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The pattern of colorectal cancer (CRC) among patients attending Soha University Hospital

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Background Worldwide, the annual mortality from CRC is estimated to be 500,000. The incidence and mortality of CRC increase with age especially after 60 years of age. In Sudan there are no present population-based cancer registries that can provide database for epidemiological studies on CRC and its risk factors, for an effective implementation of the suitable screening programs. Methods A retrospective hospital-based study was conducted on all CRC patients who attended Soha University Hospital (SUH) between January 2004 and December 2007 to describe the pattern of CRC according to age, race, gender and sub-site location of the tumor. We considered that SUH is one of the largest central hospitals in Sudan that has integrated gastrointestinal and endoscopy units and receives patients from different sources of referral. Results During the study period, 202 patients with CRC attended both hospital clinical wards and endoscopy units between the ages of 10–90 years. Age was found to be independently significantly associated with both proximal and distal CRC (p=0.01). Gender and race were found to be insignificantly associated with both proximal and distal CRC (p=0.839 and 0.522 respectively). Fifty-two percent of patients were found to be of 50 years of age and below. The mean age for CRC was found to be 50 years. Almost 70% of the patients were found to have distal CRC and about 85% of them were having rectal cancer. Conclusions Fifty-two percent of the patients were found to be of 50 years of age and below with predominance of distal CRC among all patients. This gives a clue that screening with flexible sigmoidoscopy starting at the age of 40 can be of an appreciated secondary preventive value.

Management of rectal cancer in the elderly

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Background Aim of the study is to assess tolerance, toxicities and results of multimodality treatment in elderly patients with rectal cancer. Methods 48 patients with rectal cancer aged over 70 years (70–84) were treated in our center. There were 31 males and 17 females with localized disease in the pelvis (19 stage II, 29 III disease, ECOG performance status 0/1 in 35 and 2/3 in 13). Nineteen patients were initially treated surgically followed by postoperative radiotherapy and chemotherapy. Twenty patients were primarily treated with radio-chemotherapy followed by surgery in 14 while 9 were treated with palliative radiotherapy because of their poor condition. Radiotherapy was 3D conformally planned and delivered with 3-field technique on 18MV linear accelerator. Post-operatively the median administered dose was 40Gy and postoperatively 45Gy. Chemotherapy consisted of orally administered capecitabine in most patients. Results Apart from 9 patients in poor general condition, we treated the rest with radical intent. Treatment toxicity was significant in both groups (post-op and pre-op radio-chemotherapy). Hematological and gastro-enteric grade II–III toxicity occurred in 80% of those treated post-operatively resulting in treatment modifications in 78%. Those treated with preoperative therapy had better tolerance; grade II–III toxicities experienced in 52% while 85% managed to complete therapy with no significant modifications. Clinical and radiological response was seen in all. Fourteen underwent surgery, 4 were poor candidates for open operation and 2 refused surgery. Of those treated with palliative intent, 6 received a worthwhile dose and had significant symptom improvement while 3 received only a few fractions of radiotherapy and had no symptom response. Conclusions Older patients with rectal cancer can be treated radically provided that their general condition is satisfactorily. They should be managed with preoperative radio-chemotherapy instead of postoperative while particular care should be given to the technical aspects of radiotherapy as well as the chemotherapy schedules in order to minimize toxicity.

Perioperative morbidity related with adjuvant chemoradiotherapy in patients with low rectal cancer. Our experience over a two-year period

