2010 Joint International Neurogastroenterology and Motility Meeting

Thursday, August 26 – Sunday, August 29, 2010

Westin Copley Place
Boston, Massachusetts

Endorsed by AGA Institute
ing. In the absence of further treatment alteration, their colons gradually filled up again, with impaction after 1–2 months.

Conclusion: Use of high doses of Movicol and Dulco lax is effective to disimpact children with chronic constipation. Success is excellent only if combined with education and engaging patients and parents. In the absence of further treatment modification, disimpaction is required again every 1–2 months. Patients avoided hospitalisation including naso-gastric wash-outs and rectal interventions. Time commitment from clinic and families is high initially, but reduces after a few weeks. Success and compliance are high.

241 Transcutaneous electrical nerve stimulation effect rectal motility in children
I.M. KJÖNSSON, S. HAGSTROM, C. SIGGAARD, J.C. DURHUUS and K. KROGH
Aarhus University Hospital, Aarhus, Denmark

Background: A positive effect of neuromodulation has been reported in children suffering from constipation. However, the actual effect on rectal motility is obscure.

Aim: To evaluate the acute effect of transcutaneous electrical nerve stimulation (TENS) on rectal motility in children.

Materials and Methods: In this double-blinded, placebo-controlled study among 19 children with overtime bladder (mean age 8.6 ± 1.8 years, 7 female) 48-hour urodynamic monitoring including rectal manometry was performed. After 24-hours investigation without stimulation on Day 1 the children were randomized to either active TENS or placebo treatment. On Day 2, 10 children received placebo. The catheter of active and sham stimulation was identical and both patients and investigators were blinded to whether active or sham stimulation was given. Surface electrodes were placed at the level of S2-S3. They received continuous stimulation until bedtime. (Median 88 min) All manometry records were analyzed visually. Rectal contractions were defined as pressure runs exceeding 5 cm H2O and lasting longer than 5 s.

Results: At baseline (Day 1) there was no significant difference in time with rectal motor activity from the two groups. (Active group median 1 min/hour [range 74–40 min/hour] vs placebo group median 19 min/hour [range 64–80 min/hour], P = 0.753). However, on the day of stimulation (Day 2) there was more time with rectal motor activity in the group receiving TENS (median 30 min/hour [range 15–47 min/hour]) compared to the placebo group (median 18 min/hour [range 8–40 min/hour], P = 0.03). There was a statistically significant increase in time with rectal motor activity from Day 1 to Day 2 in the group receiving TENS (P = 0.007) but not in the placebo group (P = 0.39).

Conclusion: In children, active TENS increases rectal motility whereas placebo stimulation shows no effect.

This may help explain why neuromodulation has a positive effect on fecal incontinence and constipation in children.

243 Long-term outcomes and quality of life in children with an antegrade continence enema (ACE)
A. SIDDIQI, S. FISHMAN, S. BAUER and S. NURKO
Children's Hospital Boston, Boston, MA, USA

Introduction: The Antegrade Continence Enema (ACE) is an effective therapeutic modality in select patients with intractable constipation and/or fecal incontinence. The aim of the study was to determine long-term outcome and health related quality of life (HRQOL) in children that have undergone the ACE.

Methods: ACE patients were contacted and a brief questionnaire focusing on outcomes and HRQOL was administered. Families were also asked to rate pre and post ACE functioning on a subjective 10 point scale. Objective clinical outcomes (successful / unsuccessful) was also determined based on stool frequency, predictability, continence, and pain.

Results: Eighty-four of 137 families were successfully contacted. The indication for ACE placement was intractable constipation or fecal incontinence. Mean age was 17 ± 6 years. Mean time since ACE placement was 76 ± 38 months. 55% (66%) patients were successful with the ACE at the time of their response to this questionnaire. Mean subjectively functioning scores pre-ACE were 1.8 ± 1.1, and post ACE were 7.9 ± 2.3 (P < 0.001). The table shows responses to the questionnaire in all 64 patients.

Among successful patients (n = 55) 98% said that they are better off after ACE placement, 94% said that they are happy, and 96% said that they would repeat the ACE. Among unsuccessful patients (n = 29) 83% said that they are better off, 55% said they were happy with their ACE, and 92% said they would repeat the ACE again.

