How to Cite:
Asari, U. S., Kharadi, A. H., Vijapura, A. V., Desai, P. D., Dabhi, H. R., & Chaudhary, T. A. (2022). A retrospective observational study of liver abscess in children at tertiary care hospital of Ahmedabad city. *International Journal of Health Sciences*, *6*(S3), 4921–4930. https://doi.org/10.53730/ijhs.v6nS3.6987

A retrospective observational study of liver abscess in children at tertiary care hospital of Ahmedabad city

Unnati S. Asari
Assistant professor, Department of pediatrics, AMC MET Medical College, Ahmedabad, India

Ashish H. Kharadi
Associate professor, Department of surgery, G.M.E.R.S. Medical College, Vadnagar, India
*Corresponding author email: uasari.ashish@gmail.com

Abidali V. Vijapura
Department of pediatrics AMC MET Medical College, Ahmedabad, India

Pankti D. Desai
Associate professor, Department of pediatrics AMC MET Medical College, Ahmedabad, India

Hitesh R. Dabhi
2nd year Resident, Department of pediatrics, AMC MET Medical college, Ahmedabad, India

Tejas A. Chaudhary
2nd year Resident, Department of pediatrics, AMC MET Medical college, Ahmedabad, India

***Abstract*---**In developing country like India, liver abscess in children is mostly pyogenic (PLA) in nature. This article aimed to analyze detail parameters of LA of admitted cases in tertiary care hospital of Ahmedabad city. Details of 32 patients From1 month to 14 years age groups were assessed retrospectively over periods of 2 years. The demographic profile, clinical presentation, laboratory and ultra sonographic, microbiological profile, management and outcome of patients were retrieved from case records. All cases had PLA with mean age 6 years and male predominance (64.28%). Under nutrition and enteric fever were only risk factors derived. Fever (93.75%) and abdominal pain (68.75%) were commonest presentation of LA. Leukocytosis found in 62.5% cases with neutrophilic predominance.

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
Manuscript submitted: 18 Feb 2022, Manuscript revised: 09 March 2022, Accepted for publication: 27 April 2022

Majority of LA were single (90.6%), in right lobe of liver (68.8%) with more than 50mm in size. Positivity rate of pus and blood culture in 12.5% and 15.62% cases respectively where staphylococcus aureus is commonest organism.17 cases (53.12%) require antibiotics treatment alone ,14 cases (43.75%) USG guided needler aspiration and 1 case (3%) open surgical drainage with 100%recovery rate. PLA is commonest in children and cryptogenic in origin. Management of LA required multidisciplinary approached include antibiotic and/or USG guided percutaneous needle aspiration.

***Keywords*---**liver abscess, children, percutaneous aspiration, PLA, treatment.

Introduction

Liver abscess (LA) in children has become relatively uncommon in developed country[1]but has a high incidence in India that constitute more than 79 per 100000 children in less than 10 years of age [2]. The incidence of LA varies from different region world wide like 25 per 100000 in south Africa[3],11 per 100000 admission in Denmark [4] , 20 per 100000 in Taiwan [5] and 25 per 100000 in USA[6]. Pyogenic liver abscess (PLA) is commonly presented with prolonged fever with abdominal pain. Among various organism staphylococcus aureus is most common organism follow by E. coli, Klebsiella and streptococcus respectively. Different studies reveal limited data for causative 0rganism and risk factor in developing countries. Common underling risk factors are under nutrition, liver trauma, bacteria, chronic cholangitis, congenital or acquired immunocompromised state in children[7].The incidence of amoebic liver abscess (ALA) is rare in pediatrics age group [8]. ALA developed in less than 1 % patient infected with entamoeba histolytica [9]. Ultra sonography of abdomen is gold standard tool for detailed evaluation of LA. It requires prompt treatment with prolonged antibiotics and/or surgical intervention. We had observed high occurrence rate of liver abscess in children at our institute. Pt with LA requires prolonged hospitalization and also required multidisciplinary care. So, we are going to conduct this study for detail evaluation of each cases of LA.

