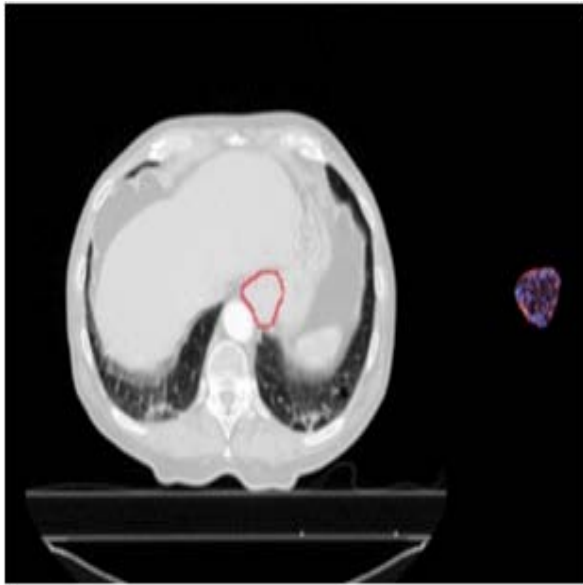


the GTV was undertaken on the images to quantify entropy, uniformity, mean grey-level intensity, kurtosis, standard deviation of histogram and skewness for fine to coarse textures (filters: 0.0-6.0).



Results: To date, 23 patients from 21 centres entered in the trial have been analysed. Mean Grey Level <399.745, Skewness >2.215, Kurtosis >0.6 were associated with improved PFS ($p=0.0227$, $p=0.0218$, $p=0.0460$ respectively) for medium filter 3.0. For filter 4.0, improved PFS was associated with Mean Grey Level <454.055 ($p=0.0227$) and Skewness >0.840 ($p=0.0371$). Mean Grey Levels of <565.535 ($p=0.0251$) and <542.5 ($p=0.0251$) were associated with improved PFS for filters 5.0 and 6.0 respectively. For OS, mean grey levels of <34.845 ($p=0.0182$), <399.745 ($p=0.0381$) and <454.055 ($p=0.0381$) were associated with improved survival for filters 0.0, 3.0 and 4.0 respectively. An entropy level <5.6 was also found to be significant ($p=0.0428$) for improved overall survival using filter 2.0.

Conclusion : Normal 0 false false EN-GB JA X-NONE
We have shown using a 10% sample of the overall database available that CTimage heterogeneity factors are associated with PFS and OS for patients from multiple centres. Preliminary results therefore suggest that in the future it may be possible to make clinical treatment decisions based on the CT image heterogeneity of a tumour volume. This will be confirmed by completing analysis on the whole SCOPE 1 database.

PO-0712

Stereotactic body radiotherapy in the treatment of inoperable hepatocellular carcinoma

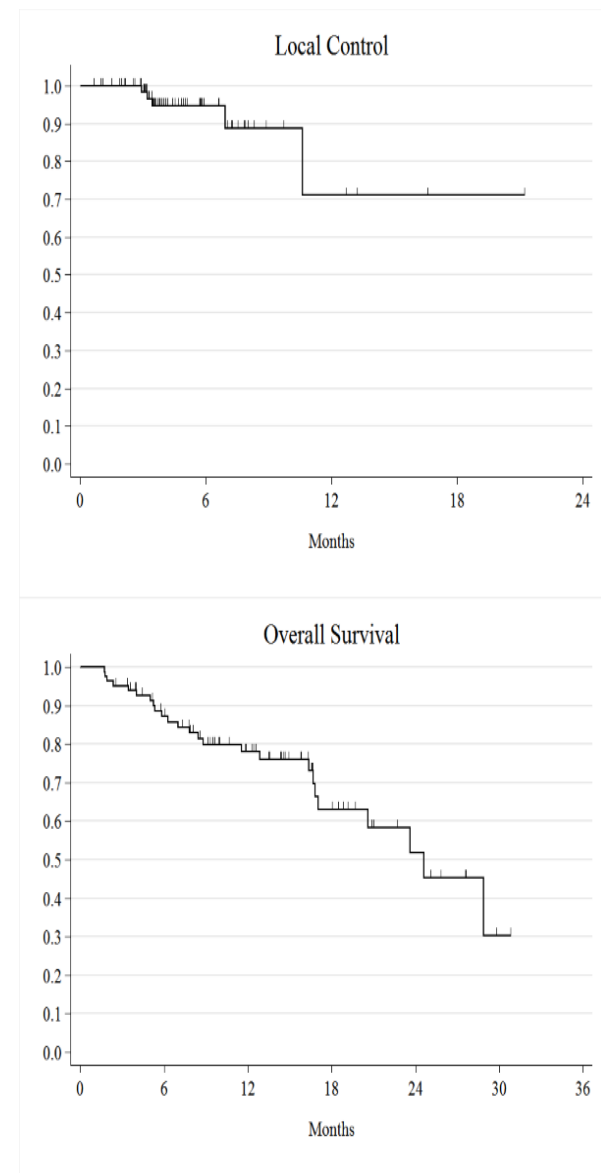
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Purpose or Objective: To evaluate the feasibility and clinical results of stereotactic body radiation therapy (SBRT) in the treatment of hepatocellular carcinoma (HCC) in patients unsuitable or failing to standard loco-regional therapies.

