Transanastomotic feeding in duodenal atresia is a promising technique to overcome prolonged use of TPN.

Ahmed arofa elsayed , M.sc. , Ayman Hussein Abdelsattar , MD. and prof dr Gamal Hassan El Tagy , MD .

The department of pediatric surgery , faculty of medicine , Cairo university .

ABSTRACT

INTRODUCTION: congenital duodenal atresia is one of the most common intestinal atresia, occurring 1 in 2500-5000 live births (1). There is massive dilatation of proximal bowel which causes two problems; caliber discrepancy, and hypomotility as it fails to pump intestinal contents across the anastomosis (1,4). Transanastomotic feeding offers a practical solution to start early feeding without prolonged TPN (2).

METHODS: 20 Neonates diagnosed as duodenal atresia, in the Neonatal Surgical Unit of Cairo University Specialized Pediatric Hospital were studied. Cases associated with malrotation, multiple atresia were excluded.

In type I atresia we did excision of the web, in type II & III we did duodenoduodenostomy, in ten cases there was no transanastomotic tube, in other ten cases transanastomotic tube was inserted. Five cases of them, Transanastomotic tube via gastrostomy was left for 1 to 3 weeks, together with nasogastric tube for gastric decompression, in the other 5 cases 2 nasogastric tubes were inserted one transnasal transanastomotic for feeding, the other via mouth for decompression.

RESULTS: 20 cases of duodenal atresia were included in this study over
2 years, from January 2012 to January 2014. The average operative time for cases of transanastomotic tube via gastrostomy was 90 minutes while in the cases without it was (50 minutes). The average time needed until full feeds to be achieved was 4-6 days in the transanatomotic feeding group, either through nasogastric tube or gastrostomy, not orally compared to the other group, which was 10 to 20 days orally. In this cohort, no stricture no leakage were found in both groups.

CONCLUSION: Transanastomotic feeding either through gastrostomy or Ryle feeding more beneficial for cases with duodenal atresia with massive proximal dilatation. It is a safe & easy technique, and despite being a lengthier operation, feeds could be established earlier.

Key words

Duodenal atresia – transanastomotic feeding –TPN

Introduction

congenital duodenal atresia is one of the most common intestinal atresia, occurring 1 in 2500-5000 live births. The first successfully treated case was reported by Vidal in 1905; for whom gastrojejunostomy was performed (1). In 1914, Ernest performed the first successful duodenojejunostomy in an infant with duodenal atresia (1). Current surgical management more commonly includes duodenoduodenostomy and duodenoplasty.(1,2,4) In 1970 a significantly higher survival rate was reported following duodenoduodenostomy in cases when the patient had a transanastomotic feeding tube (2).
Patients& methods

This study was designed to be a prospective case series. Patients were selected from neonates admitted at the neonatal surgical ICU of Cairo university specialized pediatric hospital during the period from January 2012 to January 2014. It includes 20 patients in neonatal age group with duodenal atresia. The mean birth weight was 3Kg.

Full detailed history and clinical examination were done to identify any risk factors and to detect any associated anomalies. There were 4 cases associated with down syndrome. plain X-ray was done and showed a dilated stomach and dilated first part of duodenum (double bubble). Laboratory studies were done e.g. Serum electrolytes, Cases associated with malrotation, multiple atresia were excluded.

Fig1: plain abdominal x ray : show double bubble sign

Preoperative Details

Nasogastric decompression of the stomach and fluid resuscitation was started after admission, losses were monitored and replaced. Broad-spectrum antibiotics and 1 mg vitamin K were administered.
Operative

Once the patient was stabilized, operation was done. In 10 cases of type I duodenal atresia, web excision was done, in 5 cases of them 2 Ryles were inserted one transnasal for stomach decompression and the other transoral for transanastomotic feeding, in other 5 cases only Ryle for gastric decompression was inserted.

In 10 cases of type II & III duodenal atresia, duodenoduodenostomy was done, in 5 cases of them transnasal Ryle was inserted in the stomach for decompression & transanastomotic Ryle through gastrostomy for feeding & in the other 5 cases only Ryle for gastric decompression was inserted.

Operative techniques

The abdomen was explored, Kocherization of the duodenum was done, and proximal duodenum were often thickened and dilated. When there was significant gap between the proximal and distal ends, the distal duodenum was mobilized.

A duodenoduodenostomy was the procedure of choice which either a side-to-side anastomosis or a diamond-shaped.

For 5 cases side-to-side technique was done, parallel incisions were made in both the proximal and distal segments, the site of the ampulla of Vater was detected through gentle pressure on gall bladder, then saline was injected through a small catheter passing through the distal duodenotomy to exclude other associated anomalies, then a single layer anastomosis with 6.0 Vicryl suture was done.

In 5 cases, a diamond-shaped repair was performed, a transverse incision was made in the proximal duodenum and a longitudinal incision of the
same length in the distal segment. Anastomosis was accomplished in a single layer using vicryl 6.0.

**In patients with a duodenal web**, the site of the web was identified by passing the orogastric tube through the pylorus into the duodenum and noting the indentation of the duodenal wall caused by tenting of the web. A duodenotomy was performed along the site of this indentation. Prior to repair, the distal duodenum was examined for a second defect. Then, the ampulla was identified and its relationship to the web observed because the medial portion of most of these defects is located close to the ampulla.

So, excision of the web was done from the lateral duodenal wall, leaving the medial third of the web alone to avoid damaging the sphincter of Oddi or ampulla. The resection line was oversewed with 6.0 vicryl and the duodenotomy was closed transversely in one layer as described above.