Aims and objective

To describe demographic profile and underlying cause of LA

To describe the clinical and investigation profile of LA in children. To study the management and outcome of LA

Material and Methods

This retrospective observational study was carried out in 32 children from 1 month to 14 years of age, who were admitted from 1st June to 30th June 2020 at tertiary care hospital in pediatric department whose ultra sonography of abdomen is suggestive of liver abscess. The study was approved by Institutional review board. Information regarding detail history, clinical evaluation, and diagnostic

imagine, treatment and outcome were transcribed from case records of the patients. Diagnostic workup includes complete hemogram, liver function test, coagulation profile and ultra sonographic finding. Details of Ultra sonography finding regarding No. of abscess, liquefied/no liquefied, size, lobes, involved segments were noted from case records. Details regarding treatment modalities like intravenous antibiotics, USG guided percutaneous needle aspiration and surgical drainage.

Inclusion criteria

All admitted children from 1 month to 14 years of age, USG suggestive of liver abscess.

Exclusion criteria

New born (age less than 1 month)

Analysis & results

Table 1
Age, Demographic profile & underlying etiology

AGE(YEAR)	MALE	FEMALE	TOTAL
1month-<5yr	10	5	15
5-<10yr	9	5	14
10-14yr	1	2	3
MEAN AGE	6 ± 3.5		
GENDER	1.7:1		
LOCALITY			
Amaraiwadi		11(34.37%)	
Hatkeshwar		5(15.62%)	
Shahalam		4(12.5%)	
Vatva		5(15.62%)	
Other		7(21.87%)	
UNDERNUTRITION		6(18.75)	
ENTERIC FEVER		2(6.25%)	
NO ANY UNDERLYING CAUSE (cryptogenic)		24(75%)	

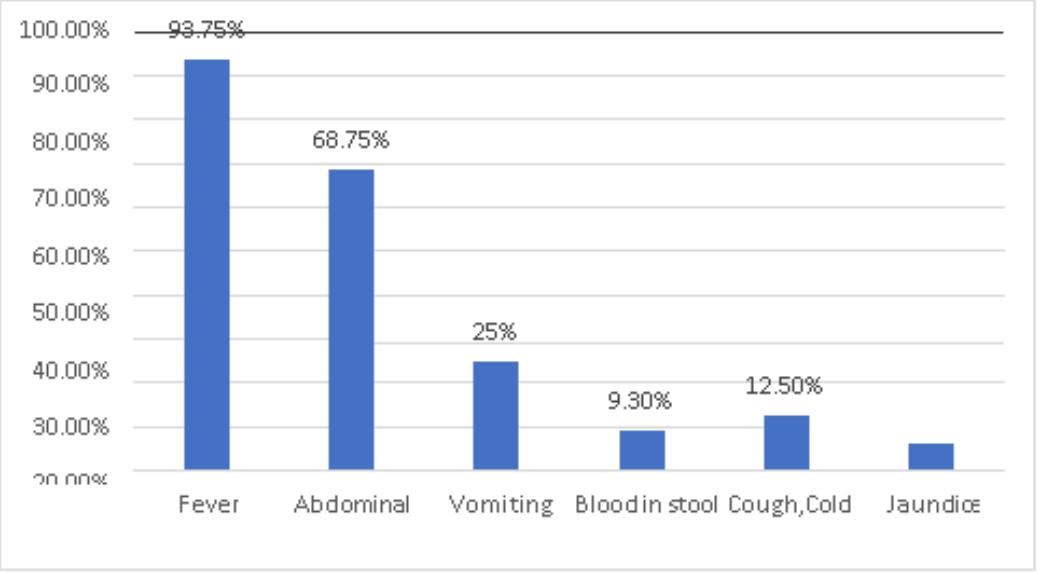

Figure 1. Clinical manifestation in Liver abscess

Table 2
Investigation profile of LA

Mean(range)	
HEMOGLOBIN (Mean)gm/dl	8.6 gm/dl
T0TAL LEUCOCYTE COUNTS($\times 10^9$)	
<4000 (n)	2 (6.25%)
4000-11000 (n)	10 (31.25%)
>11000 (n)	20 (62.5%)
S.BILLIRUBIN (mg/dl)	0.2(0.1-1.2)
Elevated for age (n)	2
SGPT (IU/L)	22 (10-57)
Elevated for age(n)	1
Total protein (g/dl)	(3.6 – 8.5)
PROTHROMBIN TIME (sec)range	15.39(11.5-22.3)
ESR (mm/hr) range	18(12-64)

