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FINAL ID: M7
TITLE: Pelvic exenteration for anal squamous cell carcinoma: oncological, morbidity and quality of life outcomes
ABSTRACT BODY:
Purpose/Background: Salvage surgery is the only potentially curative treatment option for patients with anal squamous cell carcinoma (aSCC) that persists or recurs after definitive chemoradiotherapy. Where adjacent pelvic viscera, soft tissues and bone are involved, pelvic exenteration (PE) with wide excision of the perineal skin and pelvic floor musculature may be required to ensure R0 resection. Recent data indicates PE for aSCC is associated with higher morbidity rates compared to PE for other tumour types.
Methods/Interventions: Consecutive patients who underwent PE for aSCC at a single centre between 1994 and 2021 were included. Clinical and quality of life (using SF-36® collected at baseline, 6, 12, 18 and 24 months postoperative) data were extracted from a prospectively maintained database.
Results/Outcomes: Of 958 patients who underwent PE, 66 patients (6.9%) had aSCC. 32 patients (48.5%) were male and the median age was 57 years (range 31-79). 10 patients (15%) had primary aSCC (chemoradiotherapy contraindicated), 49 (74%) had recurrent aSCC (previous chemoradiotherapy) and 7 (11%) had re-recurrent aSCC (previous chemoradiotherapy and salvage abdominoperineal resection). In recurrent aSCC, median time from chemoradiotherapy to PE was 11 months (range 3-161 month). Operative information, morbidity and mortality data are presented in table 1. Of 62 patients who underwent PE with curative intent, 50 (81%) had R0 resection. For patients with primary, recurrent and re-recurrent tumours the R0 margin rate was 100%, 80% and 57%, respectively (p=0.071).

For patients undergoing PE with curative intent, 5-year overall survival was 41% and the median overall survival was 26 months. R0 resection was associated with a higher 5-year overall survival (50% vs. 8%, p<0.001). 5-year overall survival for patients with primary, recurrent and re-recurrent tumours was 58%, 41% and 18% (p=0.315). Local recurrence data was available for 49 patients and 1-, 3- and 5-year local recurrence-free survival rates were 65%, 39% and 37%, respectively. The 2-year local recurrence-free survival was higher in patients with R0 resection compared to those with involved margins (57% vs. 11%, p<0.001).

Of the 34 patients that reported quality of life data, the mental health component scores, role-physical, bodily pain, vitality, social functioning and mental health presented slightly improved trajectories between baseline and 24 months postoperatively (all p values < 0.05). No statistically significant changes were observed in the physical component score, physical functioning, general health and role-emotional trajectories over time.
Conclusions/Discussion: Although PE for aSCC is associated with significant morbidity, mostly due to perineal wound and myocutaneous flap-related complications, long-term survival and quality of life outcomes compare favourably to published outcomes of PE for other tumour types including locally recurrent rectal cancer.
(no table selected)

Table 1. Operative information, morbidity and mortality following pelvic exenteration for anal SCC (N=66)

Characteristic	N (%)
Neurovascular resection	
Lateral compartment excision	31 (41)
Sciatic nerve excision	8 (12)
Common/External iliac vessel excision	1 (1.5)
Urinary resection	
Partial cystectomy	2 (3)
Total cystectomy	41 (62)
Ileal conduit	34 (51.5)
Colonic conduit	6 (9)
Bone Resection	
Sacrectomy	44 (67)
S1	2 (3)
S2	0 (0)
S3	22 (33)
S4	13 (20)
S5	6 (9)
Anterior sacral cortex excision	1 (1.5)
Pubis	18 (27)
Ischium	17 (26)
VRAM flap reconstruction	38 (56)
*Blood loss, median (range), mL**	1800 (0-8000)
Length of operation, median (range), minutes	580 (234–1068)
Length of ICU admission, median (range), day	4 (0-71)
Length of stay, median (range), day	24 (10-196)
Return to theatre	16 (24)
Perineal/sacral wound or flap necrosis or dehiscence	7 (11)
Perineal/pelvic collection	2 (3)
Perineal necrotising fasciitis	1 (1.5)
Enteroperineal fistula	1 (1.5)
Small bowel obstruction	1 (1.5)
Cruceam for ileal conduit ischaemia (conduitoscopy)	1 (1.5)
Urine leak	1 (1.5)
Lower limb compartment syndrome	1 (1.5)
Long saphenous vein ligation for thrombus	1 (1.5)
Complications	
Any	54 (82)
CD Grade I/II	43 (65)
CD Grade III/IV	22 (33)
In hospital mortality	1 (1.5)