Transanatomotic Ryle via gastrostomy was done in 5 cases for feeding & transnasal tube was placed for gastric decompression, after performance of the posterior layer of duodenoduodenostomy, an incision midway between lesser & greater curvature was done, Transanatomotic Ryle via gastrostomy was inserted, followed by completion of duodenal repair. Feeding was started on 3rd day & Full feeding through gastrostomy on day 5, trial oral feeding without removing gastrostomy on 7th day, oral feeding was stopped in 2 cases in whom vomiting occurred, leaving gastrostomy for 3 weeks for feeding until response to oral feeding occurred. 2 Ryles technique (transanastomotic transoral ryle & transnasal ryle for gastric decompression) was done in 5 cases, feeding program
was the same as with cases of gastrostomy. In 10 cases Central intravenous catheter was inserted at the time of operation for TPN.

Postoperative

Feeding was started when bowel sounds were heard, stool was passed, and the gastric drainage was limited (< 1 mL/kg/h of clear or pale-green fluid). Oral feeding was gradually introduced, starting with clear fluids and aspirating the stomach prior to each feed.

Results

20 neonates admitted to the neonatal surgical ICU of Cairo University specialized pediatric hospital during the period from January 2012 to January 2014 were studied. There were 11 males, 9 females, 10 cases type I duodenal atresia and 6 cases type III, 4 cases of type II. 12 neonates presented with bilious vomiting and 4 cases presented with failure of passage of meconium, other 4 cases presented with nonbilious vomiting.

Table 1: Mean & median of birth weight, age of presentation & age at surgery among studied groups.

<table>
<thead>
<tr>
<th></th>
<th>Birth Weight</th>
<th>Age of Presentation</th>
<th>Age at Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3kg</td>
<td>6.15 days</td>
<td>7.6 days</td>
</tr>
<tr>
<td>Median</td>
<td>3kg</td>
<td>5 days</td>
<td>7 days</td>
</tr>
</tbody>
</table>
Table 2: number of cases, procedure done, operative time, complications, mean & median of duration needed until full feeding either transanastomotic or oral feeding, duration of admission among studied groups.

<table>
<thead>
<tr>
<th>Duodenal atresia</th>
<th>Duodenoduodenostomy or excision of the web without transanastomotic tube</th>
<th>Duodenoduodenostomy with feeding by transanastomotic Ryle via gastrostomy</th>
<th>Duodenoduodenostomy with feeding by transanastomotic ryle via mouth</th>
</tr>
</thead>
<tbody>
<tr>
<td>number</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Operative time (min)</td>
<td>60 minutes</td>
<td>80 minutes</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>
| Duration needed until full feeding through transanastomotic tube (days) | Mean = 7.8  
Median = 7 | Mean = 5  
Median = 5 | |
| Duration needed until full oral feeding (days) | Mean = 13.2  
Median = 10 | Mean = 16.6  
Median = 14 | Mean = 10.6  
Median = 8 |
| Duration of admission (days) | Mean = 14.8  
Median = 12 | Mean = 18.2  
Median = 16 | Mean = 12.8  
Median = 10 |
| leakage          | 0                                                                        | 0                                                                        | 0                                                                   |
| stricture        | 0                                                                        | 0                                                                        | 0                                                                   |
Discussion

Transanastomotic feeding overcomes postoperative disturbed intestinal transit which needs TPN for long time, there is difficulty in obtaining and maintaining parenteral nutrition in our country due to financial causes.

We studied 20 patients in this study (11 males, 9 females), while Choudhry MS et al had 32 neonates (20 males and 12 females) with duodenal atresias (6).

In this study, there was 10 cases type I duodenal atresia (50%), 6 cases type III (30%), 4 cases of type II (20%), while Mustafawi AR, et al there was 21 of 40 cases of duodenal atresia had a type 1 atresia (52.5%), a type 2 atresia (5%) and a type 3 atresia in 1 case (2.5%). (5)

Duodenal atresia was associated with congenital anomalies in this study, 2 cases had Congenital heart disease (10%), 4 cases were associated with trisomy 21 (20%), and one case of them was associated with tracheoesophageal fistula (5%), while in the study of Choudhry MS et al, 71% of all cases had associated anomalies. Congenital heart disease was found in 24%, trisomy 21 in 19%, malrotation in 12%, gastroschisis in 9%, esophageal atresia in 8%, anal atresia in 6%, volvulus in 5%, colon atresia in 3%, mucoviscidosis in 3% and finally Meckel-diverticulum in 2%.(6)

In this study, 10 cases of duodenal atresias patients feeding was started on third day either through transanastomotic transoral ryle or via gastrostomy, other 10 cases of duodenal atresias without transanastomotic feeding, TPN was started on second day, oral feeding was started after 4-5 days. In 5 cases of web excision only, cases were
discharged 1 - 2 weeks, while 5 cases with duodenduodenostomy without transanastomotic feeding, cases were discharged 10 days - 3 weeks.

Umar et al reported that patients of Duodenal obstruction transanastomotic tube (passed through nasal route) gave good results after end to end anastomosis. (7)

Conclusion:

Transanatomotic feeding group allow early gastrointestinal feeding, although this group take more longer time in hospital until full feeding orally, but it allows overcoming difficulty in obtaining and maintaining parenteral nutrition for long time in our country.

References


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الملخص العربي

- عشرون حالة حديثي الولادة تعاني من انسداد خلقي في الأثني عشر, عشر حالات منهم تم علاجهم بدون وضع أنبوبة للتغذية وعشر آخرين تم وضع أنبوبة للتغذية أثناء اجراء العملية ثم من خلال توسيع الأثني عشر مما يسمح بالتغذية المبكرة من خلالها ويوفر علينا مشكلات التغذية الوريدية التي قد تستغرق فترات طويلة.