PROLONGED CONJUGATED HYPERBILIRUBINAEMIA – EVALUATION USING DUODENAL FLUID INSPECTION FOR BILE

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SUMMARY

Eight infants between the ages of one and three months with prolonged ***conjugated hyperbilirubinaemia*** *had duodenal aspirations performed to differentiate between biliary atresia and neonatal hepatitis. Four infants had bile-stained aspirates and in all of them the jaundice subsided completely by eight months of age.*

We have found duodenal aspiration a safe, inexpensive and simple procedure to undertake in helping us make a rapid differentiation between patients with ***conjugated hyperbilirubinaemia*** *requiring urgent laparotomy and those that do not require surgery.*

This approach appears to be reliable although further studies need to be undertaken.

INTRODUCTION

Conjugated hyperbilirubinaemia of infancy provides a formidable challenge to the paediatrician in that no laboratory tests have been helpful in differentiating biliary atresia from neonatal hepatitis and yet it is essential that the differentiation be made by 70 days of age since prognosis of biliary atresia if operated later than 70 days is poor. [1,4,7]

The^{131} I-Rose Bengal faecal excretion test combined with the percutaneous liver biopsy results have been used in deciding on laparotomy. However, the ^{131} I-Rose Bengal faecal excretion test is not only expensive and time-consuming but is often inaccurate because of difficulty in stool collection. The percutaneous liver biopsy is also not without error [4] and consent from parents are not always forthcoming. Some centres have used abdominal scanning for qualitative evidence of isotopic excretion but this is less accurate. [5] Prior to the introduction of our approach in the General Hospital, Kuala Lumpur, evaluation of conjugated hyperbilirubinaemia in infancy involved operative cholangiography and open liver biopsy. This approach will inevitably result in laparotomy of cases with neonatal hepatitis. Duodenal fluid inspection has been adopted in Japan [6,7] and a few centres in USA including South America and has been found to be quite reliable.

Duodenal aspiration has been performed on all infants referred to the Paediatric (UKM) wards from January 1982 to January 1983 for evaluation of prolonged conjugated hyperbilirubinaemia. Patients with no bilirubin pigment on visual inspection of duodenal fluid over 24 hours were interpreted as most likely having biliary obstruction and recommended immediate surgery while patients with bilirubin pigment on inspection were followed up on an outpatient basis.

MATERIALS AND METHODS

Duodenal intubation was performed on eight babies between one and three months of age referred for evaluation of prolonged conjugated hyperbilirubinaemia to the Paediatric (UKM) wards in the General Hospital, Kuala Lumpur between January 1982 and January 1983. The history was taken and a physical examination

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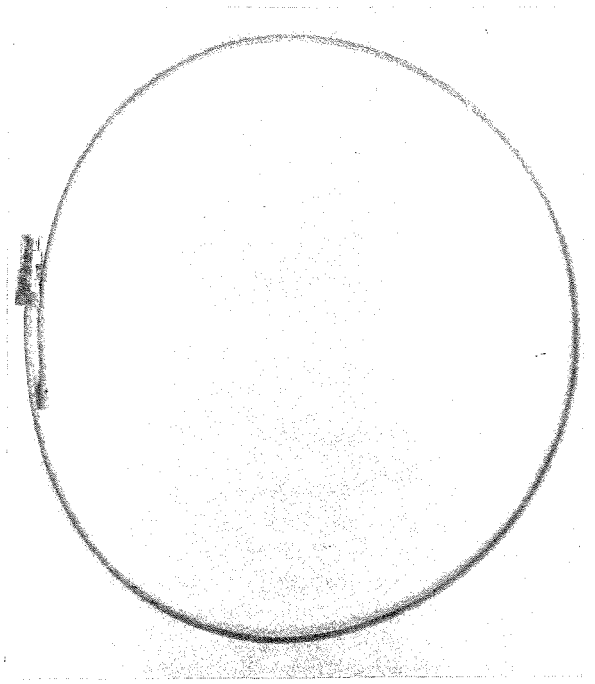

Fig. 1 Modification of size F8 cardiac catheter for use as a duodenal tube.