* Data missing for 12 patients; *CD – Clavien-Dindo*

IMAGE CAPTION:

AUTHORS (FIRST NAME, LAST NAME): K. Brown[1], M. Solomon[1], D. Steffens[1], K. Ng[1], C. Byrne[1], K. Austin[1], P. Lee[1]

AUTHORS/INSTITUTIONS: K. Brown, M. Solomon, D. Steffens, K. Ng, C. Byrne, K. Austin, P. Lee, Royal Prince Alfred Hospital, Sydney, New South Wales, AUSTRALIA|

FINAL ID: M5

TITLE: Risk of Proctectomy after Ileorectal Anastomosis in Familial Adenomatous Polyposis in the Modern Era

ABSTRACT BODY:

Purpose/Background: Prophylactic surgery for familial adenomatous polyposis (FAP) has evolved over several decades. Restorative proctocolectomy with ileal pouch anal anastomosis (IPAA), developed in the 1980s, provided an alternative to total abdominal colectomy with ileorectal anastomosis (TAC/IRA). We have previously shown that the rate of proctectomy and rectal cancer after TAC/IRA in the “pre-pouch” era was 32% and 13%, respectively. We hypothesize that patients with FAP and relative rectal sparing specifically selected for IRA in the modern era (1993-2020) would have lower rates of secondary proctectomy and rectal cancer.

Methods/Interventions: Patients with FAP who underwent TAC/IRA from 1993-2020 were identified in an IRB-approved Inherited Colorectal Cancer Registry. Data on demographics, APC pathogenic variants and extra-colonic manifestations were abstracted. Number of rectal polyps present at the time of TAC/IRA was recorded. The primary outcome was rate of proctectomy and secondary outcome was rectal cancer incidence.

Results/Outcomes: 197 patients underwent TAC/IRA between 1993 and 2020. At the time of TAC/IRA, median age was 24 (range 10-67) and median number of rectal polyps was 5 (IQR 0-14, rectal polyp number was not recorded in 23 patients). Chemoprevention (most commonly sulindac) was utilized in 65 patients (33%) before and/or after IRA. Median follow-up was 13 years (IQR 6-17). Sixteen patients (8%) had secondary proctectomy. Indication for proctectomy was rectal cancer (N=6, 3%) (N=2 Stage I; N=4 Stage III), polyps with high grade dysplasia (N=4), increasing polyp burden (N=3), defecatory dysfunction (N=2) and anastomotic leak (N=1). Median time to proctectomy was 10 years (IQR 6-18) and median time to rectal cancer was 14 years (IQR 7-22). Overall, 31 of 174 patients (18%) had 20 or more rectal polyps at the time of TAC/IRA. In this group, 8 patients (26%) underwent proctectomy and 3 patients had rectal cancer (10%). Among those with less than 20 polyps, 8 patients (6%) underwent proctectomy and 3 patients had rectal cancer (2%). Proctectomy-free survival was significantly different for patients who had more or less than 20 polyps at the time of TAC/IRA (Figure 1). In univariable analysis, the number of rectal polyps at the time of TAC/IRA was associated with the likelihood of proctectomy (OR 1.1, $P<0.001$). Rectal polyp number was not associated with incident rectal cancer.

Conclusions/Discussion: In the modern era, patients with FAP selected for TAC/IRA have low rates of secondary proctectomy and rectal cancer compared to historical controls. Although more than 20 rectal polyps at the time of TAC/IRA was associated with a higher proctectomy rate, the majority of patients in this group did not go on to proctectomy, and rectal polyp burden was not a predictor of developing rectal cancer. With appropriate selection criteria and surveillance, IRA remains an important treatment option for patients with FAP.

