FINAL ID: T1

TITLE: Validation of Body Surface Colonic Mapping Against High Resolution Colonic Manometry: A Novel Non-invasive Tool for Detection of Colonic Motility

ABSTRACT BODY:

Purpose/Background: Abnormal cyclic motor pattern (CMP) activity is implicated in bowel dysfunction, such as fecal incontinence and postoperative ileus. High-resolution colonic manometry (HRCM) studies have characterized CMPs and enabled in-depth analysis of colonic motility in research settings. However, manometry is invasive, costly, and not widely accessible. A non-invasive method for detection of colonic motility from the body surface would be a critical advance, but such methods have never been validated. This study aimed to validate novel methods for HR body surface colonic mapping (BSCM) as an electrophysiological technique for detecting colonic CMPs, through spatiotemporal correlation with simultaneous HRCM.

Methods/Interventions: Patients were recruited from the Auckland District Health Board elective colonoscopy lists. Synchronous recordings of HRCM and BSCM were performed for 3-4 hours in asymptomatic participants with normal colons, with a meal given at the hour mark. A signal processing method for BSCM was developed to specifically detect CMPs non-invasively. Quantitative temporal analysis compared the synchronicity of motility patterns, detection of meal responses, frequency bands, and overall motility index correlations between invasive and non-invasive methods. Spatial heat maps were analyzed. Usability and patient preference were determined using a questionnaire.

Results/Outcomes: A total of 11 participants were recruited of which seven had successful simultaneous recordings performed (five females; median age: 50 years [range: 38 to 63]). Median body mass index was 25.6 (range: 22.3 to 31.3). Meal responses were successfully detected across both the HRCM and BSCM techniques, and were found to be statistically comparable. The meal response duration between HRCM and BSCM was similar; a mean of 11.2 mins (p = 0.62) difference, and their timings (start and end times) were also statistically similar (p > 0.7). Correlation heat maps demonstrating the origins of CMP activity were in agreement. All participants preferred BSCM to HRCM.

Conclusions/Discussion: This study presents a novel non-invasive method for capturing colonic motility including colonic CMP activity and meal responses. Data was validated by correlation to HRCM and showed localization to the colon. BSCM is expected to contribute novel insights into the mechanisms of postoperative ileus as well as in functional disorders such as fecal incontinence and response to sacral neuromodulation. Future studies correlating BSCM findings with control and symptomatic participants at a larger scale will further evaluate CMPs as a potential biomarker of colonic function in colorectal diseases.

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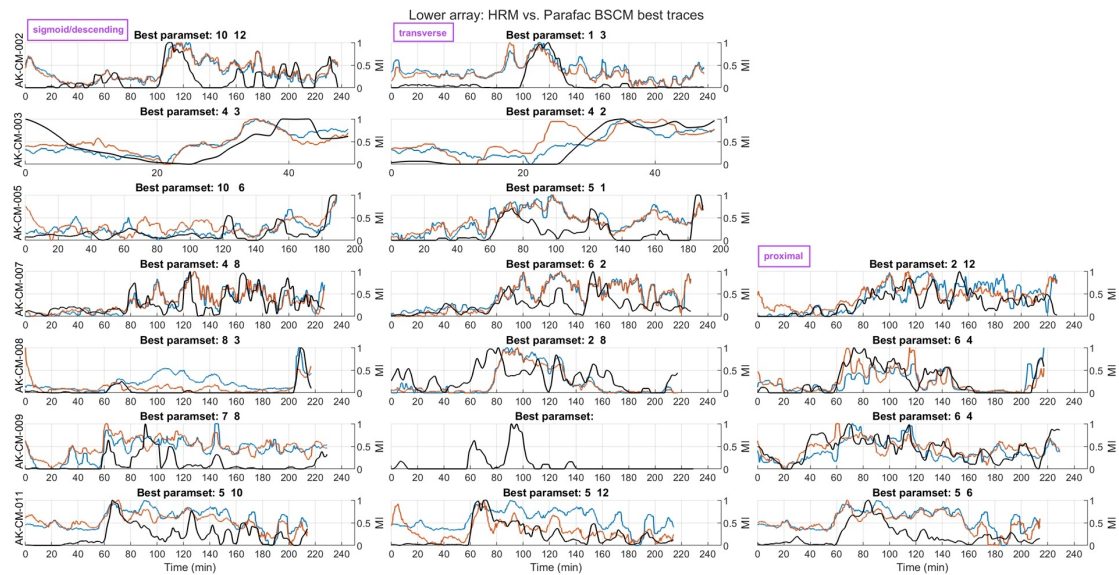
HRCM and BSCM motility index: HRCM MI (black line) and two best traces of BSCM MI (blue and orange) are shown using PARAFAC analysis. Each row represents a single participant and the columns are the segments of the colon where manometry data was available (distal, transverse and proximal colons).

