Common Gastrointestinal Problems in Children with Neurological Impairments (NI): Evaluation, Treatment and Monitoring

NI relates to disorders of the central nervous system, affecting: speech, motor skills, vision, memory, muscle actions, learning abilities. Cerebral palsy is also considered within this guide as a major subgroup of NI.

NI frequently causes GI problems in children, most notably those with oral motor function and motility conditions and can be extremely complex to manage.

In children with cerebral palsy, as many as 92% suffer from serious GI symptoms.

Such conditions can lead to insufficient caloric intake, a broad spectrum of GI and nutritional complications and associated clinical conditions, including respiratory infections and chronic aspiration, as well as a significant impact on quality of life for the patient and carer.

Common Problems Contributing to Feeding Difficulties

Dental

Children with NI have a high incidence of oral/dental problems contributing to feeding difficulties, including; the stability of the jaws, lip tone and movement as well as problems with biting such as, tonic biting and over-biting.

Children with NI have almost a 3-fold greater chance of having an occlusion abnormality.

Jaw Issues

Instability, thrusting and retraction of the jaw, may cause difficulties taking food from a spoon, drinking and with swallowing.

Bruxism

The habitual grinding of teeth, is a common occurrence in people with NI and in extreme cases, leads to tooth abrasion and flat biting surfaces. Habits such as pacifier sucking, finger sucking, biting objects and tongue interpositioning are commonly associated with bruxism.

Drooling of saliva (sialorrhea)

This appears to be a consequence of a dysfunction in the coordination of the swallowing mechanism and affects up to 58% of children with NI.

Orthopaedic

Trunk hypotonia, common in children with NI, often leads to a kyphotic thoracic column and lordotic cervical spine, causing restrictions with the pharynx and laryngeal vestibule.

Scoliosis

Many children also undergo surgery for scoliosis and can develop gastric dysmotility, thought to be related to the continuous traction applied to the spine, causing overstimulation of the sympathetic fibres. This, in turn, may cause postprandial antral hypomotility, delayed gastric emptying and, as a result, persistent nausea and recurrent vomiting. Secondary malnutrition can then further contribute to the GI motility disorder.

ESPGHAN RECOMMENDATION

Careful attention needs to be paid to dental problems, general posture and orthopaedic issues in patients with NI, because these may contribute to feeding difficulties.

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This guide, produced by the European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN), provides recommendations and a systematic approach for the care of paediatric patients with NI and should be read in conjunction with the ESPGHAN Clinical Advice Guides on:

Methods and Recommendations for Nutritional Management and Requirements for Children with Neurological Impairments

Dietetic Management of Children with Neurological Impairments

Oropharyngeal Dysfunction (OPD)

OPD occurs in 90% of children with NI and is defined by the presence of disturbances in one or more of the oral, pharyngeal or oesophageal phases of swallowing.

In addition to swallowing dysfunction, children with NI may display sialorrhea (hypersalivation), coughing, multiple swallows, gurgly voice, wet breathing, gagging and choking, and alterations in appetite, feeding difficulties and prolonged feeding times. Many of these symptoms are associated with dysfunction in the pharyngeal phase of swallowing.

Feeding can also be impacted by malocclusion of teeth and lip functions including; problems with incomplete lip closure during swallowing, low lip and suction pressure and prolonged delay between the suction and propelling stages.

OPD DIAGNOSTIC METHODS	ESPGHAN RECOMMENDATIONS
• **Feeding history**	Feeding history from early infancy and direct visual assessment of feeding to be carried out by a trained health professional who is highly experienced in evaluating oropharyngeal function, which may include: speech and language therapists, doctors, nurses, dieticians and/or GI physiologists
• **Videofluoroscopy (VFS)** to detect discoordinate pharyngeal motility and silent aspiration	VFS to be used when there is suspicion of an abnormal pharyngeal phase of swallowing and/or concerns about aspiration – this may include high-resolution oesophageal manometry, where available
• **Sucking and swallowing problems** from early infancy • **Direct observation at meal times** with or without the use of standardised or validated scoring systems • **Combined modalities, eg. Videomanometry and impedance measurements** to be considered if appropriate equipment and expertise are available • **Fibreoptic endoscopy** to detect aspiration and penetration of the upper respiratory tract	OPD should be considered in all patients with NI even in the absence of obvious clinical signs and symptoms Scoring systems that may be used in clinical practice: • Eating and Drinking • Ability Classification System • Schedule for Oral Motor Assessment • Dysphagia Disorders Survey • Functional Feeding Assessment

OPD TREATMENT	ESPGHAN RECOMMENDATION
Skilled multidisciplinary team Management should aim to optimise oral ingestion, where it is shown to be safe **Modification of feeds and feeding time** Focus on posture, feed consistency and content to provide safe feeding and limit complications, e.g aspiration **Speech and language therapy** Oral sensorimotor therapies could be used in an attempt to improve the individual and combined functioning of the lips, cheeks, tongue and pharyngeal structures.	Speech and language interventions to be considered in the treatment of NI children with OPD, and/or where there is need for modification of the consistency of feeds

OPD MONITORING	ESPGHAN RECOMMENDATION
Proactive screening of all young children with NI, including those with mild impairments, is advised, to optimise growth and nutritional outcomes	Regular monitoring of growth and nutritional status in children with NI with oral pharyngeal dysfunction

Gastroesophageal Reflux Disease (GORD)

GORD has a reported incidence of 70% in children with NI

Prompt diagnosis is vital in patients with severe NI who are at risk of developing superior mesenteric artery syndrome because of frequent scoliosis and malnutrition. This can result in reduced retroperitoneal fat around the third part of the duodenum, which is thought to avoid compression by increasing the aortomesenteric angle.