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Figure 1: Proctectomy-free survival based on rectal polyp number at the time of TAC/IRA

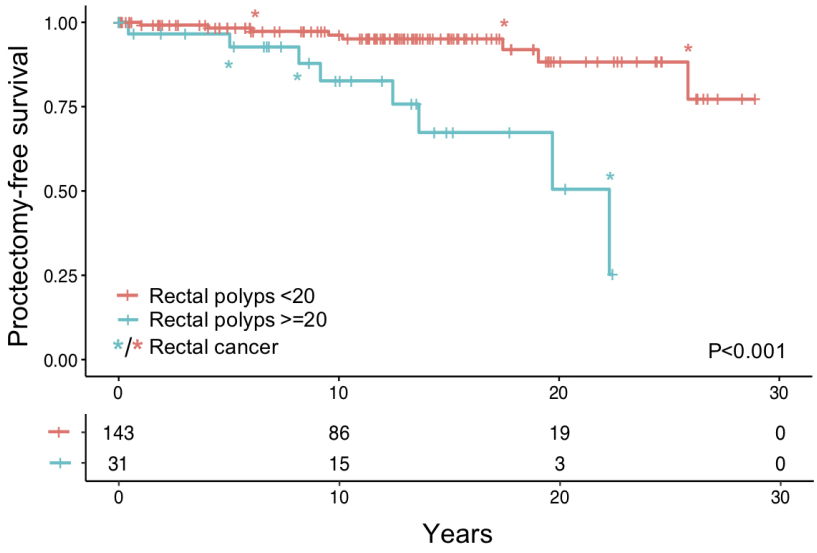

IMAGE CAPTION:

AUTHORS (FIRST NAME, LAST NAME): S. Banerjee[1], C. Anderson[1], J. Sommovilla[1], M. O'Malley[2], L. LaGuardia[2], A. Vazquez Villasenor[2], C. Macaron[3], C. Burke[3], D. Liska[1]

AUTHORS/INSTITUTIONS: S. Banerjee, C. Anderson, J. Sommovilla, D. Liska, Department of Colorectal Surgery, Cleveland Clinic, Cleveland, Ohio, UNITED STATES|M. O'Malley, L. LaGuardia, A. Vazquez Villasenor, Sanford R. Weiss MD Center for Hereditary Colorectal Neoplasia, Cleveland Clinic, Cleveland, Ohio, UNITED STATES|C. Macaron, C. Burke, Department of Gastroenterology, Cleveland Clinic, Cleveland, Ohio, UNITED STATES|

FINAL ID: M6

TITLE: Digital Intervention Using Mobile Device on Lifestyle after Surgery in Patients with Colorectal Cancer: Short-term Outcomes of a Randomized Controlled Trial

ABSTRACT BODY:

Purpose/Background: Colorectal cancer is one of the most common cancers worldwide. Surgical modalities and adjuvant treatments have advanced over the past century, but relatively less attention has been given to improving the quality of life (QOL). Recent studies report significant association with cancer recurrence and patient lifestyle after surgery, hence emphasizing the necessity to aid patients' daily life after surgery. The proposed study will evaluate the effects of digital intervention using mobile applications on lifestyle after surgery for colorectal cancer.

Methods/Interventions: A randomized controlled trial (RCT) was performed. A total of 320 patients diagnosed with colorectal cancer between age 20 to 70 years old were to be enrolled. Patients were randomized to 4 groups (3 groups each assigned to different mobile applications, and the control group). Surveys valuating health-related QOL, physical measurements, metabolic parameters (fasting glucose, HbA1c, triglyceride, HDL cholesterol), and fat/muscle mass measured in abdominal computed tomography (CT) were checked before surgery and every 6 months after surgery. Statistical analyses were computed to compare outcomes between groups.

Results/Outcomes: A total of 320 patients were enrolled in the study during November 2020 to November 2021. Intervention groups A, B, and C consisted of 76, 80, and 78 patients respectively and the control group comprised of 79 patients. There were no significant differences in basic characteristics between each group. Baseline metabolic parameters and fat/muscle measured from abdominal CT were comparable between each group except serum triglyceride in which group C was significantly higher (P =0.035). At 6 months follow up, 278 patients had complete data. At 6 months after surgery, the two groups did not present significant difference in metabolic parameters and fat/muscle measurements. The intervention group presented a better improvement in health-related QOL survey scores, most significantly in the FACT-C survey (P =0.017).

Conclusions/Discussion: Short-term results show no significant influence in metabolic parameters and fat/muscle mass from using mobile applications. The intervention group presents a trend of better QOL status at 6 months after surgery. The study will further evaluate changes of metabolic parameters, fat/muscle measurements, and health-related QOL scores during 18 months and will assess the effects of digital intervention on colorectal patients after surgery.

