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Purpose or Objective: Margin-directed neoadjuvant pancreatic cancer radiotherapy aims to improve rates of surgical resection with clear margins. The target volume encompasses adjacent/infiltrated vasculature but methods used in its definition have varied and in some cases lacked reproducibility. SPARC (UKCRN ID: 18496) is a CRUK-funded [grant number C43735/A18787] phase 1 study of pre-operative Margin-Intense Stereotactic Radiotherapy for patients with Borderline-Resectable Pancreatic Cancer (BRPC) and incorporates a comprehensive Radiotherapy Quality Assurance protocol to ensure consistency in target definition and radiotherapy delivery.

Material and Methods: On a BRPC test case 'Gold-Standard' structures were defined by two clinical oncologists and one radiologist. A detailed method was specified for derivation of CTV_M, the target structure for the margin-directed boost. GTV_T was contoured to define gross tumour. Conformity analysis metrics were generated to compare structures produced independently by six clinical oncologist investigators with the Gold-Standard.

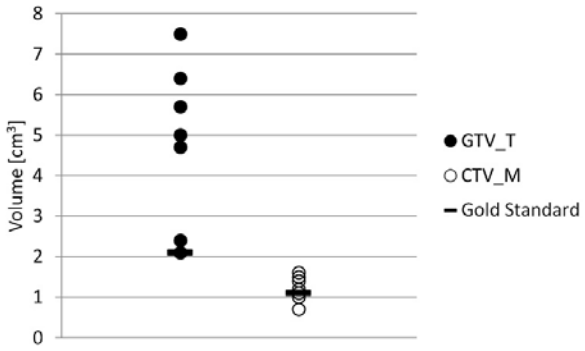

Figure. Absolute volumes of investigator and gold standard structures

Results: Gold-Standard and median investigator volumes for GTV_T were 2.1cc and 5.35cc (IQR 4.1-6.7) respectively, and 1.1cc and 1.3cc (IQR 0.9-1.5) for CTV_M. Median distance between centre of mass of Gold-Standard and investigator volumes was 0.32cm (0.19-0.47cm) for GTV_T and 0.24cm (0.09-0.36cm) for CTV_M. Median DICE conformity coefficients for GTV_T and CTV_M were 0.51 (0.40-0.60) and 0.68 (0.60-0.75), median discordance indices (measurement of over-inclusive contouring) for GTV_T and CTV_M were 0.64 (0.54-0.74) and 0.39 (0.19-0.44).

Conclusion: The investigator CTV_M structures showed less inter-observer variance in volume and less deviation from the Gold-Standard compared with the investigator GTV_T structures. The method of CTV_M definition appears consistently reproducible but accurate delineation of pancreatic malignancies remains difficult and oncologists should have expert radiology support in this task.

PO-0714

Proposal for the delineation of the clinical target volume in biliary tract cancer radiotherapy

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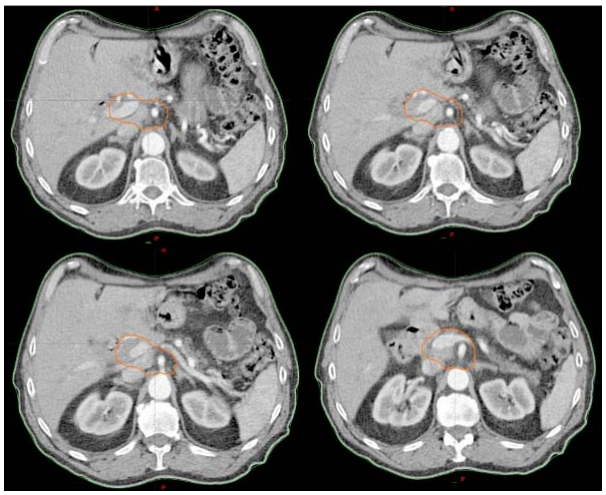
Purpose or Objective: Adjuvant radiotherapy (RT) is frequently used in the treatment of biliary tract cancer (BTC). Accurate target volume delineation is crucial for tumor control and avoiding unnecessary damages. However, there is no consensus on delineation of clinical target volume (CTV) in BTC. The aim of our study is to review the published details of the CTV contouring practice and to propose criteria for the CTV delineation in the adjuvant RT of BTC.

Material and Methods: A comprehensive literature search was performed using the ''PubMed'' and ''Google Scholar'' databases, and articles on BTC radiotherapy that provided descriptions of the CTV contouring were selected. The descriptions were thoroughly reviewed and compared to identify the areas of strong consensus on their inclusion in the CTV among different authors and the areas with more variability that require individual decisions when creating the CTV. Nodal CTV was considered as well as the microscopic tumor spread (MTS) into the liver and along the bile-duct system. Three types of BTC were considered: intrahepatic cholangiocarcinoma (IHC), extrahepatic cholangiocarcinoma (EHC) and gall bladder cancer (GBC). Based on the analyzed data on contouring practice, we proposed a set of guidelines for the CTV delineation.

Results: Out of 52 studies that reported the use of adjuvant RT in BTC, 17 were finally included: one prospective, 13 retrospective and 3 reviews. 1. EHC and GBC (14 relevant studies): the porta hepatic and celiac lymph nodes (LN) were always included into the CTV (100% accordance), the pancreaticoduodenal LN were included in all but one study (93%), whereas for paraaortic LN no agreement exists: four authors (28.5%) mentioned them to be included. Additionally, one author (7%) included the superior mesentery artery nodes for ampullary location. Some data regarding the MTS was reported in three studies: tumor bed was encompassed with 1 cm, 1-1.5 cm and 2-3 cm margin, respectively. One author mentioned 2-4 cm margin to account for MTS along the bile duct. 2. IHC (3 studies): a strong consensus (100% accordance) exists on including the porta hepatic, celiac and pancreaticoduodenal LN into the CTV. Only one author mentioned the para-aortic LNS to be included. Regarding the MTS: two authors used 1 cm margin to cover the tumor bed and resection margin of liver and one author mentioned 2-4 cm margin to account for MTS along the bile duct.

