

Comparison of oesophagogastroduodenoscopy findings and diagnostic value in neurologically impaired children and 'normal' children

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Objectives To review the oesophagogastroduodenoscopy findings in children with severe neurological impairment and 'normal' children, over a 7-year period from 2000 to 2007.

Design Retrospective study.

Setting Paediatric Unit of Caritas Medical Centre, Hong Kong.

Main outcome measures The frequencies of *Helicobacter pylori* status, peptic ulceration, and oesophagitis were compared. The diagnostic value of oesophagogastroduodenoscopy in these two groups of children was also examined.

Patients Patient data were retrieved from the Hospital Authority Clinical Management system, excluding those under surgical care. The children were divided into two groups: 'normal' and neurologically impaired. Their demographic data, indications for oesophagogastroduodenoscopy, endoscopy diagnoses, and *Helicobacter pylori* status were compared, as was the diagnostic value of oesophagogastroduodenoscopy.

Results From 2000 to 2007, 223 oesophagogastroduodenoscopies were performed in 176 patients aged 3 to 22 years; 134 were performed in 'normal' children (median age, 14; range, 3-22 years) and 89 in neurologically impaired children (median age, 12; range, 3-20 years). The three most common indications in 'normal' children were: epigastric pain (60%), gastro-intestinal bleeding (13%), and vomiting (7%). In neurologically impaired children, they were gastro-intestinal bleeding (51%), assessment for percutaneous endoscopic gastrostomy (27%), and follow-up for previous lesions (9%). Among 'normal' children, 14 had duodenal ulcers (associated with *Helicobacter pylori* in 13), but no patients had gastric ulcers or oesophagitis. Among neurologically impaired children, one had a *Helicobacter pylori*-negative duodenal ulcer, and four had gastric ulcers (three were *Helicobacter pylori*-positive). Twenty-four neurologically impaired children had oesophagitis. Neurologically impaired children had significantly more oesophagitis and gastric ulcers ($P<0.001$ and $P=0.004$, respectively) but less duodenal ulcers ($P=0.024$). In 111 children who had gastric biopsies, the *Helicobacter pylori* infection rate was 35% (31% in 'normal' children and 43% in the neurologically impaired). The diagnostic value was 37% in 'normal' children and 81% in the neurologically impaired ($P<0.001$). The overall diagnostic value of oesophagogastroduodenoscopy was 50%.

Conclusion The clinical presentation and endoscopic findings in 'normal' and neurologically impaired children were discrepant. Oesophagogastroduodenoscopy appeared to confer greater diagnostic value in neurologically impaired than 'normal' children. Diagnostic values in our unit were comparable to reports from western studies.

Key words

Child; Gastritis; *Helicobacter* infections; *Helicobacter pylori*; Stomach ulcer

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Introduction

Gastro-intestinal disorders in non-neurologically impaired ('normal') children in our locality are usually self-limiting and functional in nature, and invasive procedures

比較食管胃十二指腸鏡在中樞神經損傷的兒童患者和非患者中的檢查結果和診斷價值

目的 回顧2000至2007年因嚴重中樞神經損傷入院的兒童與沒有中樞神經損傷的兒童，其食管胃十二指腸鏡的檢查結果。

設計 回顧研究。

安排 香港明愛醫院的小兒科。

主要結果測量 比較幽門螺旋菌情況、消化性潰瘍、及食管炎的發生率；並探討食管胃十二指腸鏡的診斷價值。

患者 從香港醫院管理局的臨床管理系統擷取病人資料，需要外科治理的病人資料除外。病人分為中樞神經損傷的兒童（損傷組），和沒有中樞神經損傷的兒童（「正常」組）。比較兩組的人口學數據、食管胃十二指腸鏡指徵、內鏡診斷、幽門螺旋菌的情況，以及食管胃十二指腸鏡的診斷價值。

結果 2000到2007年，176位介乎3至22歲的病人進行了共223次食管胃十二指腸鏡檢查：分別為「正常」組134次，損傷組89次。「正常」組的年齡介乎3至22歲，中位數14歲；損傷組的年齡介乎3至20歲，中位數12歲。「正常」組中三種最常見的病因，依次為胃痛(60%)、腸胃出血(13%)、嘔吐(7%)；損傷組則為腸胃出血(51%)、經皮內窺鏡胃造口手術檢查(27%)、為曾患病灶的隨訪(9%)。14位「正常」組的兒童曾有十二指腸潰瘍，其中13位與幽門螺旋菌有關。全部病人均沒有胃潰瘍或食管炎。損傷組的兒童中，1位呈陰性幽門螺旋菌的十二指腸潰瘍，4位有胃潰瘍（其中3位呈陽性幽門螺旋菌）；24位有食管炎。損傷組的兒童明顯地有較多食管炎($P<0.001$)和胃潰瘍($P=0.004$)，但十二指腸潰瘍較少($P=0.024$)。111位曾進行胃鏡活檢的兒童中，幽門螺旋菌的總感染率為35%（「正常」組31%、損傷組43%）。食管胃十二指腸鏡的總診斷價值為50%：「正常」組37%，損傷組81% ($P<0.001$)。