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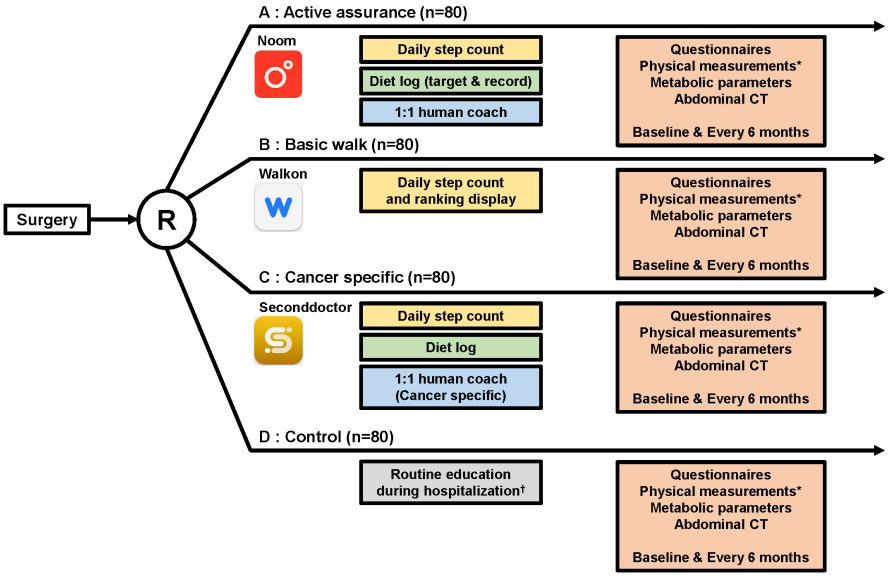

Schematic flowchart of clinical trial describing functions of each application and patient assessment during study progress.

IMAGE CAPTION: Schematic flowchart of clinical trial describing functions of each application and patient assessment during study progress.

AUTHORS (FIRST NAME, LAST NAME): Y. Kim[1], I. Park[1]

AUTHORS/INSTITUTIONS: Y. Kim, I. Park, Clinical assistant professor, Asan Medical Center, Songpa-gu, Seoul, KOREA (THE REPUBLIC OF)|

FINAL ID: M4

TITLE: Tumor Deposit Should be Considered Significantly as Poor Prognostic Factor in Stage III Colon Cancer: Multicenter Database Study

ABSTRACT BODY:

Purpose/Background: In the current AJCC staging system of colon cancer patients, tumor deposits (TDs) are implemented into the N category as N1c. However, if there are LN metastasis, the presence of TDs is ignored and only the number of LN metastasis is important to categorize nodal stages, such as N1a/b or N2a/b.
We aimed to investigate the oncologic impact of TDs in colon cancer and suggest the optimal changes of AJCC staging system without ignoring the prognostic values of TDs.

Methods/Interventions: Prospectively collected primary colon cancer patients on the Seoul Colorectal group (SECOG) database, who underwent curative radical resections between January 2010 and December 2020 at 3 tertiary hospital were analyzed retrospectively. Clinical characteristics and risk factors of TD-positive were analyzed. Recurrence-free survival and overall survival were compared between TD-negative and TD-positive patients in each pN category.
We also analyzed the oncologic impact using the SEER database.

Results/Outcomes: Among the 4,806 patients (mean age=63.76, M:F=56.3:43.7), 903 (18.8%) had tumor deposits and mean TD count was 1.46 ±2.43. Out of 903 TD-positive patients, 556 (61.5%) patients were concomitantly LNM positive and 188 (20.8%) patients were staged as pN1c.
TD-positive were significantly related with left colon cancer, poorly differentiated histology, pT3 or pT4 category, four or more of positive lymph nodes, vascular invasion, and perineural invasion in multivariable analysis ($p<0.05$).
The median follow-up period was 37.52 months. (range, 1-114 months), and recurrence developed in (11.63%) patients. TD-positive patients had been recurred significantly more (8.3% vs. 29.0%, $p<0.001$).
The RFS and OS of TD-positive patients was significantly worse than TD-negative patients (5-year RFS; 72.7% vs. 89.4%, $p<0.001$, 5-year OS; 66.3% vs. 87.3%, $p<0.001$).
In stage III, the RFS and OS in the patients with N1 and TD+ were significantly worse than those with N1 and TD- (5-year RFS; 73.8% vs. 85.3%, $p<0.001$, 5-year OS; 69.5% vs. 83.1%, $p<0.001$). The RFS and OS in the patients with N2 and TD+ were also significantly worse than those with N2 and TD- (5-year RFS; 66.5% vs. 73.9%, $p<0.001$, 5-year OS; 56.4% vs. 79.0%, $p<0.001$).
However, the RFS and OS of N1 TD-positive patients compared with N2 TD-negative patients were statistically not different ($p=0.972$ and $p=0.061$) (Fig1A)
The survival outcomes using the SEER database showed comparable results ($p=0.105$) (Fig1B).