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Background Aim of the study is to review the peri-operative morbidity associated with adjuvant chemo-radiotherapy in the treatment of locally advanced low rectal cancer. Methods A total of 24 patients were assessed. Pre-operative chemo-radiotherapy was delivered to each patient. Results Twenty-two low anterior and 2 abdomino-perineal resections were successfully carried out without peri-operative mortality. Five intra-operative complications occurred, to 12 patients with significant surgical difficulty in mobilizing the rectum. Six postoperative complications in 5 patients were also documented, in a 2 years follow-up time. Preoperative chemo-radiotherapy for patients with locally advanced low rectal cancer carries a high but acceptable peri-operative overall morbidity. While the use of radiation and chemo-radiation successfully reduces the local recurrence rates for patients with stage II and III low rectal cancer, it is associated with significant morbidity and higher treatment-related complications during surgery. We analyzed data from 24 consecutive patients who were suffering from locally advanced low rectal cancer and received multimodality therapy from January 2004 to December 2005. All patients received a long course pelvic radiotherapy (18x2.1 Gy) along with 5-FU over a 3 weeks period prior to surgery. Twenty-two patients had a low anterior TME and 2 an abdomino-perineal resection 3–5 weeks after completion of neo-adjuvant therapy without peri-operative mortality. Significant surgical difficulty in mobilizing the rectum due to fibrosis was noted in 13 patients leading to 9 intra-operative and 5 late complications in 9 and 4 patients respectively. One patient to whom a pre-sacral plexus haemorrhage occurred during surgery was re-operated on 12 hours later due to massive re-bleeding. Our data
shows that mobilization of the low rectum after a long course of preoperative chemo-radiotherapy might sometimes carry a major surgical difficulty. Extreme fibrosis of the surrounding tissues can happen as an overreaction to radiation therapy in some patients. This fibrosis may force to a loss of the TME plan and may subsequently lead either to intra-operative or late complications. **Conclusions** Pre-operative radiotherapy, though it is a mandatory element in the modern treatment of low rectal cancer, is associated with early postoperative complications and long-term side effects. Difficulties during operation may be significant and can lead to serious complications in inexperienced surgeons. This negative effect of preoperative chemo-radiotherapy in the surgical outcome must always be considered in the clinical practice.

**Table 1 Complications**

<table>
<thead>
<tr>
<th>Patients</th>
<th>DCE-MRI prediction</th>
<th>Post-radiotherapy MRI response</th>
<th>Pathology response</th>
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<tr>
<td>1</td>
<td>+</td>
<td>Complete response</td>
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<td>2</td>
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**The role of dynamic functional imaging for the assessment of radio sensitivity in patients with locally advanced low rectal cancer**


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Background The management of low rectal cancer, requires a detailed preoperative staging in order to plan the appropriate treatment. We tried to evaluate the response to neo-adjuvant radiotherapy in four of our patients with low rectal cancer, based on the information taken from the preoperative Dynamic Contrast Enhanced Magnetic Resonance Imaging (DCE-MRI). **Methods** High resolution MRI, is a mode of great sensitivity and specificity in clinical staging of the low rectal cancer and it can predict with accuracy the likelihood of achieving a clear circumferential surgical margin. The DCE-MRI, refers to tissue signal augmentation, during time, caused by the presence of contrast medium in the extravascular-extracellular space. This in fact can determine parameters such as tumor blood flow, angiogenesis and capillary permeability on tumor surface and can be used as a radiological marker of tumor radio-sensitivity to neo-adjuvant radiotherapy. **Results** Four patients suffering of locally advanced low rectal cancer, underwent a preoperative DCE-MRI, in order to assess the response to neo-adjuvant radiotherapy. Patients were classified according to the findings of DCE-MRI as: (a) Positive responders (+) and (b) Unidentifiable responders (Und). The classic long-term regimen consisted of 40 Gy radiation with a daily dose of 5-FU over a three weeks period was given to all patients. Four -six weeks after completion of chemo-radiotherapy, they were restaged according to pelvic MRI findings, as (a) complete responders, (b) good responders, (c) poor responders. Soon after MRI, they were operated on. Four TME low anterior resections (3 open and 1 laparoscopic) with a diverting loop ileostomy were successfully carried out. The DCE-MRI prediction was compared with post chemo-radiotherapy MRI and pathology findings. Results are shown in Table 1. In our study we have tried to use the DCE-MRI as a prediction tool, of the efficacy of preoperative radiotherapy in down-staging or significantly reducing the tumor bulk in the locally advanced low rectal cancer. We have noticed a strong correlation between the positive prediction with the findings of the postoperative pelvic MRI and of the pathology report (patients 1 and 4). It seems that no correlation can be established in the unidentifiable patients. **Conclusions** We believe that patients with a positive DCE-MRI prediction of response, will benefit from a long course of preoperative chemo-radiotherapy, despite the higher complication rates, as they have a high probability of real clinical remission.

**Table 1 Results**

<table>
<thead>
<tr>
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**Laparoscopic anterior resection of the rectum in situs viscerum inversus. A case report**

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Situs viscerum inversus (S.V.I.) is a rare congenital anatomical abnormality caused by an autosomic recessive or X-linked mutation. The abnormality is characterised by an inversion of endo-abdominal and endo-thoracic organs. There are two types of S.V.I.: totalis, with associated destro-cardia (prevalence: 1/10000) and incomplete, without destro-cardia (prevalence 1/22000). We present a case report of a 59 year-old male patient with a situs viscerum inversus who was admitted in the Division of General Surgery of Aosta’s Valley (“U. Parini” Regional Hospital of Aosta’s Valley) with cancer of the upper rectum: this clinical association is extremely rare with major intra-operative technical difficulties, especially when abnormal anatomical position of mesenteric vessels exists. We performed a laparoscopic anterior rectal resection with a transanal Knight-Griffen anastomosis. No intra-operative complications were observed; the length of hospital stay was 6 days.

