overcrowding and poor sanitary condition. 3–9% of all cases of amoebiasis produce liver abscess. However, other aetiologies like pyogenic and tubercular should always be entertained in the differential diagnosis colonic amoebiasis as the antecedent source of liver abscess, provided the basis for management of amoebic liver abscess. Early treatment with open surgical drainage alone had limited success rate. Efforts to treat both liver abscess and colonic infestation improved the success rate.

Systemic amoebicidal agents along with USG guided closed aspiration is the treatment of choice. The present laparoscopic era has reduced the open procedure. Surgical Management was the mainstay for treating LA earlier. However, recent evidences from percutaneous drainage procedure have shown a favourable outcome with less average length of stay in hospital compared to conservative mode of treatment.[2] The concept of the present study was to evaluate the changing trends in clinical profile, microbiological aetiology, and management outcomes of patients diagnosed with LA.

Aims and Objectives

1. To study the demographic profile.
2. To study the risk factors associated with liver abscess.
3. To study the microbiological diversity in liver abscess.
4. To study the spectrum of clinical presentation.
5. To evaluate efficacy of ultrasonographic studies in determining the aetiology which may change the treatment outcome.
6. To study the effectiveness of different modes of management.

MATERIALS AND METHODS

This will be a Clinical Prospective Study of 60 patients done at KMCH between January to September 2016.

Methods of Collection of Data (Including Sampling Procedure)

A. Study Design- Prospective Cohort study.
B. Place of study- Govt. Kilpauk Medical College and Hospital, Chennai.
C. Study sample size- $N = Z^2 P(1-P)/ d2 = 60$ with 95% confidence interval z value is taken as 1.96
   P = Proportion of people with amoebic liver abscess / alcoholism 70%
   D = Absolute error 12%
   So, applying these variables in the formula sample size is 60.
D. Study period of - 9 months (January to September)
E. Selection criteria- First 60 Patients admitted during the period of study.

Source of Study

All Patients of liver abscess presenting to the surgery OPD or Casualty of Royapettah Hospital. Referred from medical wards of Royapettah hospital or referred from outside diagnosed as case of liver abscess clinical /Sonological /CT/MRI features of liver abscess.

Inclusion Criteria

All cases of liver abscess diagnosed clinically and/or ultrasonographically.

Exclusion Criteria

Traumatic Liver Abscess
Past history of liver abscess.

Method of Collection of Data

- 60 eligible patients are chosen.
- Clinical assessment done at time of inclusion in the study.
- Detailed history and examination done.
- Diagnosis to be confirmed by ultra-sonogram of abdomen.
- Pus drained will be sent for culture and sensitivity appropriate antibiotic coverage will be given.
- Basic routine investigations and coagulation profile will be done.
- Consent will be obtained for inclusion under study
- Patients will be followed up daily clinically and LFT & USG Abdomen will be repeated on the 3rd day if patient is symptomatically not relieved.
- Repeat Ultrasound / CT /MRI Abdomen & pelvis will be done immediately if patients condition does not improve/worsens or after 3-4 days as a routine as a prognostic factor.
- If the patient develops any of the complications like ruptured liver abscess into any of the serosal cavity, will be immediately taken up for surgery.
- Patient informed about any surgical procedure and consent will be obtained.

Diagnostic Criteria

All the patients had several investigations required to approach the diagnosis and they were diagnosed as amoebic or pyogenic liver abscess. Basically, USG abdomen, serology and pus c/s were done. Serology positive and USG characteristics of smooth wall homogenous with no internal echoes and superficial solitary abscess were grouped as amoebic. Serology negative and pus c/s negative case with USG characteristics of amoebic abscess were also considered as amoebic abscess.

Lung Involvement

X-ray chest PA view was taken in all cases. X-ray findings of right pleural effusion, presence or absence of cough with expectorations were considered as positive.

Treatment Given

Cases with abscess cavity <5 cm were treated by drug therapy alone. Failures to relieve symptoms within 3 to 4 days were treated by percutaneous aspiration. Those with abscess cavity >5 cm, were treated either by percutaneous aspiration or by percutaneous catheter drainage. Bilateral abscess cavities that were small and multiple were managed by medical therapy and when any one of the cavity is >5 cm, it was managed by percutaneous aspiration. Abscess cavities restricted to left lobe were treated by drug therapy if they were multiple and <5 cm; if >5 cm and single were managed either by percutaneous aspiration or by laparoscopic drainage. Those abscess cavities that were >10 cm or with chances of impending rupture in segment III, IV, V, VI were managed by laparoscopic drainage.