Conclusions/Discussion: TDs were associated with risk factors presenting poor prognosis and significantly affected the survival outcomes. Presence of TDs in stage III colon cancer patients presented significantly worse survival outcomes in pN categories. The impact of TDs on prognosis should not be reduced, and it could be suggested that the oncologic prognostic significance of N1 and TD-positive are similar to those of N2.

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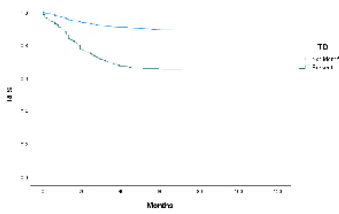
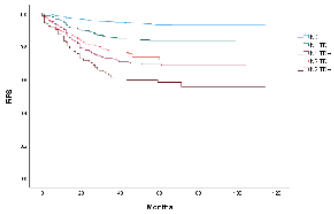
I. SECOG Seoul Colorectal Research Group

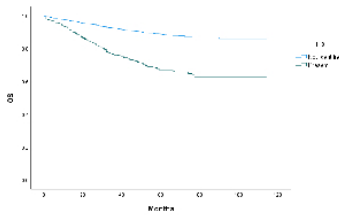
A. RFS (TD- vs. TD+)



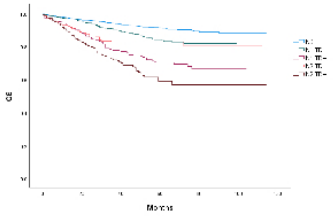
B. RFS (N category & TD -/+)



C. OS (TD- vs. TD+)

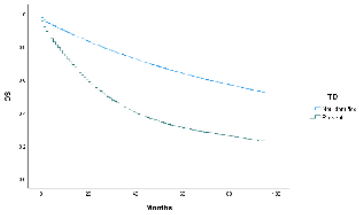


D. OS (N category & TD -/+)



II. SEER

A. OS (TD- vs. TD+)



B. OS (N category & TD -/+)

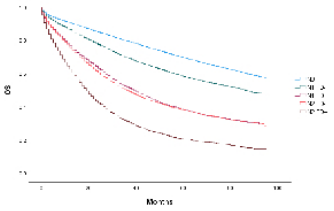


IMAGE CAPTION:

AUTHORS (FIRST NAME, LAST NAME): J. Kim[1], S. Ryoo[2], D. Lee[3], H. Lim[2], M. Kim[2], J. Park[2], S. Jeong[2], K. Park[2]

AUTHORS/INSTITUTIONS: J. Kim, General surgery resident, Seoul National University Hospital, Jongno-gu, Seoul, KOREA (THE REPUBLIC OF)|S. Ryoo, H. Lim, M. Kim, J. Park, S. Jeong, K. Park, General surgery professor, Seoul National University College of Medicine, Seoul, KOREA (THE REPUBLIC OF)|D. Lee, General surgery professor, National Cancer Center, Goyang, Gyeonggi-do, KOREA (THE REPUBLIC OF)|

FINAL ID: M1

TITLE: Colorectal Cancer Diagnosis by a Portable Breath Analyzer

ABSTRACT BODY:

Purpose/Background: Colorectal cancer screening may save life but screening tests available so far have unsatisfactory reliability and very low patients' compliance. A pattern of volatile organic compounds (VOCs) in exhaled breath has been found to be a potential noninvasive diagnostic tool for detection of colorectal cancer. This study aims to evaluate the reliability of an innovative, portable gas chromatography (GC) device, to enable rapid, on-site colorectal cancer diagnosis.