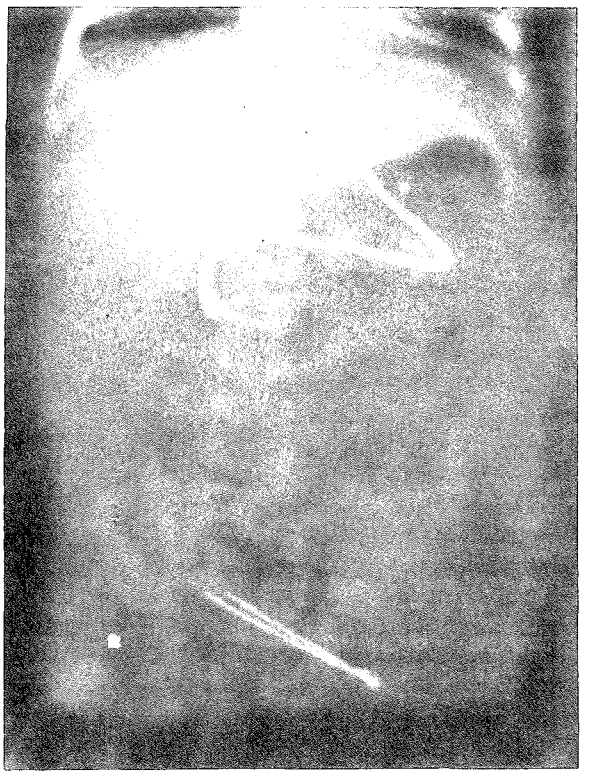

Fig. 2 Confirmation of the duodenal tube's position through fluoroscopy.

carried out. The investigations carried out included liver function tests, bilirubin levels both direct and indirect, TORCHES study, Australia antigen, urine for reducing substances and bacterial cultures, alpha$_1$ antitrypsin titre and serum amino acid chromatography.

A size F8 cardiac catheter of about 50cm long is modified for use as a duodenal tube. One end of the catheter is heated over a spirit flame for expansion. This end is hence rendered less traumatic and also enables easier aspiration of duodenal fluid. An adaptor is attached to the other end to enable aspiration with a syringe (Fig. 1).

Before use, the catheter is immersed in 1% chlorhexidine solution, then washed and rinsed with hot water shortly before introduction. The patient who has been sedated with chloral hydrate (30 mg/kg) orally an hour before is given 1 mg Maxolon intramuscularly shortly before introduction. The expanded end of the catheter is advanced via the oral route and negotiated through the pylorus to lodge between the second and third part of the duodenum. The position is confirmed on fluoroscopy (Fig. 2). The other end of the catheter is strapped with plasters around the mouth. The process may take anything from 15 minutes to 45 minutes; our average time is 25 minutes.

A 5 ml plastic syringe is attached to the adaptor, duodenal fluid aspirated and observed for bile. If bile is seen, the tube is removed, otherwise it is kept in place and two-hourly aspirations done in the ward. The tube is kept up to a maximum of 24 hours if no bile is seen. The baby is allowed clear fluids to drink during the period of intubation.

RESULTS

The results from this limited series suggest that duodenal aspiration is a promising investigative tool for us in this country to help in the differentiation between biliary atresia and neonatal hepatitis.

The liver function tests have not helped in the differentiation between Neonatal Hepatitis Syndrome and Extrahepatic Biliary Atresia. Serum Alkaline Phosphatase has been high in both Neonatal Hepatitis (Cases 4,7,8) and in Extrahepatic Biliary Atresia (Case 3). Liver enzymes have been high in neonatal hepatitis (Cases 2,4,7)

