Factors and systems engineering. Through the principles of human factors and system engineering, this study seeks to understand the relationship of radiation therapy associated hardware and software incidents, practitioners, their environment, and radiation technology.

Methods and Materials: A retrospective analysis of incidents occurring from April 2013 September 2015 within a major metropolitan radiation therapy centre was performed. Radiation therapy (RT) related incidents were analyzed using two frameworks. Framework I classified incident types as software, hardware, or not applicable. Framework II applied the Human Factor Analysis and Classification System (HFACS), which was used to determine human and systemic attributes to incident causation.

Results: One hundred and seventy-six incidents were identified to be RT-related. The application of Framework I indicated 44.89% and 15.34% involved the use of RT software and hardware respectively. A thematic analysis was completed using Framework II in relation to the classifications within Framework I. An examination of the major classes of software incidents showed, 26.70% of the total incidents were software transcription-related. A review of the major classes of hardware incidents identified that 89.19% of total incidents were due to faults of the RT device and 5.11% were attributable to operator error.

Conclusions: The addition of new technology and practices has the benefit of improved outcomes for patients. However, it also serves as a double edged sword that may potentially increase the risk of medical error and patient harm. Applying the principles of human factors and systems engineering provides an opportunity to identify incidents and leverage software and hardware design to potentially mitigate these errors, ultimately enhancing patient safety and quality of care.

58 ACUTE QUALITY OF LIFE CHANGES AFTER STEREOTACTIC ABLATIVE RADIODINOTHERAPY FOR LIVER METASTASIS: A PROSPECTIVE COHORT ANALYSIS

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Purpose: The use of stereotactic ablative radiotherapy (SABR) to treat metastatic disease is increasing. There is a paucity of prospective quality of life (QoL) data published for liver SABR. Moreover reported series often include hepatocellular carcinoma. Herein we report QoL after SABR in patients with liver metastases (LM).

Methods and Materials: A single-institution prospective cohort study was undertaken to measure the acute changes in QoL after SABR. Patients with Child-Pugh A liver function, any solid primary tumour with 1-3 LM treated with SABR were eligible. Doses of 30-60 Gy in 3-5 fractions were delivered. Indications of SABR included oligometastases and oligoprogression. Prospective QoL was measured using the European Organisation for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-CR29 quality of life questionnaires at baseline, and after radical CRT.

Results: Sixty patients (32 males) were included. Mean age at treatment was 67 ± 13 years. Median BED10 was 100 Gy (58-180). The most common primary cancer was colorectal in 42% of the patients followed by other gastro-intestinal malignancies in 17% and breast in 15%. Oligometastasis was the treatment indication in 55% of patients. Actuarial overall survival at one year was 79%. The global health score measured by QLQ-C15 was significantly worse at treatment completion (p = 0.001), 1w (p = 0.003) and 6w (p = 0.002) after SABR but recovered by three months (p = 0.12). Nausea, constipation and fatigue were also worse at treatment completion (p = 0.05) but recovered one and six weeks after treatment. The FLIE questionnaire showed consistent findings for nausea with significant deterioration at the end of treatment (p < 0.001). The majority of patients reported stable or better QoL at three months for all domains in the three questionnaires. On multivariable analysis, uninvolved bowel was a significant predictor of worse fatigue (p = 0.009) and anorexia (p = 0.004). A median max dose was a predictor of constipation (p = 0.026).

Conclusions: SABR offers a non-invasive mean of ablating liver metastases with minimal impact on QoL. Our data suggests that some dosimetric parameters are predictors of worse QOL outcome. Longer follow up and efficacy data are needed.

59 PATIENT SELF-ASSESSMENT OF BOWEL FUNCTION BEFORE AND AFTER RADICAL CHEMORADIOTHERAPY FOR ANAL CANAL CANCER

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Purpose: Anal canal cancer (ACC) and associated treatment can adversely impact quality of life, with bowel control and function being key considerations. Standard treatment for localized ACC consists of combined chemoradiotherapy (CRT). Previous studies examining treatment-related late bowel toxicity have not adequately assessed baseline function, and any bowel dysfunction is often attributed to previous treatment. In this single-institution study, we aimed to evaluate patient self-assessed bowel function and associated symptoms at baseline and after radical CRT.

Methods and Materials: Fifty-four patients with ACC scheduled for radical CRT with mitomycin C and 5-fluorouracil were recruited. Median patient age was 57 (range 37-83); 36 (66.7%) were female; 26 (48.1%) had AJCC Stage II disease, 9 (18.5%) had Stage IIIA, and 19 (35.2%) Stage IIIB. Patients completed the European Organisation for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-CR29 quality of life questionnaires at baseline, midpoint and end of CRT, at six and 12 weeks, and six, nine, 12, 24, and 36 months post-completion of CRT. Patients scored problems of leakage, constipation, diarrhea, stool frequency, flatulence, and embarrassment on a scale from 1-4 indicating the degree of the problem, with a score of 1 representing “not at all”, and 4 representing “very much”. Patient scores were compiled for each time point and compared (Fisher’s exact test).

Results: At baseline, 9.8% of patients had leakage scores of 3-4, compared with 11.1% 12 months post-CRT (p = 1.0). 13.4% had constipation scores of 3-4 at baseline, compared with 5.3% at 12 months (p = 0.29). 3.8% had diarrhea scores of 3-4 at baseline, compared with 15.8% at 12 months (p = 0.066). 17.7% had stool frequency scores of 3-4 at baseline, compared with 19.4% at 12 months (p = 1.0). 17.7% had flatulence scores of 3-4 at baseline, compared with 19.4% at 12 months (p = 1.0). Finally, embarrassment scores of 3-4 were reported by 13.7% of patients at baseline compared with 11.1% of patients at 12 months (p = 1.0). At a median follow up time of 26.6 months (range 0-66.4), nine patients (16.7%) had a colostomy, 10 (18.5%) had disease recurrence, and seven (13.0%) had died.

Conclusions: In our population, bowel function including fecal incontinence, stool frequency, flatulence, and embarrassment were comparable 12 months after completion of CRT compared with baseline. Diarrhea increased over this time period, while constipation decreased, although not reaching statistical