Methods/Interventions: Between July 2021 and May 2022, patients submitted to curative surgery for histologically proven adenocarcinoma of the colon or rectum (I-II and III clinical stage) and healthy controls (HC) with negative colonoscopy entered the study. Exclusion criteria Included history of other cancers, endoscopic removal of colonic polyps or a history of familial adenomatous polyposis or Lynch syndrome, IBD, liver disease and metastatic CRC. The exhaled breath was collected into Tedlar bags through a Nafion filter and mouthpiece with a one-way valve and analyzed within 24 hours by an automated portable gas chromatography (GC) device, containing a miniaturized thermal desorption tube, thermal injector, separation column, and photo-ionization detector, as well as other accessories such as pumps, valves, and a helium cartridge. The chromatograms were analyzed by chemometrics, machine learning, principal component analysis and linear discriminating analysis.

Results/Outcomes: 36 CRC patients (median age 67, IQR 61.7-77.2, 9 females, Stage I: 7, 19.4%; Stage II: 15, 41.7%, Stage III: 14, 38.9%) and 32 HC (median age 65, IQR 60-74, 15F) well matched for smoking habit and comorbidities, entered the study. After a training set (18 CRC and 18 HC), and a testing set (18 CRC and 14 HC), the detection of three VOCs was able to discriminate CRC patients from HC with an overall specificity of 87.5%, sensitivity of 94.4% and accuracy of 91.2%.

Conclusions/Discussion: This preliminary data indicates that the innovative portable gas chromatography (GC) device can discriminate colorectal cancer patients from people CRC free, with high reliability, suggesting its potential use for rapid and on-site CRC mass screening.

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AUTHORS (FIRST NAME, LAST NAME): A. Dezi[1], A. Picciariello[1], X. Fan[2], R. Sharma[3], W. Zang[3], L. Vincenti[1], D. F. Altomare[1]

AUTHORS/INSTITUTIONS: A. Dezi, A. Picciariello, L. Vincenti, D.F. Altomare, University "Aldo Moro" of Bari, Italy, Bari, PUGLIA, ITALY|X. Fan, Professor, Department of Biomedical Engineering, University of Michigan, Ann Arbor, Michigan, UNITED STATES|R. Sharma, W. Zang, Department of Biomedical Engineering, University of Michigan, Ann Arbor, Michigan, UNITED STATES|

FINAL ID: M2

TITLE: Characteristics and Outcomes of Stage IV Colon Cancer Patients with MSI-Instability Treated with Immunotherapy

ABSTRACT BODY:

Purpose/Background: Immunotherapies have shown promise in the treatment of patients with metastatic colorectal cancer and mismatch repair (MMR) deficiency/microsatellite instability (MSI). While there is compelling data to support its use, adoption has been variable. We sought to evaluate the utilization of immunotherapy and associated disparities of patients with MMR-deficient/MSI-unstable stage IV colon cancer treated with immunotherapy.

Methods/Interventions: We conducted a retrospective review of the National Cancer Database for patients with stage IV colon adenocarcinoma and MSI instability from 2009 to 2017. MSI-high patients were divided into two cohorts based on whether they had received immunotherapy. Multivariable cox proportional hazards modeling was used to examine the adjusted association between use of immunotherapy and overall survival while controlling for use of systemic chemotherapy and any surgical procedures.

Results/Outcomes: Among 1,558 stage IV colon cancers included, 672 (43.1%) were MSI-high. A total of 332 (21.3%) of patients received immunotherapy. Among MSI-high patients, use of immunotherapy increased from none to 39.8% in 2017. On univariate analysis, patients receiving immunotherapy were younger (median age 61.5 versus 66 years; $p<0.001$) and more likely to have MSI-high profiles (51.5% versus 40.9%, $p<0.001$). Although the majority of patients in both groups had government-based insurance, a significantly higher number in the immunotherapy group had private insurance (45.3% versus 35.4%; $p=0.004$). Gender, race, ethnicity, education, income, facility type and distance, geographic setting, and Charles-Deyo comorbidity scores were not significantly different between the two groups. On multivariable analysis, younger age (OR 0.98, 95% CI 0.96-0.99, $p=0.001$) and MSI-high status (OR 1.05, 95% CI 1.02-1.07, $p<0.001$) maintained statistical significance in predicting patients receiving immunotherapy. Amongst MSI-high patients, overall survival was greater for patients who received immunotherapy (5-year survival 35% versus 20%, $p<0.001$). Furthermore, after adjustment for age, sex, race, facility type, any use of chemotherapy, and any surgery, use of immunotherapy was associated with lower risk of overall mortality (HR 0.659, 95% CI 0.51-0.84, $p<0.001$).