Conclusion: The ACE was successful in 66% of patients. The majority of families whose children undergo ACE placement have a favorable impression of the procedure independent of objective final outcome, as a result of perceived clinical improvement.

244 Chronic constipation with small frequent defecations occurs in children but does not fit Rome III criteria for Functional Constipation
B.R. SOUTHWELL1, K.A. ISMAIL1, Y.J. YIK1,2 and J.M. HUTSON2
1 Murdoch Childrens Research Institute, Royal Childrens Hospital, and Department of Paediatrics, University of Melbourne, Victoria, Australia; 2University of Malaysia, Kuala Lumpur, Malaysia

Rome III, diagnostic criteria for Functional Constipation include <3 defecation/week, at least 1 episode of fecal incontinence, retention posturing, painful or hard bowel movements or large diameter stool symptoms paper. Slow Transit Constipation (STC) is associated with frequent small soft stools [1]. The aim of this study was to measure defecation characteristics in children with chronic STC and determine if they fulfilled the Rome III criteria for Functional Constipation. Methods: Nineteen STC patients were enrolled in a clinical trial of transcutaneous electrical stimulation [2]. All had chronic constipation for >2 years that had not responded to standard medical therapies, were on laxatives and stool softeners. They underwent a medical examination including abdominal palpation and extensive medical history and had radiotransit study to confirm they had STC. They recorded daily

Table for abstract 243

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy with the ACE</td>
<td>80%</td>
<td>5%</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better off with the ACE</td>
<td>93%</td>
<td>2%</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would recommend the ACE to another patient</td>
<td>88%</td>
<td>6%</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Would repeat the ACE again</td>
<td>92%</td>
<td>2%</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE gives greater control over bowel movements</td>
<td>80%</td>
<td>5%</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE helps avoid embarrassing social situation</td>
<td>71%</td>
<td>15%</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
diaries for one month, including numbers of defeca-
tions/day, episodes of soiling and pain, medication and
form of the study ( Bristol Stool Scale, BSS), if they had
sensation in the rectum of the need to defecate and
then went to the toilet or if they did timed sits on the
toilet.
Results: All 19 patients (8–17 years, mean 11.2 year)
had longstanding constipation that was managed but
not resolved with laxatives and stool softeners. Age at
onset was birth for 4, < 2 years for 9 and ≥ 2 years for 6
patients. 12/19 had constipation for < 10 years and 7/19
for >10 years. 5/19 patients had < 3 and 14/19 (75%) had
>3 defecations/week (mean 6.8, SEM 1.2) with
3.8 ± 1.1 defecation/week during timed sits with no
sensation of the need to defecate and 3.2 ± 0.8/week in
response to rectal sensation. The volume of stool at
each defecation was small. They did not have large rec-
tal masses or palpable stools in the abdomen. Children
recorded small rabbit pellet poops (BSS 1) and soft poops
(BSS 6).
Conclusion: Children with long standing chronic constipation
STC present with frequent small stools that can be soft or
hard. The only criteria in the Rome III definitions of
Functional Constipation that they fulfilled was soiling
>1/week. Their constipation is not associated with
anorectal retention or large stools. Small frequent stools
could be due to the laxatives and stool softeners
or the underlying STC. This group is not represented in
the Rome III criteria for Functional Constipation.
References:

245
Findings of simultaneous high resolution manometry and videoendoscopy in children with esophageal
symptoms
N.A. TPINS*, C.R. RUDOLPH and M. SOOD
Pediatrics, Medical College of Wisconsin, Milwaukee,
WI, USA