Table 3
Ultra sonography finding of abscess characteristics

1)Mild Hepatomegaly	13(40.62%)
2) ABCESS SIZE (n[%])	
<50 mm	12(37.5%)
>50 mm	20(62.5%)
Mean size (mm)	49×40
3) ABCESS NUMBER n[%]	

SINGLE	29(90.6%)
MULTIPLE	3(9.4%)
4) LIQUIFIED STATUS n[%]	
NON LIQUIFIED	22(68.8%)
PARTIALLY	9(28.1%)
LIQUIFIED	1(3.1%)
5) AFFECTED LOBE	
Right lobe	22(68.8%)
Left lobe	7(21.8%)
Right & left lobe	3(9.4%)

Table 4
Blood and Pus culture results

1) BLOOD CULTURES	
POSITIVITY RATE	15.62%
ORGANISMS(n)	
Staphylococcal aureus	2/32
Salmonella typhi	2/32
E.coli	1/32
2) PUS CULTURE	
POSITIVITY RATE	12.5%
ORGANISMS(n)	
Staphylococcus aureus	2/32
E.coli	1/32
Klebsiella	1/32

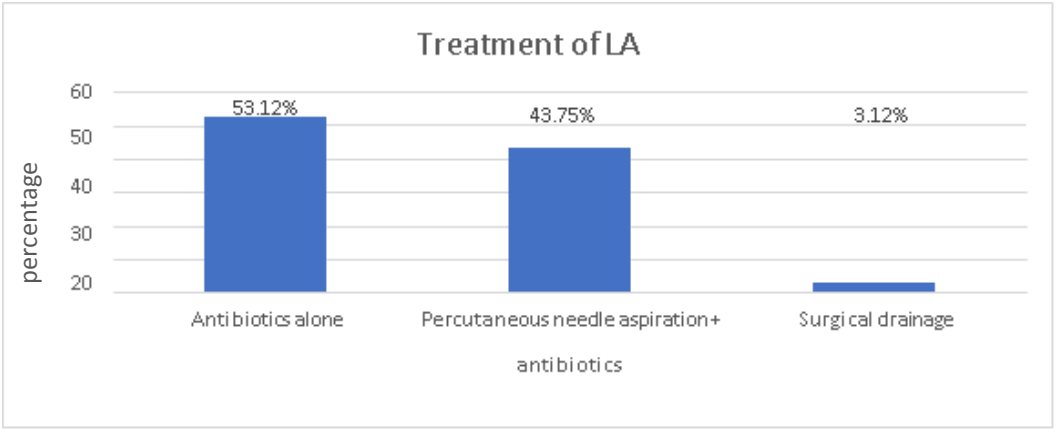

Figure 2: treatment of LA
Mean Duration of hospital stay 15 ± 4

Results

This study consists of 32 children of liver abscess. Mean age of patient was 6 ±3.5 years and having male predominance 64.28 % except in >10 yr. of age having Female predominance. Male: female ratio1.7:1 in all age groups. Fever is commonest symptoms among 30 patients (93.75%) that high grade and continues in nature. Out of 30 patients, 12 cases (37.5 %) had history of fever more than 7days. This was followed by abdominal pain in 22 cases (68.75%), vomiting in 8(25%) cases, respectively. Only few patients had nonspecific symptoms like cough &cold (12%), blood in stool (9.3%) and jaundice in (6.25%) cases. Leukocytosis was found in 20 cases (62.5%) with neutrophilic predominance & 2 (6.25%) has leucopenia. Mean hemoglobin value amongst case had 8.6 gm/dl s/o moderate anemia and mean Bilirubin level 0.2mg/dl. Only 2 cases (6.25%) had mild up to 5 mg% icterus and 1 case (3%) had elevated Serum glutamic Pyruvic Transaminase but not more than 100 (0-40IU/L) level. Mean ESR values were 18mm/hr.and mean prothrombin time was 16.2 sec.