Conclusions/Discussion: In a nationwide analysis, MSI-high patients were more likely to receive immunotherapy. Notably, overall survival was significantly higher in the immunotherapy group. The most striking finding from our dataset is that less than half of patients with stage IV colon cancer and MSI instability received immunotherapy, suggesting underutilization of this treatment. Future research should address the timing of administration of immunotherapy, long term outcomes of patients, subclasses of patients deriving the most benefit from treatment, and barriers to use of immunotherapy.

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AUTHORS (FIRST NAME, LAST NAME): D. A. Dulak[1], J. Neary[2], M. El Hechi[2], T. J. Holleran[2], S. Berkey[3], B. Bello[3], Z. Sun[4]

AUTHORS/INSTITUTIONS: D.A. Dulak, Colon & Rectal Surgery Fellow, MedStar Washington Hospital Center, Washington, District of Columbia, UNITED STATES|J. Neary, M. El Hechi, T.J. Holleran, General Surgery Resident, MedStar Washington Hospital Center, Washington, District of Columbia, UNITED STATES|S. Berkey, B. Bello, Colon & Rectal Surgery Attending, MedStar Washington Hospital Center, Washington, District of Columbia, UNITED STATES|Z. Sun, Assistant Professor of Surgery, MedStar Georgetown University Hospital, Washington, District of Columbia, UNITED STATES|

FINAL ID: M3

TITLE: CT-diagnosed EMVI Status has High Prognostic Accuracy in Colon Cancer Patients: Comparison of Pathologic EMVI

ABSTRACT BODY:

Purpose/Background: Extramural venous invasion (EMVI) is a well-known poor prognostic factor, but only a subset of patients developed cancer recurrence. Considering major role of EMVI, we perceived two different types of EMVI: CT-diagnosed EMVI (ctEMVI, based on vascular enlargement with tumor density in CT scan) and pathologic EMVI (pEMVI, based on existing tumor cells in vein). We hypothesized that ctEMVI shows a tumor-host interaction during cancer dissemination and represents late-stage EMVI, while pEMVI represents early-stage EMVI. However, little is concerns about this difference. We aimed to assess whether ctEMVI and pEMVI have different prognostic implications and compare these to other known prognostic factors in colon cancer patient.

Methods/Interventions: A total of 509 patients who underwent curative resection for stage I-III colon cancer between September 2015 and 2017 were retrospectively reviewed. Evaluating pEMVI, several sections, including the deepest part of tumor, were stained with hematoxylin and eosin and elastin stain.

Results/Outcomes: The accuracy of stratification for detecting EMVI by CT compared with histological examination was 73.8%. Cox regression analysis showed ctEMVI (hazard ratio, 2.656; 95% confidence interval [CI], 1.271-5.548, P<0.001) and lymph node metastasis (hazard ratio, 2.727; 95% CI, 1.318-5.641, P<0.001) to be significantly associated with poor disease-free survival (DFS) and ctEMVI (hazard ratio, 2.656; 95% CI, 1.271-5.548, P<0.001) and pathologic T3, T4 (hazard ratio, 13.452; 95% CI, 1.716-105.467, P=0.022) with poor overall survival (OS). When stratifying all patients by pathologic and CT-diagnosed EMVI, patients with both-negative [ctEMVI(-)pEMVI(-)] had comparable DFS and OS with only pEMVI [ctEMVI(-)pEMVI(+)], but, significantly better DFS and OS than those with only ctEMVI [ctEMVI(+)pEMVI(-)] and both-positive. Ten of 291 patients in both-negative group had cancer recurrence, but after radical resection for metastasis, eight were disease-free state at the last follow-up. On the other hand, among the 24 who had recurrence in both-positive group, only four were disease-free state at the last follow-up.

Conclusions/Discussion: CT-diagnosed EMVI has greater prognostic accuracy than pEMVI. In addition, patients in both-negative group had controllable recurrence, while patients with pathologic or CT-diagnosed EMVI mostly had unresectable recurrence. Further study should be performed to confirm this finding.