Background: A diagnosis of esophageal motor disorders is
considered when symptoms cannot be explained by
acid suppression test, endoscopy and/or reflux monitor-
ing.
Aims: We evaluate conventional manometry (CM), high
resolution manometry (HRM) and videoendoscopy (VF)
findings in children with otherwise unexplained esopha-
geal symptoms.
Methods: Findings of children evaluated by simulta-
neous esophageal manometry (VF) with high resolution
manometry (HRM) were compared. HRM was performed
using a 36 or 36 channel solid-state catheter (Unisensor, Switzerland). HRM data was
converted to 8 channel CM manometry with pressure
sensors in the stomach, LES (esophageal), 3, 6, 9, 12,
15 cm above the LES and UES. Swallows with liquid bar-
um and barium-coated solids and free drinking were
evaluated. HRM and VF data were recorded on a
synchonized computer system (MMS, Netherlands).
Results: Twenty one combined HRM/VF studies were
performed in 19 children (10 females, median age
10.1 years, range 0.7–19.5 years). Dysphagia was
reported by all, frequent regurgitation 12, vomiting 8,
chest pain 8, heartburn 6, throat pain 6, and choking 6.
11 reported 2 or more symptoms. CM was abnormal in
16 (achalasia 8, nutcracker 1, non-specific motor disor-
der 6). HRM was abnormal in 17 (achalasia 8, nut-
cracker 1, hypertensive peristalsis 3, hypotensive
peristalsis 5). In the patients with chest pain, 6 had
eosophageal spasm (4 had diffuse spasm involving 2
eosophageal segments and 2 had focal). A sustained
eosophageal contraction was found in 3 of 4 chest pain
patients with diffuse esophageal spasm. Hypotensive
peristalsis with a hypertensive LES was noted in the
others. Hypotensive peristalsis was noted in 2 patients
with regurgitation. Patients with throat pain had a
wide transition zone (4), focal esophageal spasm (2),
diffuse esophageal spasm (2) and achalasia (1). VF
was abnormal in 13 studies. VF findings were: slow bolus
transit (11), retrograde bolus movement (12), functional
LES obstruction (12) and anatomic abnormality (1). VF
abnormalities were noted in: 5/12 regurgitation, 4/8
vomiting, 7/8 chest pain, 4/6 heartburn, 4/6 throat pain
and 4/6 choking. Retrograde bolus movement (bolus
escape) occurred with achalasia (8), hypertensive
peristalsis (5) and hypotensive peristalsis with transition
zone abnormalities (4).
Discussion: Combined HRM and VF techniques are
feasible in children. In children with chest pain symp-
toms, esophageal spasm may be focal, and missed with
CM. Bolus transit abnormalities are well appreciated
with the addition of VF. Further study will improve
correlation of HRM and VF findings in children.

246
Intractable chronic constipation with rapid proximal
colonic transit may be an indication of food
intolerance.
Y.I. YIK1,2, R.S. SOUTHWELL3 and I.M. HUTSON4
1 Murdoch Childrens Research Institute, Royal
Childrens Hospital, and Department of Paediatrics
University of Melbourne, Victoria, Australia; and
2 University of Malay, Kuala Lumpur, Malaysia

Aims/Background: Nuclear transit studies (NTS),
which have been used in our institute since 1997,
allow us to follow transit through the stomach, small
and large intestines. In some children we observed
rapid transit through the small intestine and proximal
colon associated with anorectal retention. This study
aimed to determine how common this is and clinical
features associated.
Methods: Children drank a radioactive meal and
images were collected at 0, 2, 6, 24, 30 and 48 h.
We retrospectively reviewed NTS from 1997-2009 from
children with chronic constipation to identify patients
who had rapid transit in the proximal colon. Rapid
transit was defined as > 25% of tracer beyond hepatic
flexure at 6 hour, and > 25% of tracer beyond end of
descending colon at 24 h. This was correlated with
clinical symptoms and outcome from patient records.
Results: Five hundred and twenty (520) children with
chronic constipation underwent NTS. Children with
palpable faeces were not sent for NTS. 64/520 (12%)
had rapid proximal colonic transit. 55/64 were
available for review of clinical history, symptoms and
outcome. There was a high rate of symptoms associ-
ated with food allergy/intolerance: abdominal pain
(80%), nasal stuffiness (37%), other allergic symptoms
(43.6%), family history of allergy (10.9%). 18 children
were treated with dietary exclusion (cow's milk or
wheat protein) with resolution of symptoms in 9/18
(50%).
Conclusions: A subgroup of children with intractable
chronic constipation have rapid proximal colonic trans-
it and symptoms consistent with food allergy/intoler-
ance. 12-50% respond to dietary exclusion. NTS is
useful to identify not only patients with slow colonic
transit, but also rapid proximal transit that may be sec-
ondary to food intolerance. Exclusion diets have been
effective in 50% of those tested.