GORD DIAGNOSTIC METHODS	ESPGHAN RECOMMENDATIONS
Oesophagogastroduodenoscopy with biopsies — the method of choice to diagnose and monitor oesophageal involvement **Oesophageal pH-metry** can detect and quantify acidic, weakly acidic and non-acidic reflux episodes when combined with oesophageal multichannel intraluminal impedance pH-metry **Upper GI barium swallow or abdominal ultrasound** to be used in patients with persistent gastric stasis and vomiting, to exclude intestinal obstruction **Scintigraphy** may have a role in detecting pulmonary aspiration	Objective measures to be used including; oesophageal pH- or pH/multichannel intraluminal impedance monitoring, and/or upper GI endoscopy Given their high prevalence of GORD, a trial of PPIs with careful clinical follow-up is acceptable management

GORD TREATMENT Consists of lifestyle changes, pharmacologic therapies and surgical treatment	ESPGHAN RECOMMENDATIONS
Dietary changes: **A high-pectin diet** has been shown to significantly decrease the reflux index, the number of reflux episodes/day, the duration of the longest reflux as well as vomiting and coughing episodes **Whey-based formula** in gastrostomy-fed NI children reduces reflux episodes and the duration of reflux **Hypercaloric diet** for 6 months, increasing body weight and BMI improves GORD	Modifications of enteral nutrition (thickening of liquid enteral formulas, whey-based formulas) in addition to other therapeutic options of GORD in children with NI
Pharmacological intervention Acid-suppression drugs are the main therapy and PPI's are considered treatment of choice for the healing of erosive oesophagitis and GORD symptoms, although they don't influence the volume and number of reflux so some vomiting may persist	PPIs to be used as first-line treatment Special attention concerning side effects needed in prolonged treatment
GORD Monitoring Only objective diagnostic testing is reliable for monitoring as children with severe NI aren't able to report symptoms such as pain and heartburn. When long-term therapy is needed and stopping PPI treatment may be considered potentially detrimental, multichannel intraluminal impedance, if available, may assist monitoring	Prokinetic agents not to be used routinely because of their weak efficacy and side effects, although their use may be considered in uncontrolled GORD Periodical re-evaluation of long-term therapy is recommended

Constipation

Constipation is significantly more common among children using medication known to slow intestinal motility, and in children who are tube fed. Evidence also suggests brain abnormalities play a role in colonic transit time delay as it was found to be more frequent in children with severe brain lesions.

DIAGNOSTIC METHODS	ESPGHAN RECOMMENDATION
Digital rectal examination should be performed at least once when assessing constipation in children for overall perianal evaluation as well as the amount, consistency and location of stool **Abdominal radiograph** can be used if diagnosis is uncertain **Colonic transit time assessment** to be used as a quantitative measure of constipation. A transit time delay at the proximal segment of the colon would suggest alterations of the motility of the smooth muscle associated with the reduction of activity of the striated muscles of the anal sphincter and/or of the pelvic floor.	Constipation to be diagnosed in children with NI by a careful history, abdominal, perineal, and if necessary, rectal digital examination

CONSTIPATION TREATMENT	ESPGHAN RECOMMENDATIONS
Should conform to the standard for non-disabled children. Common therapies as follows: **Faecal disimpaction** to be used as initial approach, in conjunction with maintenance therapy, using enemas for 3 consecutive days and osmotic agents until the child performs liquid and clear evacuation **Fibre increase** — children with NI are less responsive to laxatives than typically developed children. Modest constipation relief can be achieved by increasing fibre intake to 17 to 21g/day. **Osmotic laxatives** such as lactulose (1-2mL.kg -1.day -1) or polyethylene glycol (0.8 g.kg-1.day-1) can be used as maintenance therapy. **Enemas** in refractory cases, hydrocolonic enema and anterograde continence enema (ACE) is an effective option. Although this procedure is safe and effective in children with defecation abnormalities, there is limited information about long-term outcomes for children with NI	Standard treatments for constipation in children should be used for those with NI, unless there is a risk of aspiration of polyethylene glycol or liquid paraffin Fluid and fibre intake should be increased as an additional strategy to treat constipation in children with NI

Close monitoring is needed as high fibre intake may cause flatulence, distension and bloating. There is also a risk of severe pneumonia due to aspiration of laxatives, in children with NI with a high risk of aspiration.

1. Del Giudice E. et al. Gastrointestinal manifestations in children with cerebral palsy. Brain and Development 21(5):307-11 · August 1999

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