結論 兩組兒童在臨床表現和內視鏡的結果存有差異。似乎食管胃十二指腸鏡對中樞神經損傷組的兒童有較大的診斷價值。本研究得出的診斷價值數據與西方文獻相近。

like oesophagogastroduodenoscopy (OGD) are infrequently required. Reports of OGD findings in local children are sparse. Two recent reports were retrieved; endoscopy findings being either peptic ulcer or gastritis.^{1,2} Conversely, organic gastro-intestinal diseases such as gastroesophageal reflux disease and helicobacter pyloric infection were more common in children with neurological impairment.^{3,4} The yield from OGD in this group of children may be higher than in 'normals'. The Development Disabilities Unit (DDU) is the largest residential centre for children with severe neurological impairment in Hong Kong. It was under the care of Paediatric Unit in the Caritas Medical Centre (CMC) since 1993. As recurrent gastro-intestinal symptoms

such as vomiting and gastro-intestinal bleeding were commonly encountered in these children, OGD was required for their evaluation. In our hospital, upper endoscopy performed under sedation for 'normal' and neurologically impaired (NI) children commenced in 1998. From 2001, a regular OGD service for children became available. Up to the present, a total of 223 procedures were performed, of which 89 were in children who were NI. A retrospective study was carried out to review OGD findings in these two groups. The frequency of *Helicobacter pylori* (HP), peptic ulcer disease, and oesophagitis were compared together with the diagnostic value of OGD.

Methods

This was a retrospective study of OGD findings in children under the care of the CMC from 2000 to 2007. Data were retrieved from the Clinical Data Analysis and Reporting System, a computerised system incorporating all clinical data of patients attending public hospitals in Hong Kong. Searches were performed under the hospital code CMC, discharge date 2000 to 2007, discharge specialty (IPAS) PAE, and procedure code of 45.13 (other endoscopy of small intestine) and 45.16 (esophagogastroduodenoscopy [EGD] with biopsy). The data of institutionalised children were retrieved from the Hospital Authority Clinical Management System. Any OGDs performed by surgeons and percutaneous endoscopic gastrostomy procedures were not included. All the procedures were performed in endoscopy rooms, under local anaesthesia and with sedation (chloral hydrate 50 mg/kg ± midazolam 0.1-0.2 mg/kg).

Patient hospital numbers were retrieved and corresponding endoscopy reports obtained. Demographic data such as name, age, sex, date of procedure were recorded. The indications for OGD, the endoscopic diagnosis and biopsy sites were retrieved respectively from endoscopy and electronic patient records. Histological data such as helicobacter status and diagnosis were retrieved from the Hospital Authority Clinical Management System.

Regarding the diagnostic value, procedures related to preoperative assessment complications of percutaneous endoscopic gastrostomy were excluded as were follow-up OGDs. An OGD was considered valuable if it revealed endoscopic and/or histological abnormalities and had a direct impact on treatment (ie positivity of HP, erosions, peptic ulcer, oesophagitis). The patients were divided into two groups: non-NI or 'normal' children and those who were NI. The demographic data, indication for OGD, endoscopic diagnoses and HP status, and diagnostic value of OGD in these two groups of children were studied. Categorical data were analysed by Chi squared or Fisher's exact tests, with a significance level of $P=0.05$.