Medical Treatment Strategy Followed Was

Abscess cavities that were <5 cm were treated by Tab. Metronidazole 800 mg for 10 days. Patient was on i.v metronidazole for three days initially or till the fever subsided. Later oral metronidazole is given and percutaneous aspiration was done and continued if patient had persisting symptoms after 3 to 4 days of aspiration.

Percutaneous Aspiration

Patients with abscess cavity >5 cm were treated either by percutaneous aspiration or PCD. Multiple abscesses and the abscess fail to respond with medical treatment were percutaneously aspirated. Under USG guidance it is done by using 16G or 1 8G aspiration needle or 3-way adopter as a single prick. First, aspiration was done followed by drugs. If symptoms are not decreasing after 3 days, do repeat USG and assess the cavity size. If the cavity is increasing in size or not decreasing do 2nd aspiration and continue drug therapy. If the symptoms are not subsided by 7th post-aspiration day and USG showed the cavity is not decreasing or increasing in size, consider PCD or laparoscopic drainage.

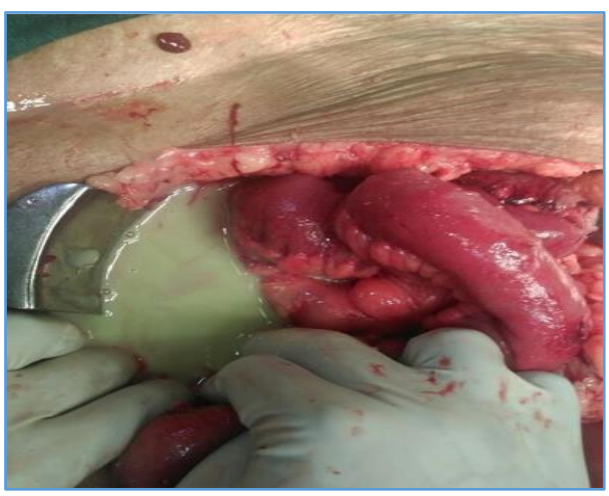

Figure 1. Laparotomy for Ruptured Abscess

Figure 2. Pigtail Drainage

Removal of PCD

1. If the Quantity is less than 30 ml /8 hrs.
2. IF the drainage is not purulent.
3. USG and cavitogram were done to assess the cavity size. Note down the decrease in size of the cavity and the PCD can be removed.

Laparoscopic Drainage

Patients with large abscess greater than 10 cm and large abscess that was located in the left lobe of liver not amenable to percutaneous drainage were treated by laparoscopic catheter drainage. Smaller 16 /14 F Foley's used for abscess drainage and the same criteria of removal similar to that of PCD was employed.

RESULTS

The following observations were made in this study.

Age	Male		Female		Total	
Group	**No.**	**%**	**No.**	**%**	**No.**	**%**
0-30	9	17.64	1	11.11	10	16.66
31-40	9	17.64	1	11.11	10	16.66
41-50	15	29.4	4	44.44	19	31.66
51-60	13	25.49	3	33.33	16	26.66
61 yrs.	5	9.8	0	0	5	8.33
Total	**51**	**100**	**9**	**100**	**60**	**100**

Table 1. Age And Sex Distribution

The mean age distribution of the study group is 45.34 with youngest patient at 21 years of age and oldest patient being 66 years of age. It is more common in males (85%) than females (15%). The commonest age group for liver abscess was 41-50 yrs. (31.66%) followed by 51-60 (26.66%).

Symptoms	No. of Patient	Percentage
Fever	45	75
Abdomen pain	44	73.33
Jaundice	27	45
Cough	2	3.33
Diarrhoea	8	13.33
Altered sensorium	1	1.66

Table 2. Presenting Symptoms

The commonest symptom was fever (75%) then by abdomen pain (73.33%), Jaundice was present in 45%, diarrhoea occurring in 13.33%, cough in 3.33% and altered sensorium 1.66%.

Signs	No. of Patient	Percentage
Fever	45	75
Icterus	27	45
Pallor	6	10
Hepatomegaly	20	33.33
Abdominal tenderness	32	40
Respiratory findings	3	3.75

Table 3. Signs

The most common sign was fever which was present in 75% patients, 40% of patients had abdominal tenderness at the time of diagnosis and 32.5% patients had hepatomegaly, 45% of patients had icterus, pallor was present in 10% of patients and respiratory findings in 3.75% of patients which include right pleural effusion, basal crepitations.