**Anorectal malformations and the posterior sagittal approach**

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Background Aim of this presentation is to show the technique of anorectal malformations’ repair via the posterior sagittal approach. **Methods** A wide spectrum of anorectal diseases were treated in 79 patients, aged from 1 day to 12 months, in our clinic during the last 15 years. **Results** There were 42 males and 37 females. Among the males 30 suffered from rectal agenesis and anal atresia with a recto-urethral fistula, 3 from recto-vesical fistula, 5 from imperforate anus without fistula, 1 from rectal stenosis and 3 from recto-perineal fistula and covered anus. Among the females, 12 suffered from rectal agenesis and anal atresia with a recto-vestibular fistula, 10 from recto-vaginal fistula, 3...
from imperforate anus without fistula, 1 from rectal atresia, 3 from persisted cloaca and 8 from recto-perineal fistula and covered anus. All of them, excluding the 3 males with recto-vesical fistula and the 2 females with persisted cloaca, were treated only via the posterior sagittal approach without an abdominal approach. **Conclusions** Anorectal malformations comprise a wide spectrum of diseases, which can affect boys and girls, and involve the distal anus and rectum as well as the urinary and genital tracts. The surgical approach for repairing these defects changed dramatically in 1980 with the introduction of the posterior sagittal approach, which allowed surgeons to view the anatomy of these defects clearly, to repair them under direct vision, and to learn about the complex anatomical arrangement of the junction of rectum and genitourinary tract. It has become the predominant surgical method for anorectal anomalies. When the rectum or the vagina are very high and an abdominal approach is also needed, laparoscopy can be used in combination with the posterior sagittal approach.

**Laparoscopic left colectomy with preservation of mesenteric artery for diverticular disease**


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Respecting the plane of Toldt-Gerota during left colon resection makes it possible to preserve the nerves of the hypogastric plexus. Anatomical plane alteration caused by inflammation during the diverticulitis often makes it difficult to perform the operation. In particular, inferior mesenteric artery (AMI) ligation involves a risk of hypogastric plexus injury leading to genitourinary disorders. The technique of AMI preservation for non-malignant pathology described by the authors makes it possible to perform left colectomy without damaging the plexus and also results in better vascularized intestinal stumps. The authors perform this technique with the help of the 10 mm Ligasure Atlas ® (TYCO Health care), which allows more efficient and quicker tissue and vessels dissection and coagulation.

**Complications in laparoscopic versus open colectomies for colorectal cancer**

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**Background** Aim of the study is to evaluate complications after laparoscopically assisted colectomy (LAC), in comparison with those of patients after open colectomy (OC). **Methods** During a 19-year period, from March 1988 until December 2006, 585 colectomies for cancer were performed in our institution. 110 of them were LAC, (from 1998 to 2006) and 475 were OC (from 1988 to 2006). Patients’ median age was 65.2 years (42–79) and men/women ratio was 1.5/1. Follow-up was conducted to 432 patients (89 from the LAC group and 343 from the OC group. **Results** Of the 110 patients who underwent LAC, the following complications occurred: anastomotic leak in 5 patients (5.6%), injury to ureter in 2 patients (2.2%), anastomotic hemorrhage in 4 patients (4.4%), prolonged postoperative ileus in 5 patients (5.6%), pleuritic fluid in 4, (4.4%), and wound purulence in 3 patients (3.3%). No abdominal hernias occurred to any of those patients. Port site metastasis occurred in one patient. For the OC group the rates were 6.4%, 0.29%, 4.9%, 6.4%, 4.6%, 6.1% and 4.6%, respectively. The results displayed no statistically significant differences between the two groups, as far as the anastomotic leak, anastomotic hemorrhage, postoperative ileus, pleuritic fluid and wound purulence were concerned. On the contrary, statistically significant difference was observed for injury to ureter (p=0.048, in favour of the OC group) and abdominal hernias (p=0.04, in favour of the LAC group), student t test. Fluid oral intake began earlier in the postoperative course of the LAC group, during the 1st or 2nd postoperative day. Postoperative pain was also significantly less, with opioid analgesics and non-opioid analgesics lasting less than 24 and 48 hours, respectively. **Conclusions** Laparoscopically assisted colectomy, performed by experienced surgeons, offers shorter hospital stay, less postoperative pain and incisional hernias.