247
Targeting the cause of intractable chronic
constipation in children: The nuclear transit study
(NTS)
Y.I. YIK1,2, R.S. SOUTHWELL3 and I.M. HUTSON4
1 Murdoch Childrens Research Institute, Royal
Childrens Hospital, and Department of Paediatrics
University of Melbourne, Victoria, Australia; and
3 University of Malay, Kuala Lumpur, Malaysia

Aims/Background: Chronic constipation is a common
problem in children. Radio-nuclear transit studies
(NTS) can be used to investigate total colonic transit
time and where the slowing occurs. Gastric emptying,
small bowel transit, colonic transit and total colonic
transit time can be determined. This study reviewed
NTS collected over 12 years at a tertiary children's
hospital to identify sites of hold up or delay in children
with non-responding chronic constipation.
Methods: NTS which have been in common use in
Royal Childrens Hospital (RCH) since 1997 were
reviewed retrospectively. 557 patients had NTS for
chronic constipation during this period (1997-2009)
and data from 416 patients were available for data anal-
ysis (images for 141 patients were not available). A
radioactive milk drink was consumed and images
taken at 0, 2, 6, 24, 30, and 48 h. Patients with
palpable faeces were considered to have anorectal
retention and not sent for NTS.
Results: Four groups were identified: 1) Anorectal
retention (AR) with normal transit through the proxi-
mal colon [n = 66]. 2) AR with rapid proximal colonic
transit [n = 66]. 3) Slow transit in the proximal colon
with radioactivity retained in the ascending or trans-
verse colon at 24 - 48 h (Slow-transit constipation/
STC) [n = 160] and 4) STC with additional delay in
gastric emptying and/or slow small bowel transit [n = 37].
95 patients were not categorised. Children with AR
were managed with medical therapy. Children with AR
with rapid proximal colonic transit were investigated for
food intolerance and treated
with an elimination diet with some success. Children
with STC or with STC with gastric and/or small bowel
bodysymptom did not respond to standard medical
therapy and required therapies such as antegrade con-
sistency change with /or or small bowel stimulation.
Conclusions: NTS is useful for categorising patients
with intractable chronic constipation, allowing for dif-
ferent treatments targeting the site of delay. NTS
require a well established radiology facility but provide
important data for sub-grouping patients and making
decisions on treatment.
Gut Electrical Stimulation

249

Modulating energy settings to derive optimal EEG parameters in gastroparesis
S. DARAM1, C. LAHR2, D. SPREE1, A. KEDAR1 and T. ABELLI
1 Division of Digestive Diseases, Department of Medicine, University of Mississippi Medical Center, Jackson, MS, and 2 Department of Surgery, University of Mississippi Medical Center, Jackson, MS, USA

Purpose: Permanent gastric electrical stimulation (GES) can reduce symptoms for patients with refractory gastroparesis (GP). We have previously demonstrated that an algorithm permitting incremental changes in GES energy delivery may help improve symptom response. This study evaluated the effect of changes in GES energy levels at stimulator placement on the scrotal electrogastrogram (EGG) parameters of frequency, amplitude and frequency-amplitude ratio (FAR). We hypothesized that different GES energy settings may affect the EGG, potentially yielding an improved GEG, demonstrated by a lowered FAR.

Methods: Fifty-six study participants (42 F, 14 M; age range: 14–73 years, Mean age 42.3 years, 45 Caucasians, 11 African Americans, GP Etiology - Idiopathic 32, Diabetic 19, Post-surgical 5) underwent permanent GES placement for refractory GP. Serial EGG parameters were measured at stimulator placement in the following sequence with stimulator OFF (baseline), at previously standardized low, medium and high energy settings, and with stimulator returned to OFF. Results were compared with normal values (freq <3.3, FAR <20, compared by t-tests, and reported as mean ± SD).

Results: Patients as a group had abnormal baseline EGG values. Maximum reduction in scrotal EEG FAR was obtained using low energy for 47% of patients (n = 15), medium energy for 25% (n = 8), and high energy for 28% (n = 9). Mean values for results are provided in the table.

Conclusions: Serial EGG values obtained at GES device placement in 56 patients with GP demonstrate immediate changes in frequency, amplitude and FAR. Optimal EGG values were achieved for 80 patients with low energy, 11 with medium energy, and 15 with high-energy. Follow-up studies are needed to assess whether or not these observed changes can help predict favorable long-term outcome with GES.