Onset	No. of Patient	Percentage
Short duration <10 days	29	48.33
Long duration	31	51.66
Table 4. Duration of Stay (Morbidity)		

Alcoholism	No. of Patient	Percentage
Alcoholic	39	65
Non-alcoholic	21	35
Table 5. Correlation between Alcoholism and Amoebic Liver Abscess		

Investigation	No. of Patient	Percentage
Anaemia (Hb<10 gm%)	6	10
Leucocytosis (>12,000 c/cmm)	41	68.33
Diabetic (RBS >200 mg/dl)	12	20
Raised urea (>60 mg/dl)	7	11.66
Table 6. Lab Parameters		

Haemoglobin less than 10 gm% was found in 6 cases (10%), lowest haemoglobin noted in this series was 7.6 gm%.

Leucocytosis of more than 12,000 cells/cumm was present in 41 patients (68.33%). The highest count noted in this study was 22,000 cells/cumm. 1/5th (20%) of patients were found to be diabetic.

Raised urea (>60 mg/dl) was found in 7 cases (11.66%).

	No. of Patients	Percentage
Hypoalbuminemia	6	10%
Hyperbilirubinemia	33	55%
Raised ALP	31	51.66%
Abnormal	4	6.6%
Prothrombin time		
Table 7. Abnormal LFT		

Location	No. of Patient	Percentage
Right lobe	47	78.33
Left lobe	6	10
Both lobes	7	11.66
Total	**60**	**100**
Table 8. Anatomical Location of Abscess		

Ultrasonogram examination was done in all cases.

Number	No. of Patient	Percentage
Solitary	49	81.66
Multiple	11	18.33
Total	**60**	**100**
Figure 9. Solitary/Multiple Abscess		

Organism	No. of Patient	Percentage
No growth/ Anchovy sauce	36	87.8%
Gram –ve	3	7.31%
Staph aureus	2	4.87%
Total	**41**	**100%**
Table 10. Pus Culture Analysis		

In this study 41 cases were subjected to invasive treatment. Out of 41 cases, 36(87.8%) had "Anchovy sauce" appearance of the pus and revealed no growth. While growths were obtained in 5 (12.1%) of these cases, gram –ve organisms grown in 3 cases (7.3%) and staph aureus in 2 cases (4.8%).

Treatment	No. of Patient	%
Conservative	19	31.66
Aspiration/pigtail drainage	31	35
Laparotomy	5	8.33
Laparoscopic abscess drainage	5	8.33
Total	**60**	**100**
Table 11. Treatment Analysis		

Of 60 cases, with liver abscess, the volume is <50 cc is 19 cases (31.66%) were treated conservatively and those with volume >50 cc were treated by USG guided aspiration is 30 cases (51.66%). 5 cases were treated by Laparotomy and 5 cases by laparoscopic abscess drainage. Abscess ruptured into peritoneal cavity in 5 cases hence laparotomy done. Pus was completely drained out and sent for microbiological examination, peritoneal toilet was given.

Complications	No. of Patient	Percentage
Ruptured into peritoneal cavity	5	8.33
Pleural effusion	2	3.33
Septicaemia	1	1.66
Table 12. Complications		

Total patient with liver abscess	60
Surviving	59
Death due to liver abscess	1
Table 13. Mortality Rate	

DISCUSSION

Age and Sex Incidence

The age of the patients varied from 21– 66 years. The mean age was 45.34 yrs. which is in accordance to studies like by Sharma et al and Mukhopadhyay et al who reported it to be 40.5 and 43.64 years, respectively. The highest incidence was noted in the age group 41-50 years of age (31. 66%) followed by 51-60 years of age (26.66%) yrs. in this study

Indian data show predominant male involvement; Sharma et al. and Mukhopadhyay et al. reported male to female ratio to be 7: 1 and 11: 1, respectively. However, Pang et al. and Heneghan et al. reported it to be 2: 1 and 1.22:1, respectively.

Symptoms	Study	Sharma et al
	No. of Cases (%)	Percentage
Fever	45 (75)	94
Pain abdomen	44 (73.3)	90.6
Jaundice	27 (45)	12.7
Cough	2 (3.33)	3.5
Signs		
Fever	45(75)	95
Icterus	27(45)	24

Abdominal		42
Tenderness	32 (53.33)	
Hepatomegaly	20 (33.33)	39
Respiratory finding	3 (5)	37

Table 14. The Comparison of Symptoms and Signs in Present Study with Literature

The frequency of fever and pain abdomen is 67-87% and 62-94% of patients with amoebic liver abscess respectively in different series. In our study, these two symptoms of fever and pain abdomen occurred in 75% and 73.33% respectively. From India, Sharma et al in a study of 70 cases of amoebic liver abscess found hepatomegaly in 84%, pleural effusion in 10% and ascites in 4% cases.[3] In contrast, hepatomegaly (33.33%) was not a predominant feature of amoebic liver abscess in our study.