IMAGE CAPTION: HRCM and BSCM motility index: HRCM MI (black line) and two best traces of BSCM MI (blue and orange) are shown using PARAFAC analysis. Each row represents a single participant and the columns are the segments of the colon where manometry data was available (distal, transverse and proximal colons).

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FINAL ID: T2

TITLE: Use of Multiple Disease-modifying Drugs Within One Year Associated With Increased Colectomy in Ulcerative Colitis

ABSTRACT BODY:

Purpose/Background: Disease modifying drugs (DMD) demonstrated promising results in inducing clinical remission of ulcerative colitis (UC). However, in aggressive phenotypes, the rapid cycling through multiple agents may be a surrogate for refractory disease requiring colectomy. This study aims to assess the relationship between number of DMDs used within the first year of disease treatment and the subsequent need for colectomy.

Methods/Interventions: The Marketscan database (2005-2020) was queried for inpatient, outpatient, and pharmaceutical claims of DMD use in adults. DMDs included infliximab, adalimumab, certolizumab, vedolizumab, golimumab, ustekinumab, tofactinib, and ozanimod. First claim date for a DMD was the index date (ID). Patients with ICD-9 or ICD-10 codes for UC within 1 year prior to ID, continuous enrollment in an insurance plan from 1 year prior to ID, and follow-up of ≥30 days were included. Patients were categorized based on number of DMDs used (1, 2, 3+) within 1 year after ID. Landmark date (LD) was identified as the date 1 year after ID. The primary outcome was time to colectomy. Kaplan-Meier curves were used to estimate cumulative incidence of colectomy after the LD by number of DMDs prior to LD. Multivariable, time-varying Cox proportional hazard model estimated the hazard ratio (HR) of requiring surgery. Model included number of DMDs (time-varying covariate), age, index date, sex, comorbidity index, and pancolitis. To examine if HR of surgery changed over time based on speed of DMD cycling, a test of non-proportional hazards was performed. P-values for all data presented is <0.05 and considered significant.

Results/Outcomes: There were 12193 patients identified with UC and DMD use. Their median age was 41 years-old and pancolitis was identified in 48.7% of patients. At the LD, DMD use of 1, 2, or 3+ had decreasing prevalence of 83.3%, 14.8%, 1.8%, respectively, with 5.4% of patients requiring colectomy beyond the LD. By 3 years after ID, 27% of patients required colectomy, with HR of 2.41 and 6.96 for 2 and 3+ DMDs within the first year compared to 1 DMD (Fig.1). Time-varying analysis of cumulative adjusted HR to colectomy from ID showed increasing use of 2, 3, or 4+ DMDs to be associated with increased risk of colectomy (HR 4.22, 11.7, and 22.9, respectively) compared to 1 DMD. While the number of DMDs in the first year was associated with colectomy, the time interval between DMD transition was not predictive of colectomy.