Depending on ultra sonographic observations 29 cases (90.6%) has single abscess with predominantly located in right lobe in 22cases (68.8%) and that was predominantly found in 7,6,4 ,5 segments respectively. This abscess was more than 50mm indiameter in 20 cases (62.5%) and 22(68.8%) cases had nonliquefied abscess in nature. We found positive pus culture only in 4 cases (12.5%) and 5 cases (15.62%) had blood culture positive. In present study none of patients were diagnosed having amoebic liver abscess. We found E. coli (6.25%), Staphylococcus aureus (3.125%), Klebsiella (3.125%) organisms in pus culture of liver abscess. The Records shows, all cases were treated empirically by I. V antibiotics like inj. Metronidazole in 100% cases, combination of 3rd generation cephalosporin and amikacin in 23 cases and 9 cases were managed by combination of inj. Meropenem and vancomycin during hospital stay. Depending upon mode of treatment, 17 cases (53.12%) were treated by antibiotics only whereas 14 cases (43.73%) were required USG guided needle aspiration along with I.V antibiotics and only 1 case (3%) has surgical drainage. All cases were recovered and dischargedsuccessfully.

Discussion

In children, Pyogenic liver abscess (PLA) constitutes the majority of case (80%)[3,10]. The incidence of pyogenic liver abscess was 79 per 100000 Pediatrics admissions at tertiary care Hospital in India [2]. The present study reported 32 children with liver abscess in 2 years period. Inthis study the mean age was 6 ±3.5 years, while in study by Pai-Jui Yeh etal, mean age was 9.6 ±6.2 during 10yr of Study period,8 year in Iranian, 6.3year in West India,8.1 year in brazil[10,11,12,13]. Male predominance (64.28%) was observed that was similar to studies conducted in Brazil (male62%),India(male 44%), Taiwan (male 66%) with male to female Ratio is 1.6:1 in our study[10,12,13] .We found only 8 cases had underlying causes among them 6 cases (18.75%) had moderate to severe under nutrition. This finding is also supported by study done by Hendrick etal[3] were 56% cases and in Kumar et al [2] reported 27.8 % cases had moderate to severe under nutrition. Immunosuppression because of under nutrition is one of major predisposing factor for development PLA[2]. As this institute located in south zone of

Ahmedabad, clustering of cases had been noticed maximum in Amaraiwadi (34.3%) followed by Vatva and Hatkeshwar in 15.6% and 15.6% respectively. Several factors may contribute development of such hot spot namely lower socioeconomic condition, poor sanitization, unhygienic living condition. Liver abscess is seen in children with major debilitating disease, sickle cell anemia, helminthic infection, congenital & acquired immunosuppression[1]. Genetic disorder like Papillion lefevre syndrome is rare autosomal recessive disease associated with LA[14]. Other causes like hepatic trauma, intestinal infection, chronic cholangitis, systemic bacteria, umbilical vein catheterization also responsible for development of PLA[11,13,15,16]. A large number of cases (75%) have been found without any apparent cause and considered cryptogenic in nature [19,20].

In LA, high grade continue fever is most prevalent symptoms in (93.75%) Cases, among them 12cases (37.5%) had h/o prolonged fever more than 7 day with mean of 12 days, that was followed by Abdominal pain in 22 cases (68.75%) and vomiting 8 (25%) cases. This finding supported many studies [2,5,17,18]. Only few cases from age group less than 5 years of children presented with non specific symptoms like cough & cold (12.5%), blood in stool (9.3%), jaundice (6.25%) etc. In present study, Only20 (78.2%) cases found leukocytosis with neutrophilic predominance, moderate to severe anemia with mean of 8.68 gm/dl and normal ESR mean of 18mm/hrs. In liverfunction test, mean S. bilirubin is 0.2mg/dl (0.1-1.2mg/dl). Elevated SGPT was found in 1 case and S. bilirubin found in 2 cases only. This finding is supported by Indian study (n=34) with normal liver function test and clinically no icterus in LA [14].

In our study positive cultures were obtain in 9/32 cases (28.12%), positivity rate among blood cultures and pus cultures were 12.5% and 15.62 % respectively that was very low compared to study done by Salahi R etal[11] in which pus culture positivity rate was 50%. We found most common cultured pathogens were staphylococcus aureus in 4/32 followed by Escherichia coli in 2/32, salmonella typhi in 2/32, klebsiella in 1/32 cases respectively. Our observation was supported by many studies[7,12,29]. Staphylococcus aureus is the most common pathogen for PLA in childrens[12,27]. Escherichia coli, Klebsiella, Pseudomonas and anaerobes are also responsible for PLA in few cases[12]. In present study 2 cases of liver abscess had culture positive enteric fever which was unusualcomplication of enteric fever. Kumar etal reveal same finding in their study[29].