Duration of Symptoms

The onset of the disease is subjected to great variations depending upon the type, location and quantity of liver abscess; it may be acute, insidious, clinically undetectable or fulminant form. In this present study acute onset <10 days was seen in 48.33 months and 51.66% with the chronic presentation of liver abscess. Duration of symptoms longer than 2 weeks is seen in 14-41% in different series. In a study of amoebic liver abscess by Amarapurkar and colleagues of 131 patients, the duration of symptoms less than 2 weeks was seen in 83.9% of cases. According to Maingot's abdominal operations, most patients of liver abscess manifest symptoms for less than 2 weeks but a more indolent course occurs in 1/3rd of the patients.[3,2,4]

Alcoholism in Cases of Liver Abscess

Alcoholism was found to be the most consistent etiological factor in this study of liver abscess. 65% of the cases of this study were found to be alcoholics. The presence of alcoholism as a risk factor was noticed in many studies. In Indian culture almost all the alcoholics are males. The age predisposition and gender differences may be as a result of high alcohol intake by young male which predisposes to ALA. Alcohol suppresses function of Kupffer cells (specialized macrophage) in liver which has important role in clearing amoeba. Moreover, invasive amoebiasis appears to be dependent on the availability of free iron. A high content of iron in the diet, often obtained from the country liquor in habitual drinkers predisposes to invasive amoebiasis, as does a diet rich in carbohydrate.[2,4]

Analysis of Laboratory Investigations

10% of patients were found to be anaemic (Hb<10gm /dl) in our present study. The mean Hb of the patients in this study was 10.4 gm/dl with a range 8.8-13.6 gm%. According to Bhagwansatiani and Eugene D. Davidson, anaemia was present in 39% of cases. There is less literary evidence suggesting anaemia is a predisposing factor for liver abscess. Buthigh incidence of anaemia is noted in many of the cases, and the relation is not well understood. Leukocytosis was observed in our cases (68.33%) which was comparable to other studies. Diabetes Mellitus was observed in 20% of patients. The increased association of diabetic state with liver abscess shows that diabetes is a risk factor for liver abscess. According to A.J. Greenstein, D Lowenthal, BA, G.S. Hammer, F. Schaffner and A. H. Aufses, Diabetes was found in 10% of cases. From India, earlier series showed jaundice in 45%-50% of cases of amoebic liver abscess, whereas in our study the elevated bilirubin levels were noted in 33 patients(55%).Pathogenic processes proposed which can lead to jaundice are sepsis, alcoholic liver disease, hepatocellular dysfunction, associated hepatitis in the adjoining areas, intrahepatic biliary obstruction by the expanding abscess, and biliovascular fistula resulting from hepatic necrosis leading to damage of bile ducts and hepatic veins Raised ALP levels were noted in 51.66% of patients and observations by Bhagwan Satiani and Eugene D. Davidson increased levels of ALP was seen in 63% of cases. According to Chu KM, Fan ST Hypoalbuminemia was an adverse prognostic factor in eases of liver abscess. Increased prothrombin time >20 was seen in 6.6%.

	Present Study No. of Cases (%)	**Sharma et al**
Right lobe	78.33	71
Left lobe	10	17.5
Both lobes	11.66	11.5

Table 17. USG Findings of liver Abscess

Ultrasonogram abdomen was done to all patients in this study. In the present study right lobe was involved in 78.33% of cases. This is in accordance with the study concluded by Sharma et al who recorded 71% involvement in right lobe. The predilection of LA in right lobe is because of streaming effect in portal circulation. It receives most of the blood draining from right colon, the primary site of intestinal amoebiasis.[4,5]

	N	**Minimum**	**Maximum**	**Mean**
Age	60	21	66	45.34
WBC	60	7000	22000	12599.17
Hospital stay duration	60	3	42	12.17
Valid N (list wise)	60			

Table 18. Descriptive Statistics

Null Hypothesis (H0)

There is no significant difference between dependent variable Treatment and predictors– alcoholism, jaundice and abdominal pain.