**Dehiscence rate after low anterior resection with TME for rectal cancer**

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**Background** Anastomotic dehiscence is a major complication of rectal surgery. Local control and survival following oncolgic rectal surgery have been improved by the introduction of total meso-rectal excision (TME). The aim of this study is to present the dehiscence rate after low anterior resection with TME for rectal cancer in our patients. **Methods** In a seven year period (1990–1997) we performed low anterior resections with TME in 143 patients. They were 89 (62.2%) male and 54 (37.8%) female patients with a mean age of 67 years (range 46–88). Most of them (133, 90.0%) underwent curative resection. Among these patients, 5 (3.5%) had a tumor of stage 0, 27 (18.9%) of stage I, 54 (37.8%) of stage II, 44 (30.8%) of stage III and 13 (9.0%) of stage IV according to the TNM classification. Tumors were well differentiated in 32 (22.4%) patients, 101 (70.6%) patients had tumors of moderate differentiation and 10 (6.9%) of poor differentiation. Mucinous characteristics of the tumors were present in 6 (4.2%) patients. Stapled anastomosis was performed in most of the patients (136/143, 95.1%). Preoperative radiotherapy was applied in 30 (20.9%) of the patients. The diagnosis of anastomotic dehiscence was based on clinical features, peripheral blood investigations and abdominal CT images. **Results** Clinically apparent anastomotic leakage developed in 13 (9.0%) patients. Six of them were managed operatively and seven conservatively. There was no postoperative mortality among the patients with anastomotic dehiscence. Anastomotic dehiscence was higher in the group of patients that underwent preoperative radiotherapy (3/30, 10% vs 10/113, 8.8%). **Conclusions** Total mesorectal excision and preoperative radiotherapy both decrease the possibility of local recurrence after low anterior resection for rectal cancer. However, they both increase the anastomotic dehiscence rate.

**Multidisciplinary management of locally recurrent colorectal cancer**

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Background Aim of the study is to assess the effectiveness of multimodality treatment, chemotherapy, radiotherapy and surgical resection in the management of locally recurrent colorectal cancer. Methods Seventeen patients with recurrent colorectal cancer were referred to our center. There were 11 males and 6 females with median age of 58 years (32–82). Twelve had rectal carcinoma treated with surgery 16–42 months earlier; 2 of these had received adjuvant radiotherapy and 5 chemotherapy. Five patients had cervical cancer treated with surgery and chemotherapy 20–38 months earlier. The recurrence was documented with CT, MRI or PET-CT scan. Three patients were initially treated surgically followed by radiotherapy and chemotherapy and 14 were initially treated with concurrent chemo-radiotherapy; surgery was performed later in 7. Radiotherapy was 3D conformally planned and delivered with 18MV linear accelerator to a median dose of 48Gy (range 38Gy–60Gy). Chemotherapy consisted of continuous infusion of 5FU in 5 and Xeloda orally in 12. Results Patients who initially underwent surgery, had localised small volume recurrence at the anastomosis; two remain disease-free 21 and 38 months while the third is alive with recurrence in the liver 19 months after the local recurrence. Of the 14 patients who were treated with chemo-radiotherapy, response was documented radiologically in 12 (85%). Two patients with PET-CT confirmed complete response had no further treatment and remain disease-free for 6 and 10 months. Seven patients underwent surgical resection of the residual disease and their median survival was 21 months, 3 refused surgery and 2 (with no response to chemo-radiation) were deemed inoperable. All 5 developed progressive disease locally and their median survival was 13 months. Conclusions The management of locally recurrent colorectal cancer is difficult. This small retrospective series indicates that a combination of chemo-radiotherapy and surgery offers the best results in terms of local control and probably survival.