Conclusions/Discussion: In patients with UC with poorly controlled disease, using 3+ DMD within 1 year is associated with increased likelihood of requiring surgical intervention, highlighting the importance of early involvement of surgical teams in the disease-course of patients requiring any DMD. However, as more rapid transitioning of DMDs did not influence likelihood of colectomy, it is reasonable to consider trials of new agents in an effort to increase organ preservation

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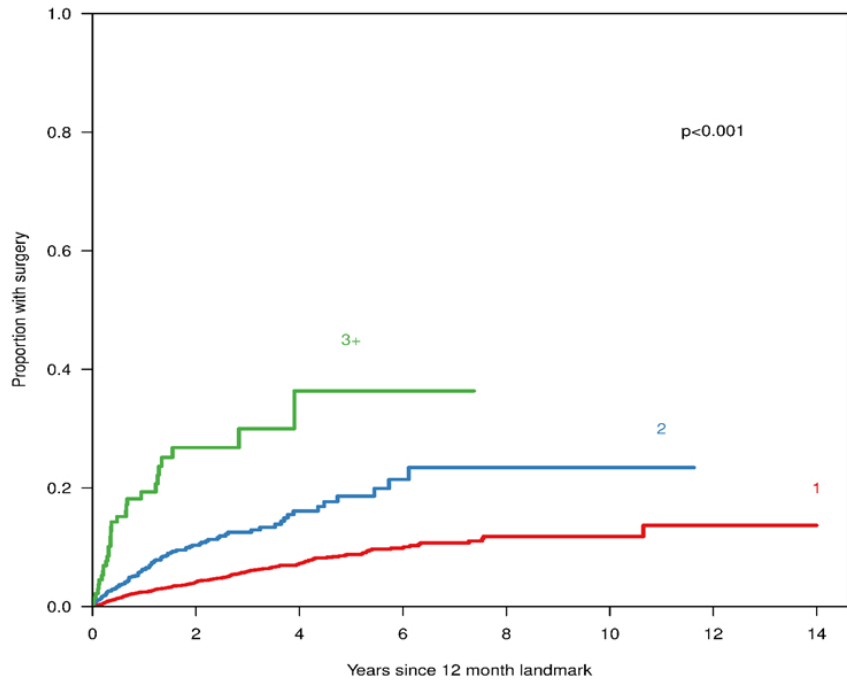Cumulative Incidence of Colectomy By Number of Biologics

IMAGE CAPTION:

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FINAL ID: T3

TITLE: Multidisciplinary Robotic Management of Complex Enometriosis at a Tertiary Center in UK: An Interim Analysis

ABSTRACT BODY:

Purpose/Background: Pelvic endometriosis can have a significant impact on the quality of life and often requires complex surgical procedures with associated morbidity. Robotic approach offers distinct advantages to performing precision surgery often leading to organ preservation. Pelvic endometriosis can involve all pelvic compartments hence requiring input from gynecologists, colorectal surgeons, radiologists, hepatobiliary surgeons, and urologists. Management of such complex patients in a multidisciplinary team can reduce the complication rate, improve outcomes, and allows the correct decisions to be made for each patient.

Methods/Interventions: Robotic endometriosis database at a tertiary center for endometriosis in the UK was analyzed. Cases with grade III-IV endometriosis requiring combined operation with a colorectal surgeon were identified between January 2021 and March 2022. All patients were managed through a complex gynecological multidisciplinary setting including gynecologists with advanced training in robotic endometriosis surgery, robotic specialist colorectal surgeons, urologists, radiologists, nurse specialists, and database administrator. Demographic and intraoperative data were collected. Pre and post-operative pain scores and quality of life were collected through the British Society for Gynaecological Endoscopy (BSGE) Pelvic Pain Questionnaire.