Alternative Hypothesis (H1)

There is significant difference between dependent variable Treatment and predictors – alcoholism, jaundice and abdominal pain.

Model Summary[b]

Mod El	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics F Change	df1	df2	Sig. F Change
1	.306[a]	.094	.040	1.083	.094	1.755	3	51	.168

Table 19. Summary

a. Predictors: (Constant), alcoholism, jaundice, abdominal pain
b. Dependent Variable: Treatment.

ANOVA[A]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.176	3	2.059	1.755	.168[b]
	Residual	59.824	51	1.173		
	Total	**66.000**	**54**			

Table 20. ANOVA

a. Dependent Variable: Treatment
b. Predictors: (Constant), alcoholism, jaundice, abdominal pain.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.707	.389		6.964	.000
abdominal pain	.541	.343	.220	1.576	.121
1					
jaundice	.443	.307	.201	1.442	.155
alcoholism	-.448	.308	-.194	-1.454	.152

Table 21. Correlation

a. Dependent Variable: Treatment.

In present study left lobe and both lobes were involved in 10% and 11.66% of patients respectively where as 78.33% of patients had abscess cavity in the right lobe. In the present study solitary abscess and multiple abscesses were present in 78.75% and 21.25% of cases respectively. This is in accordance with the study conducted by Chaturbhuj Lal Rajak et al who recorded 72% solitary and 18% multiple abscesses.

Pus Culture Analysis

41 cases in this study were subjected to invasive treatment out of which 87.8% cases had anchovy sauce appearance of pus and revealed on growth gram (-) organisms found in 7.3% and staph aureus found in 4%

Analysis of Treatment

In the present study of 60 cases patients who had multiple small abscess and solitary abscess with volume <50 ml were treated conservatively. The conservative management was done on 31.66% of cases. All cases were started on metronidazole IV at a dose of 40 mg/kg/wt for 8-10 days. When patients did not show improvement in 24-48 hrs. of metronidazole therapy, broad spectrum 3rd generation cephalosporins were started.[5,6] According to Hiroshi Okano, Katsuya Shraki percutaneous aspiration is not required in all cases of liver abscess. A subset of cases with small liver abscess <300 cc can be successfully managed conservatively.

In 51.66% patients who had abscess >50 cc were chosen for percutaneous aspiration. The site, depth and direction of aspiration were marked under USG guidance, aspiration needle was usually used and under aseptic precautions, the abscess cavity was entered. Local anaesthetic was used, pus was aspirated and sent for culture and sensitivity; no complication were noted due to this procedure apart from local pain which soon subsided after analgesics. Patient showed improvements in their symptoms and signs within 48-72 hrs. of the aspiration. Percutaneous catheter drainage was not done on any patient in this study. Laparotomy as the initial line of treatment was performed in 5 (8.33%) of cases of liver abscess ruptured into peritoneal cavity. On laparotomy, thorough peritoneal lavage and drains were kept.

According to Arshed Zafar, Sajjad Ahnied, needle aspiration is safe, rapid effective method of treating liver abscess. Routine aspiration is not indicated. It should be initial line of treatment in abscess >300 cc, impending rupture or abscess that do not respond to chemotherapy.[7]

Laparotomy was done in 6 cases for liver abscess which ruptured intraperitoneally. Laparoscopic liver drainage was done in 7 patients which is technically difficult for the young laparoscopic surgeons.

Discussion of Complications

The complications in our study were rupture of liver abscess into peritoneal cavity and pleural effusion. Six case

presented with peritonitis for which laparotomy was done and peritoneal lavage was given. Septicaemia with multiorgan dysfunction was seen in 1 case. Pleural effusion was observed in 3 cases. According to Sharma MP, Dasarthy S, Verma N et al, mortality rate in their study was 0-18% and in our study one case (1.25%) had the end result of mortality due to liver abscess after intraperitoneal rupture.[8]

CONCLUSION

This study is based on the reports of 60 patients treated for liver abscess at Govt. Royapettah Hospital, Kilpauk Medical College, Chennai.

The most common age group affected by Liver abscess was between 41 -50 years. The male – female sex ration found in this study was 6:1 the most common symptom was fever, followed by pain abdomen. Alcohol consumption is important risk factor observed in the most number of patients; solitary abscesses were common compared to multiple abscesses. The right lobe was more commonly affected. 2/3 of the patients needed invasive management, most common cause is amoebic. Multiple small abscesses and solitary abscess with volume less than 50 ml were managed successfully on conservative antimicrobial therapy.

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