TABLE I
REPORT ON THE 8 CASES OBSERVED

No.	Name, Age & Wt. at admission	Serum Bilirubin (umol/l)	Serum Alkaline Phosphatase (u/l)	Liver Enzymes (Iu/l)	Duodenal Aspiration	OUTCOME
1	T.C.H. 1 month 3.3 kg	Total S.B. 392 Conj. 304 Unconj. 88	700	SGPT 59 SGOT 28	Clear aspirate up to 24 hours	Refused laparotomy. Seen at age 14/12. Deeply jaundiced. Failure to thrive. Wt 6.3 kg. Pale stools. Liver 6 cm enlarged, firm. Spleen 8cm, firm. Ascites. Dilated veins over upper half of abdomen.
2	H.S.H. 3 months 4 kg	Total S.B. 108 Conj. 84 Unconj. 24	290	SGPT SGOT NA	Bile-stained aspirate	Anicteric by 4 months of age. Wt 4.8 kg.
3	T.A.N. 2 months 3.5 kg	Total S.B. 221 Conj. 171 Unconj. 24	> 350	SGPT 108 SGOT 256	Clear aspirate up to 12 hours	Laparotomy Findings: Absence of common hepatitic duct. Atretic gall bladder. Cirrhotic liver. Operative cholangiogram showed patent common bile duct and cystic duct. Attempt at Kasai operation abandoned.
4	K.A. 2½ months 3.63 kg	Total S.B. 210 Conj. 145 Unconj. 55	> 350	SGPT 320 SGOT 352	Bile-stained fluid obtained after 6 hours	Anicteric by 8 months of age. Thriving and developing normally. Wt not available.
5	Z.Y. 3 months 7.48 kg	Total S.B. 338 Conj. 232 Unconj. 106	349	SGPT 138 SGOT 324	Clear aspirate up to 24 hours	Pending laparotomy patient went into acute liver failure 2 weeks after intubation. Baby discharged at own risk in moribund state.
6	W.N. 1 month 3.49 kg	Total S.B. 204 Conj. 140 Unconj. 64	> 350	SGPT 214 SGOT 210	Clear aspirate up to 24 hours	At 13 months of age, still deeply jaundiced failing to thrive with ascites. (Wt 6.1 kg)
7	L.F.C. 2 months 3.4 kg	Total S.B. 241 Conj. 199 Unconj. 42	> 350	SGPT 131 SGOT 225	Bile-stained aspirate	Anicteric by 4 months of age. Wt 5.4 kg
8	C.L. 1½ months 3 kg	Total S.B. 208 Conj. 132 Unconj. 76	532	SGPT 69 SGOT 77	Bile-stained aspirate	Anicteric by 3 months of age. Thriving well. Wt 4.8 kg

and also in Extrahepatic Biliary Atresia (Case 3) (Table I).

None of the other investigations like TORCHES, Australia antigen, urine for reducing sugar and amino acid chromatography, serum aminoacid chromatography, bacterial cultures of blood and urine and also alpha1 antitrypsin levels have turned out to be abnormal in any of the cases of neonatal hepatitis. In cases 1 and 6 it may be argued that the patients may still be cases of severe neonatal hepatitis. Although this could have been resolved had the parents agreed to a laparotomy, the patients seemed to be following the natural course of the disease for biliary atresia. All the other investigations to screen for neonatal hepatitis were unhelpful.

Case 5 also had evidence for portal hypertension on admission. She was deeply jaundiced with gross hepatosplenomegaly and ascites. Again all the laboratory investigations were unhelpful and liver biopsy was not attempted. However even if this patient has had neonatal hepatitis, it was indeed a fulminating one.

Cases 2, 4, 7 and 8 were found to have bile-stained aspirates and laparotomy was avoided. Subsequently all of them became anicteric. Case 3 had clear duodenal aspirates and was correctly placed into the category requiring immediate laparotomy. Unfortunately the findings of operation showed that the anatomical abnormality and the grossly cirrhotic liver made corrective surgery untenable.

DISCUSSION

Our experience so far suggests that duodenal fluid inspection is a promising approach to differentiate between biliary atresia and neonatal hepatitis. We have to date performed 12 duodenal intubations of infants with similar problems and are awaiting the results of laparotomy or follow up examination in four cases. Duodenal intubation in experienced hands is a simple and safe procedure to undertake and the technique can be easily learned by medical officers. There were no complications seen in our series and once the catheter has been satisfactorily inserted, it is tolerated well by the infants.

In less developed countries like Malaysia, where many hospitals have limited laboratory facilites, we feel that duodenal aspiration could be used singly to screen for infants with conjugated hyperbilirubinaemia requiring immediate surgery. Hence infants with clear aspirates can be referred to the referral centres while those with obvious bile stained aspirates can be followed up at the local level. We have found this procedure to be more acceptable to the parents than liver biopsy and it has shortened the period of hospital stay for infants with prolonged conjugated hyperbilirubinaemia referred for investigation and treatment.

CONCLUSION

We have found duodenal aspiration a promising diagnostic approach for evaluating infants with conjugated hyperbilirubinaemia. It is safe, quick and cheap but we would need to have a larger series in order to determine its reliability and henceforth recommend its routine use in the evaluation of infants with conjugated hyperbilirubinaemia in this country.

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