Results/Outcomes: From a database of 230 robotic endometriosis cases, a total of 39 consecutive robotic grade III-IV endometriosis cases were included. Median age was 35 (IQR, 30-41) years. Median body mass index was 24 (IQR, 20.3-25.8). Type of procedures carried out included: Shaving 34 (87.2%), Disc excision 3 (7.7%), and segmental resections 2 (5.1%). Only one (2.6%) patient required a stoma. There were no conversions or return to theatre postoperatively. Median length of postoperative stay was 2 (IQR, 2-4) days. There was no 90-day mortality, and no Clavien-Dindo grade III or IV complications. All cases were histologically confirmed as endometriosis. Median preoperative dyschezia score was 4 (IQR, 2-9), and improved to 1 (IQR, 0.5-5) postoperatively (at 6 months). Median preoperative score of dyschezia without period was 1 (IQR, 0-6), and improved to 0 (IQR, 0-1.5) postoperatively (at 6 months). Median preoperative score of quality of life was 55 (IQR, 37.5-70), and improved to 70 (IQR, 61-75) postoperatively (at 6 months).

Conclusions/Discussion: A multidisciplinary approach to the management of complex pelvic endometriosis can offer excellent surgical outcomes with clinical improvement of dyschezia and quality of life. A higher proportion of successful shaving in this series suggests that robotic approach can enhance the organ preservation rates in complex endometriosis. Further analysis is required to expand the benefit of the robotic multidisciplinary approach for the management of complex pelvic endometriosis.

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FINAL ID: T5

TITLE: Combined Robotic Ventral Mesh Rectopexy and Sacrocolpopexy for Tricompartmental Pelvic Organ Prolapse

ABSTRACT BODY:

Purpose/Background: Pelvic floor dysfunction (PFD) is a common and underdiagnosed pathology in females. Ventral mesh rectopexy (VMR) is an effective treatment for obstructed defecation syndrome and rectal prolapse. A robotic approach has grown in popularity due to the restricted space of the pelvis and enhanced visibility. Multispecialty management should be the approach for the treatment of PFD, as there is often multicompartmental prolapse (MCP). There is no available research to date on the robotic-assisted multidisciplinary pelvic floor reconstruction.

The aim of this study was to assess the safety of combined robotic VMR and either uterine or vaginal fixation for treatment of multicompartmental pelvic organ prolapse.

Methods/Interventions: All patients undergoing robotic VMR in our institution from March 2018 to March 2021 were retrospectively reviewed. For the analysis, we included all patients with robotic approach and combined procedure. Patients who did not undergo a combined procedure with urogynecology were excluded. All patients were discussed at a dedicated bi-weekly pelvic floor multidisciplinary team meeting before planning surgery. Operative time, blood loss, intraoperative complications, postoperative POPQ score, length of stay, 30-day morbidity, and readmission were obtained.

Results/Outcomes: From 2018 to 2021, there were 321 operations for patients with MCP. The mean age was 63.4 years, and BMI 27.2. The predominant primary PFD was rectal prolapse in 170 cases (60%), rectocele in 107 (38%), and abnormal pelvic descent in 96 (34%). Pelvic Organ Prolapse Quantification (POP-Q) scores were II in 146 patients (53%), III in 121 (44%) and IV in 9 (3%). 315 of the 323 cases included robotic VMR (98%). Sacrocolpopexy or sacrohysteropexy was performed in 281 patients (89%). Other procedures included 175 hysterectomies (54%), 104 oophorectomies (32%), 151 sling procedures (47%), 149 posterior repairs (46%), and 138 cystocele repairs (43%). The operative time for VMR was 211 minutes and combined pelvic floor reconstruction 266 minutes. The average length of stay was 1.6 days. Eight patients were re-admitted within 30 days, 1 with a severe headache and 7 patients with post-operative complications (2.5%). The complications included: ileus, urinary retention requiring catheterization, pelvic collection, and perirectal collection both requiring radiologic drainage. Four complications required re-operation: epidural abscess, small bowel obstruction, missed enterotomy requiring resection, and urinary retention requiring sling revision. There were no mortalities.

Conclusions/Discussion: A combined robotic approach for multicompartmental pelvic organ prolapse is a safe and viable procedure with a relatively low rate of morbidity and no mortality. This is the highest volume series of combined robotic pelvic floor reconstruction in the literature and demonstrates a low complication rate and short length of stay.

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