Conclusion:



This is the first proposal of the CTV contouring guidelines for adjuvant RT for BTC. We recommend the coverage of porta hepatic, celiac and pancreaticoduodenal LN in all cases of BTC. Para-aortic LN coverage should be considered especially in EHC and GBC, and its use should be individualized. Tumor bed and resection margin of liver should be encompassed

with at least 1cm margin. In view of considerable variability between different authors, there is an obvious need for the international consensus guidelines.

Poster: Clinical track: Lower GI (colon, rectum, anus)

PO-0715

Chemoradiation with concomitant boost in rectal cancer (T4&recurrences): a phase II study

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Purpose or Objective: Aim of this clinical study was to evaluate resectability and pathological response after preoperative concurrent chemotherapy with 2 different drugs and radiation therapy (RT) intensified with concomitant boost.

Material and Methods: A clinical trial based on two-stage Simon's design was planned. The trial included a first phase with enrolment of 9 patients. If 0/9 patients had complete pathologic response (pCR) the study had to be closed. In case of ≥ 1/9 patients with pCR it was planned to enrol other 8 patients. RT was performed with 3D-conformal technique. The dose to mesorectum and pelvic lymph nodes was 45 Gy (1.8 Gy/fraction). A concomitant boost was delivered to GTV + 2 cm margin with a total dose of 55 Gy (2.2 Gy/fraction). The following concurrent chemotherapy was administered: Raltitrexed (3 mg/m2) and Oxaliplatin (130 mg/m^2) on days 1, 17, 35 of RT. Acute and late toxicities were evaluated according to CTC-AE v.3.0 criteria.

Results: All 9 patients enrolled in the 1st phase underwent radical surgical resection, with 4/9 pCR. Then, 9 additional patients were enrolled for a total of 18 patients (F: 8, M: 10; median age 64.5, range: 45-80; clinical stage: 2 local recurrences, 16 cT4, 6 cN0, 4 cN1, 7 cN2, 1 cN3). Seventeen patients underwent surgical resection (7 anterior resections and 9 abdominal-perineal amputation) while 2 patients did not undergo surgery for early metastatic progression (1) or surgery refusal (1). R0 resection was achieved in all patients who underwent surgery. Overall, 5 patients had pCR and 2 patients showed only microscopic residual disease (pT0-Tmic: 7/17 = 41.2%). Acute grade≥ 3 toxicity was: 1 leucopoenia - neutropenia, 1 liver toxicity, 5 gastro-intestinal toxicities, with an overall incidence of 7/18 patients (38.9%). The actuarial analysis showed the following 2-year results: local control 100%, metastasis-free survival 93.7%, overall survival 92.3%.

Conclusion: The regimen used in this study allowed to achieve complete and near-complete response rate higher than 40%, despite the advanced stage of disease. However, severe acute toxicity was reported in more than 1/3 of patients.

PO-0716

Preoperative chemoradiation with VMAT-SIB in rectal cancer: a phase II study (Grace-Rectum-1)

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Purpose or Objective: Aim of this analysis was to describe the results of a phase II study based on the use of VMAT in preoperative combined treatment of locally advanced rectal cancer.

Material and Methods: A clinical trial based on two-stage Simon's design was planned. The trial includes a 1st phase enrolment of 9 patients. If 0/9 patients had complete pathologic response (pCR) the study had to be closed. In the case of ≥ 1/9 patients with pCR it was scheduled to enrol other 8 patients. Radiation therapy was performed using VMAT-SIB technique. The dose to mesorectum and pelvic lymph nodes was 45 Gy (1.8 Gy/fraction). A concomitant boost was delivered on GTV + 2 cm margin with a total dose of 57.5 Gy (2.3 Gy/fraction). The following concomitant chemotherapy was administered: Capecitabine (825 mg/m^2 twice daily, 5 days/week) and Oxaliplatin (130 mg/m^2 on days 1, 17, 35). Acute and late toxicities were evaluated according to CTC-AE v. 3.0 criteria.

Results: All 9 patients enrolled in the 1st phase underwent radical surgical resection, with 4/9 pCR. Then 9 additional patients were enrolled for a total of 18 patients (F: 7, M: 11; median age 62, range: 39-79); clinical stage: 4 local recurrences, 6 cT4, 5 cT3, 3 cT2, 2 cN0, 7 cN1, 9 cN2). Sixteen patients underwent surgical resection (9 anterior resection, 6 abdominal perineal amputations and 1 trans-anal resection) while 2 patients did not undergo surgery for early metastatic progression (1) or death from acute pulmonary oedema prior to surgery (1). R0 resection was achieved in all patients who underwent surgery. Overall, 4 patients had a pCR and 7 patients only a microscopic residual of disease (pT0-Tmic: 11/18 = 61.1%). Acute grade≥ 3 toxicity was: 1 leukopenia-neutropenia, 1 skin toxicity, 1 genitourinary toxicity and 5 gastrointestinal toxicities, with an overall incidence (considering the patient who died after radio chemotherapy) of 7/18 patients (38.9%). The actuarial analysis reported the following 2-year results: local control 80%, metastasis-free survival 93.7%, overall survival 88.9%.

Conclusion: The regimen used in this study showed excellent results in terms of pathologic responses (pT0-Tmic: 61.1%). However, despite the use of VMAT technique, more than 1/3 of patients had severe acute toxicity.