The low culture positivity rate was because of patients may be taken prior antibiotics therapy leads to sterile abscess in PLA[12]. We found none of patients had amoebic liver abscess while study by Bhasin S etal [21] shows 49.3% cases having ALA. Few other studies also supported higher incidence of ALA than PLA. That may be due to poor sanitization and endemicity [22,23]. Abdominal Ultra sonography is still mainstay investigations due to low price and lack of radiation compared to CT abdomen or MRI. In our study 29 cases (90.6%) has single abscess, mostly right lobe of liver in 62.5% cases with involvements of 7,6,4,5 segment respectively. Mean diameter of solitary abscess 49×40 mm.
Antibiotics therapy contributes the main part of treatment in LA with or without surgical intervention. In presenting study, 53.12% (17/32) cases recovered by antibiotics treatment only and 43.75% (14/32) required antibiotics with USG

guided percutaneous needle aspiration and only 3.12% (1/32) cases required open surgical drainage. This study is supported by Kumar at etal [2] who treated 60% cases of PLA conservative by antibiotics alone [2,3]. Our study shows 3 cases had multiple liver abscess <50 mm size treated by antibiotics alone. Similarly, Hendricks etal reveals 60% cases of multiple LA were managed by conservative management [3] where Barakate MS etal had managed multiloculated liver abscess by aggressive percutaneous techniques [25]. However small Abscess <50 mm and large abscess >50 mm Were best managed by conservative alone and USG guided percutaneous aspiration respectively [19,20,24]. So, management of PLA whether by conservative or percutaneous treatment or both is still in debate and that is depends on size of LA, single or multiple and lack of antibiotic response in form of clinical sign of persistent sepsis or enlarging abscess. While evaluating outcome, all patients were required average 15 ± 4 of hospitalization that was parallel to parental antibiotics duration and no case of LA was expired. Because of prompt diagnosis with Ultra sonography of abdomen with antibiotics treatment along with percutaneous needle aspiration has improved mortality and morbidity in LA. Barakate MS etal shows decrease mortality from 42% to 15% due to modern management of LA [2,3,6,15,25,26,27,28].

Conclusion

In children, Pyogenic liver abscess is commonest among all LA and commonly prevalent in developing country like India due to lower socioeconomic class, poor sanitization, hygienisity. Nevertheless, of normal laboratory findings, no icterus and negative culture report, don't rule out PLA. Now a days, abscess culture positivity rate declines due to prior antibiotics treatment. Early diagnosis of LA, conservative management and /or percutaneous aspiration are main stay treatment and this can cause drop-in mortality rate whereas open surgical drainage should be reserved for few selected cases only.

References

1. Kirtisudha Mishra, Srikanta Basu, Subhasis Roy Choudhary. Liver abscess in children: anoverview. World journal of paediatric 2010; 6(3):210-216.
2. A, Srinivasan S, Sharma AK. Pyogenic liver abscess in children – South Indian experiences. J0PediatrSurg 1998 Mar; 33(3):417-421.
3. Hendricks MK, Moore SW, Millar AJ. Epidemiological aspects of liver abscesses in children in the Western Cape Province of South Africa. J Trop Pediatr 1997 Apr; 43(2):103-105.
4. Hansen PS, Schonheyder HC.pyogenic hepatic abscess .A 10 years population basedretrospective study. APMIES 1998;106:396-402
5. Kong MS, Lin IN. Pyogenic liver abscess in children. J Formos Med Assoc. (1994) 93:45-50.
6. Pineiro-Carrero VM, Andres JM. Morbidity and mortality in children with pyogenic liverabscess. AM J Dis child 1989;143:1424-1427
7. M.P Sharma, Arvind Kumar. Liver abscess in children. Indian J Pediatr 2006; 73(9):813-817.
8. Haque R, Huston CD, Hughes M, Houpt E ,Petri WA Jr. Amoebiasis. N Engl J Med2003;348:1565-1573.
9. Wells CD, Arguedas M. Amoebic liver abscess. South Med J 2004;97:673-682