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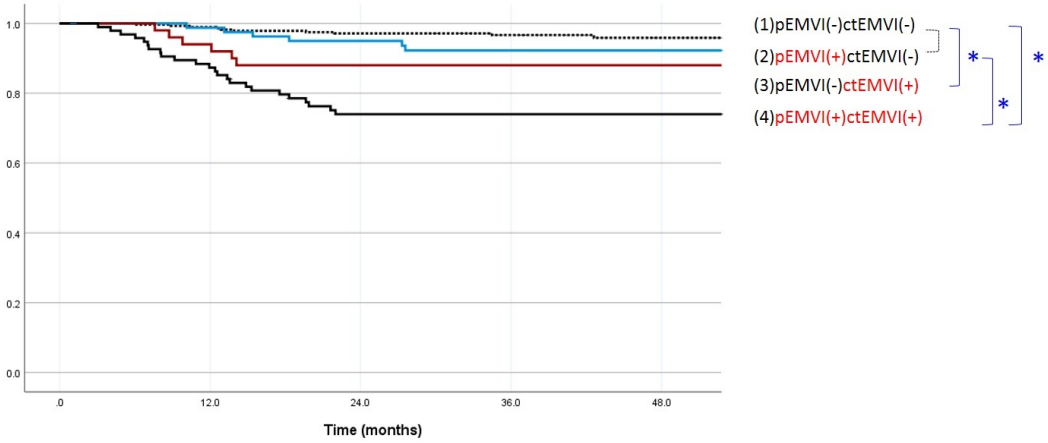
- Median follow-up, 40.6 months (IQR, 34.5-50.5)



Disease-free survival,

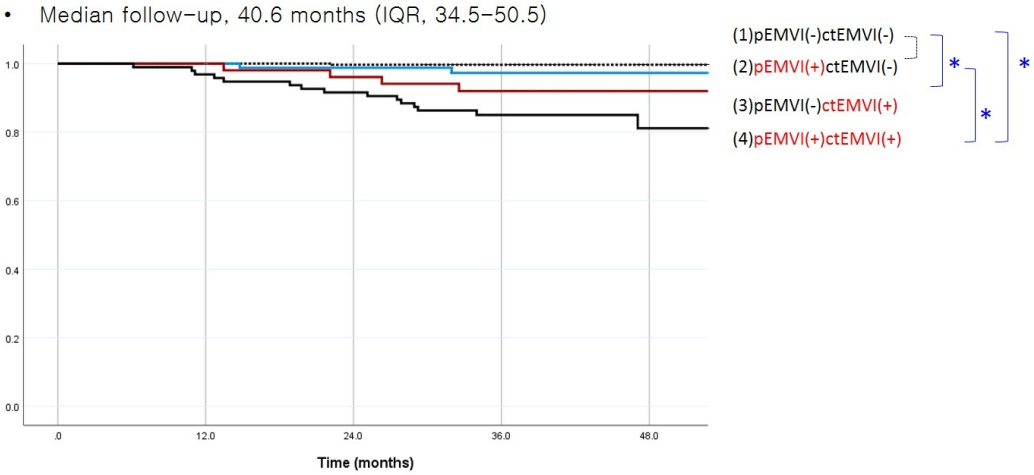
(1) pEMVI(-)ctEMVI(-) 96.7%

vs. (2)pEMVI(+)ctEMVI(-) 92.3% (P=0.121) (vs.(4), P=0.001)

vs. (3)pEMVI(-)ctEMVI(+) 88.0% (P=0.008) (vs.(4), P=0.062)

vs. (4)pEMVI(+)ctEMVI(+) 74.0% (P<0.001)

- Median follow-up, 40.6 months (IQR, 34.5-50.5)



Cancer-specific survival,

(1) pEMVI(-)ctEMVI(-) 99.6%

vs. (2)pEMVI(+)ctEMVI(-) 97.3% (P=0.067) (vs.(4), P=0.003)

vs. (3)pEMVI(-)ctEMVI(+) 92.0% (P<0.001) (vs.(4), P=0.172)

vs. (4)pEMVI(+)ctEMVI(+) 85.0% (P <0.001)

IMAGE CAPTION:

AUTHORS (FIRST NAME, LAST NAME): H. Kim[1], G. Choi[1], S. Song[1]

AUTHORS/INSTITUTIONS: H. Kim, G. Choi, S. Song, Kyungpook National University Hospital, Daegu, KOREA (THE REPUBLIC OF)|