Material and Methods: Patients with < 3 inoperable HCC lesions with < 6 cm diameter were treated with SBRT. Prescription dose was adapted according to tumor size and global liver function and comprised 48-36 Gy in 3 fractions or 40 Gy in 5 fractions (prescribed on 80 % isodose). Primary endpoint included in-field (LC) local control and toxicity. Secondary endpoints were overall (OS), cancer-specific (CSS) and progression-free survival (PFS).

Results: 82 patients with 120 HCC lesions were treated. Median age was 70 (range 44-90). Most of the patients had Child-Pugh A5-A6 cirrhosis (80.4%), Barcelona Clinic Liver Cancer classification 0-A-B (93%). Median lesion size was 22 mm (range 7-120 mm). Most lesions were in the left lobe (65%). In most patients SBRT was the first local treatment (82%). Up to 7% of patients had portal vein thrombosis. Median observation time was 14 months. Actuarial 1-year LC, PFS, CSS and OS were 76.7% (95%CI:40-92.5%), 13.5% (95%CI:4.9-26.4), 92.1% (95%CI:81.8-96.7%) and 78% (95%CI:66.4-86%), respectively. Up to 18 patients (22%) experienced G3-G4 acute toxicity and 1 case of G5 toxicity was reported. Four cases of classical Radiation-induced liver disease (RILD) were reported, while 21 patients experienced a modification of Child-Pugh classification (25%), mostly of 2-3 points. On multivariate analysis, no factors were predictive for LC while initial Child-Pugh class and > 2 points Child-Pugh classification modification predicted for OS and CSS.



Conclusion: SBRT is a safe and effective treatment option for inoperable HCC, with acceptable LC rate and toxicity profile. Limiting toxic events may have prognostic significance.

PO-0713

Conformity analysis of target-volume definition for margin-directed boost in pancreatic cancer SBRT

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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 GTV_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.

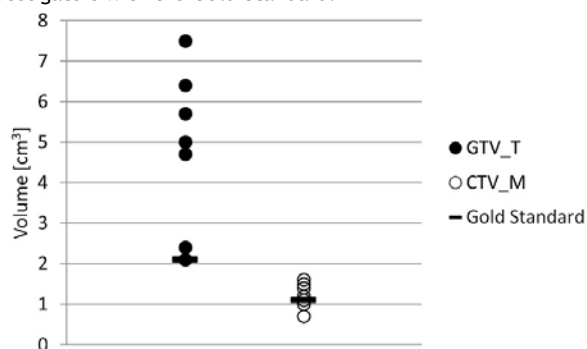


Figure. Absolute volumes of investigator and gold standard structures

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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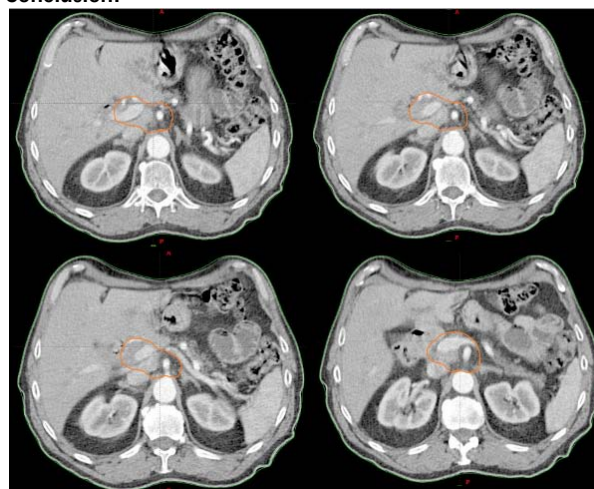
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Purpose or Objective: Adjuvant radiotherapy (RT) is frequently used in the treatment of biliary tract cancer (BTC). Accurate target volume delineation is crucial for tumor control and avoiding unnecessary damages. However, there is no consensus on 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