10. Yeh P-J, Chen C-C, Lai M-W, Yeh H-Y and Chao H-C(2020) Pediatric Liver Abscess: Trends in the Incidence, Etiology, and Outcome Based on 20 – Years of Experience at a tertiary center. Front. Pediatr. March 2020/volume 8/ Article 111
11. SM, Salahi H, Bahador A, Abbasy HR, Salahi F. Liver abscess in children: A 10-year singlecentre experience. Saudi J Gastroenterol 2011:17:199-202.
12. Waghmare M, Shah H, Tiwari Management of liver abscess in children: Our experience.Euroasian J Hepato -Gastroenterol 2017;7(1):23-26
13. Ferreira MA, Pereira FE. Musso C. Dettogni RV. Pyogenic liver abscess In children: some observations in the Espirito Santo State, Brazil, Arg Gastroenterol (1997) 34:49-54.
14. Oguzkurt P. Tanyel FC, Büyükpamukçu N. Hiçsönmez A. Ancreased risk of pyogenic liver abscess in children withPapillon-Lefevre syndrome. J PediatrSurg 1996:31:955-956.
15. Mishra K, Basu, S, Subhasis Roy Choudhary. Liver abscess in children: an overview. Worldjournal of paediatric 2010;6(3):210-216.
16. Hsu YL. Lin HC. Yen TY. Hsieh TH. Wei HM. Hwang KP. Pyogenic liver abscess among children in a medical center in Central Taiwan. J Microbiol Immunol Infect. (2015) 18.302-5. doi: 10.1016/).jmil.2013.08.009
17. Tai FC, Huang YT, Chang LY, Wang JT. Pyogenic liver has endemic disease, Taiwan.Emerg Infect Dis. (2008) 741592-600, doi: 10.3201/eid1410.071254
18. TaiCC, Chung JH, Ko SF, Liu PM, Su CT, Li WC, et al. Liver abscess in children: a single institutional experience in southern Taiwan, ActaPaediatr. (2003) 44:282-6, doi: 10.7097/APT.200310.0282
19. Bari S, Sheikh KA, Malik AA, Wani RA, Naqash SH. Percutaneous aspiration versus open drainage of liver abscess in children. PediatrSurgInt 2007 Jan;23(1):69-74.
20. Donovan AJ, Yellin AE, Rall PW. Hepatic abscess. World J Surg 1991 Mar-Apr;15(2):162-169.
21. Sadhna BhasinLal, VubhunaxVenkateshAditikarma.The pediatric infectious diseasejournal;2021:40(5):179-184)
22. Jain M. Jain J, Gupta S. Amebic liver abscess in children-experience from Central India.Indian J Gastroenterol.2016;35:248-249.
23. Salim A, Jeelani SM, Qazi SH, et al. Amoebic liver abscess: outcomes of percutaneous needle aspiration vs drain placement in paediatric population. J Pak Med Assoc. 2019; 69(suppl1): S29-S32.
24. Cheema HA, Saeed A. Etiology, presentation and management of liver abscesses at theChildren's Hospital Lahore. Annals 2008; 14:148-150.
25. Barakate MS, Stephen MS, Waugh RC, Gallagher PJ, Solomon MJ, Storey DW, Sheldon DM. Pyogenic liver abscess: a review of 10 years' experience in management. Aust NZJ Surg 1999 Mar;69(3):205-209.
26. Kouassi-Dria AS, Moh NE, Aké YL, Midekor-Gonebo K, Keita B, Bonny-Obro R, et al. Liver abscess of children in Côte-d'Ivoire. Ann Pediatr Surg, (2018) 14:51–5, doi: 10.1097/01.xps.0000521800.43379.30
27. Muorah M, Hinds R. Verma A. Yu D, Samyn M. Mieli-Verganial. Liver abscesses in children: a single center experience in the developed world. J Pediatr Gastroenterol Nutr. (2006) 37, Bhatt GC42:201-6. doi: 10.1097/01.mpg-0000189344.23387.26
28. Kleinman RE, Goulet O, Mieli-Vergani G, Sanderson IR, Sherman PM, Shneider BL. Walker's Pediatric Gastrointestinal Disease: Pathophysiology.

Diagnosis, Management. Raleigh, NC: People's Medical Publishing House (2018).
29. Kumar A, Kapoor R, Chopra K, Sethi GR, Saha MM. Typhoid fever. Unusual hepaticmanifestation. Clin Peadiatr (Phila) 1989 Feb;28(2):99-100