250

Transabdominal electrical stimulation therapy for slow-transit constipation (STC) from physiotherapy clinic-delivered to parental home-delivered treatment
Y.I. YIK1, N. HUTSON2 and B.R. SOUTHWELL1
1 Murdoch Childrens Research Institute, Royal Childrens Hospital, and Department of Paediatrics, University of Melbourne, Victoria, Australia, and 2University of Malaya, Kuala Lumpur, Malaysia

Aims/Background: Transabdominal electrical stimulation (using interdigital current) stimulates colonic motor activity. In an RCT, stimulation was performed by trained physical therapists at clinics, for 20 min, 5 times/week for 4 weeks. 46 children completed the trial (23 sham stimulation). Colonic motility was increased and colonic transit times decreased [1] with no change in defecation frequency. Subsequently 11 patients took home battery operated machines and performed stimulation at home every day. Defecation increased in 9/11 [2]. The aim of this study was to determine how good results are if machines and the method are delivered by a naive clinician rather than trained physical therapist.

Methods: A pediatric surgeon was trained in use of the home stimulation machine by one of the RCT physical therapists. 20 children with STC (diagnosed with nuclear transit study) who were naive to electrical stimulation were enrolled. Children and parents attended a training session and were shown how to place the electrodes and run the machine. Photos were taken for the family to use for reference. They went home and were contacted by phone daily to overcome problems. Patients filled in daily continence diaries for 1 month before and during stimulation that was given daily for 30 min. There were no adverse effects. Stimulation continued for 4 months.

Results: At baseline, 72% of the patients had defecation each day with high levels of laxatives but did not have sensation of the need to defecate. With stimulation, 10/20 developed sensation of the need to defecate. Defecation increased in 4/20 [who had <3 defecations/week at the start] after 2–3 months of daily stimulation. Two children altered the settings of the machine so no effective current was delivered. Two families failed to return diary information.

Conclusions: Transcutaneous electrical stimulation therapy using interdigital currents is safe for home treatment of children with slow-transit constipation, however good education is required for effective delivery. The effects are slow to develop. Future studies will investigate combining medical disappointment before electrical treatment to determine if a quicker response can be obtained.


251

Small intestinal motility during sacral nerve stimulation: a study with the motility tracking system MTS-1
J WORSKOE1, L. FYNE2, I. FASSOV2, N.JM KRIJHOF2, S. LAURBERG3 and K KROGH2
1 Aalborg University, Center for Sensory Motor Interaction (SMI), Aalborg, Denmark, 2 Aarhus University Hospital, Department of Surgery, Aalborg, Denmark, and 3 Aarhus University Hospital, Department of Hepato-gastroenterology V Aalborg, Denmark

Background: Sacral nerve stimulation (SNS) effectively treats patients with fecal incontinence [1]. Stimulation

Table for abstract 249

<table>
<thead>
<tr>
<th>Energy Level</th>
<th>Baseline (n = 54)</th>
<th>Low (n = 30)</th>
<th>Medium (n = 11)</th>
<th>High (n = 15)</th>
<th>Post-GES (n = 54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Frequency</td>
<td>5.08 ± 1.94</td>
<td>4.42 ± 1.45</td>
<td>4.51 ± 1.64</td>
<td>4.74 ± 1.83</td>
<td>4.46 ± 1.73</td>
</tr>
<tr>
<td>Mean Amplitude</td>
<td>0.10 ± 0.10</td>
<td>0.39 ± 0.31</td>
<td>0.32 ± 0.21</td>
<td>0.33 ± 0.22</td>
<td>0.28 ± 0.31</td>
</tr>
<tr>
<td>Mean FAR</td>
<td>56.8 ± 21.74</td>
<td>18.84 ± 16.96</td>
<td>21.89 ± 20.49</td>
<td>26.86 ± 29.51</td>
<td>25.80 ± 36.97</td>
</tr>
<tr>
<td>p-value</td>
<td>0.0002</td>
<td>0.007</td>
<td>0.004</td>
<td>0.002</td>
<td></td>
</tr>
</tbody>
</table>