Radiofrequency ablation of colorectal hepatic metastases long term survival

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Background Aim of the study is to evaluate long term survival of patients with colorectal liver metastases undergoing radiofrequency ablation (RFA). Methods Prospective evaluation of 30 patients with colorectal liver metastases who were no candidate for resection underwent RFA conventionally or laparoscopically. Preoperative number of metastatic foci, dominant size of the metastases, presence of extrahepatic disease, and type of preoperative chemotherapy were analysed. Results From 2002 to 2005 thirty patients (22 men and 8 women) underwent RF ablation for colorectal metastases. Mean age was 64.03±9.90. Two patients had extrahepatic disease. The mean number of lesions was 4.73±2.94. Kaplan-Meier 3 years survival was 43%, and 5 years 21%. Median survival was improved for patients with <5 vs ≥5 lesions (p<0.0001). There were no survival improvement regarding predominant size of the lesions, type of pre-postoperative chemotherapy (5FU-leucovorin vs FOLFOX), and presence of extrahepatic disease. Conclusions In our study we found that the number of metastases is an important factor for survival prediction in these patients. The 5 years survival of 21% represents a survival benefit of RFA.

Surgical site infection (SSI) following rectal cancer resection

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Background Colorectal surgery is associated with a high incidence of complications associated with infections and especially infections of the surgical sites (SSI). These complications increase the postoperative hospitalization period and the total cost. The aim of this study is to present the surgical site infection rate after rectal cancer surgery in our patient group. Methods We conducted a retrospective analysis of the medical records of 203 consecutive patients that underwent rectal resection for cancer between July 1990 and September 2007. They were 125 (61.5%) male and 78 (38.5%) female patients with a mean age of 67 years (range 22–89). All but two of the patients underwent elective surgery. The tumor was located in the sigmoid colon in 3 (1.5%), in the upper rectum in 40(19.7%), in the middle rectum in 80(39.4%) and in the lower rectum in 80 (39.4%) patients. The tumors were well differentiated in 42 (20.7%), moderately differentiated in 142(69.9%) and poorly differentiated in 19 (9.4%) patients. Among these patients, 7(3.4%) had a tumor of stage 0, 36 (17.8%) of stage I, 81 (39.9%) of stage II, 63 (31.0%) of stage III and 16 (7.9%) of stage IV according to the TNM classification. Mucinous characteristics of the tumors were present in 11 (5.4%) patients. The rectal resection was performed with a curative intent in 188 (92.6%). We performed 176 (86.7%) low anterior resections and 27 (13.3%) abdomino-perineal resections. All patients received at least three doses of cefalosporin and metronidazole peri-operatively. Results The total SSI rate was 2.9% (6/203). We observed 2 (1.1%) SSIs in the patient group that underwent low anterior resections and 3 (11.1%) SSIs in the patient group that underwent abdomino-perineal resections. Perineal wound infection occurred in 1(3.7%) patient. Conclusions The rate of surgical site infection is low after elective rectal surgery under antibiotic chemoprophylaxis. The incidence of this complication is higher in abdomino-perineal resections compared to low anterior resections.

Laparoscopic vs open approach for Total Mesorectal Excision. A comparative study

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Background Aim of the study is to compare the short-term results of the laparoscopic to open approach for the surgical treatment of rectal cancer. Methods Consecutive cases with rectal cancer operated upon with the laparoscopic approach form 2004 to 2007 were compared to a series of rectal cancer cases, matched in age, gender and stage of disease, which had open surgery. A total meso-rectal excision (TME) was attempted in all cases. Comparison involved neo-adjuvant treatment, duration of surgery, intra-operative complications, one and three month postoperative morbidity and mortality, use of analgesia, length of hospitalization, and histopathologic report. Results Neo-adjuvant chemo-radiotherapy was given
in 11 patients of the open group (42 cases, 23 male) and 15 of the laparoscopic group (45 cases, 26 male). Six cases of the open and 10 of the laparoscopic group had abdomino-perineal resection of the rectum. Duration of surgery was longer and blood transfusion requirements were less in the laparoscopic than the open group ($p=0.005$ and $p=0.01$ respectively). Three cases (7%) of the laparoscopic group were converted to open. Overall morbidity, in particular wound and chest infection and postoperative ileus, was significantly higher after the open than the laparoscopic approach (62% vs 33%, $P=0.03$). Also, the laparoscopic approach was associated with less use of analgesia, faster bowel function recovery, faster oral feeding and shorter hospitalization as compared to the open ($p<0.001$). Anastomotic leak tend to be higher but not significantly so after the laparoscopic than the open approach (16 vs 10%; n.s.). An R0 resection was achieved in 88% of the cases in the open and 94% in the laparoscopic group. Overall histopathologic staging was similar between groups. **Conclusions** Laparoscopic TME is associated with less morbidity and faster recovery as compared to the open approach. The quality of surgery, as assessed by histopathology is similar between the two approaches.