TABLE. Demographic data, indications for oesophagogastroduodenoscopy (OGD), diagnoses, *Helicobacter pylori* status, and diagnostic value of OGD in 'normal' and neurological impaired children

	'Normal' children	Neurological impaired children	P value
Median age (range) [years]	14 (3-22)	12 (3-20)	-
Sex	55 boys, 63 girls	38 boys, 20 girls	-
Indication for OGD	(n=134)	(n=89)	-
Epigastric pain	80 (60%)	1 (1%)	
Gastro-intestinal bleeding	18 (13%)	45 (51%)	
Anaemia	9 (7%)	5 (6%)	
Vomiting	10 (7%)	1 (1%)	
Assessment for percutaneous endoscopic gastrostomy	0	24 (27%)	
Follow-up for previous lesion	9 (7%)	8 (9%)	
Other	8 (6%)	5 (6%)	
Diagnosis	(n=118)	(n=58)	
Duodenal ulcer	14 (12%)	1 (2%)	0.024
Gastric ulcer	0	4 (7%)	0.004
Oesophagitis	0	24 (41%)	<0.001
<i>Helicobacter pylori</i>	(n=78)	(n=35)	
Positive	24 (31%)	15 (43%)	0.337
Negative	52 (67%)	20 (57%)	
Diagnostic value	37%	81%	<0.001

Results

Altogether 223 OGDs were performed in 176 patients aged 3 to 22 years. Their demographic features, indications for OGD, diagnoses, HP status, and diagnostic value of OGDs are summarised in the Table. In all OGDs, 134 were performed in 'normal' children (median age, 14 years) and 89 were in NI children (median age, 12 years). Among the latter, 52 were residents in the DDU and six were out-patients.

In the group of NI children, 44 were tube fed and six had had fundoplication. The frequency of oesophagitis found at OGD in tube-fed children was 45%. Two of the six children with gastrostomy and fundoplication had oesophagitis. Four (29%) of the 14 orally fed NI children had oesophagitis. There was no significant difference in the frequency of oesophagitis between the tube-fed and orally fed children ($P=0.23$) when those with fundoplication were excluded or included in the analysis ($P=0.23$ and 0.26 , respectively).

The HP status was not regularly tested. Of 76 'normal' children having a gastric biopsy, 24 had HP infection. Of the corresponding 35 NI children having a gastric biopsy, 15 had HP infection. The HP infection rate in all children having a biopsy was 35% (31% in 'normal' children and 43% in those with neurological impairment; $P>0.05$). In children with HP infection, the frequency of peptic ulcer disease was 43%.

In the 'normal' children, 125 OGDs were

performed for diagnostic purposes, of which 46 showed abnormalities. They included: 16 with duodenal ulceration (HP +ve, 15; HP -ve, 1); one with duodenal erosion (HP +ve), three with duodenitis (all HP +ve), two with gastric erosion, two with Mallory Weiss syndrome, seven with HP +ve gastritis, and 16 with HP -ve gastritis. The diagnostic value was 37%.

Fifty-four OGDs were performed for diagnostic purposes in the NI children. Forty-four of these had abnormalities, which included 31 with oesophagitis, five with gastric ulcers (3 HP +ve, 2 HP -ve), one with duodenal ulcer (HP -ve), seven with gastritis (5 HP +ve, 2 HP -ve). The diagnostic value was 81% in NI children, which was significantly greater than in 'normal' children ($P<0.001$). The overall diagnostic value in our service was 50%.

Discussion

This is the first report of endoscopic findings in local children with gastro-intestinal disease presenting to a paediatric unit. A unique feature of our report was that one third of our population was NI. The indications for OGD differed between two groups of children and their endoscopic findings were discrepant. The commonest indication for OGD in 'normal' children was epigastric pain, of whom only three children were subsequently found to have peptic ulcer disease. No 'normal' child had reflux oesophagitis. On the other hand, in those with

neurological impairment, OGD was performed when they had more severe presenting features; reflux oesophagitis was the commonest finding, followed by peptic ulcer disease. This difference could be explained by the high prevalence of gastroesophageal reflux disease in NI children.³ Tube feeding per se, however, did not appear to be associated with oesophagitis. The frequency of peptic ulcer disease was similar in the two groups, but gastric ulcer was only observed in NI children. Two patients with gastric ulcers each had a gastrostomy in situ, and it is reported that gastrostomy tubes may contribute to the development of gastric ulcer.⁵⁻⁷ The frequency of HP in 'normal' children in our study was similar to that described in another local report.¹ The frequency of HP in NI children was high, but not statistically

different from 'normal' children. Since only two thirds of our population were sampled for HP, the accuracy of our HP infection may have been affected, and could explain the discrepancy between our results and those of a previous study.⁴ The diagnostic value of OGD in NI children was higher than that in 'normal' children. This could be due to the high prevalence of gastroesophageal reflux diseases in the former. The overall diagnostic value of our service was similar to that in western centres.^{8,9} In short, we have described the clinical presentations, endoscopy diagnoses, rate of HP infection, and diagnostic value of OGD in children attending our unit over the last 7 years. Significant differences in the endoscopic findings and OGD diagnostic value were demonstrated between 'normal' and NI children.

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