perform the validation (Table 1). Our validation resulted in an AUC of 0.62. The AUC increased to 0.76 after we removed all duplicate patients due to multiple false-positive tumor length ‘hits’ per patient during automated free text search.

### Table 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>2577</td>
</tr>
<tr>
<td>All patients with clinical TN stage</td>
<td>2220</td>
</tr>
<tr>
<td>All patients with clinical TN stage and tumor length</td>
<td>842</td>
</tr>
<tr>
<td>All patients with clinical and pathological TN stage</td>
<td>96</td>
</tr>
<tr>
<td>All patients with clinical and pathological TN stage and tumor length</td>
<td>38</td>
</tr>
</tbody>
</table>

**Conclusions:** We describe a method to extract data from multiple sources, and to apply a prediction model on routine clinical patient data. Although the free text extraction was not perfect and the number of patients in our validation was low (N=38), we have successfully shown a method for automatically (mightly) applying prediction models in clinical practice, and thus enabling use of prediction results for treatment decisions. Unfortunately, there is still a need to enhance data collection at the source. For example, the availability of pCR was our most limiting factor (only 4% of patients). Furthermore, the extraction of tumor length from free text reports remains necessary until available in a structured format.

Based on this method, future work consists of adding more data sources and routine clinical validation of prediction models.

**PO-0702**

**Improving radiotherapy adherence in rectal cancer through centralisation of treatment and clinical audit**

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**Purpose/Objective:** A re-organisation of surgery of rectal cancer among reference hospitals was implemented in 2011 based on the results of a clinical audit. The aim of this study was to assess the impact of centralization of rectal cancer surgery on radiotherapy patterns of care and its impact on clinical outcomes.

**Materials and Methods:** Quality of rectal cancer care was assessed by means of a clinical audit (retrospective cohort study) of all patients receiving treatment for rectal cancer with a radical intent in public hospitals in Catalonia in two-time periods (2005/7 and 2011/12). Radiotherapy patterns of care as well as clinical outcomes, comparing both periods, were analyzed in order to measure the impact of centralization. Clinical practice was compared with evidence-based clinical guidelines.

**Results:** From 2005/7 to 2011/12 the number of hospitals performing rectal cancer surgery decreased from 51 to 29. The study covered 2553 patients with TNM stage-II or III primary rectal cancer. From 2005/7 to 2011/12 the number of patients receiving radiotherapy for their rectal cancer, either pre or postoperatively, has increased from 72.2 to 76.2% (p=0.025). Delivering pre-operative radiotherapy ± chemotherapy (RT/ChT) increased from 57.3 to 66.2% (p=0.001). Short course radiotherapy increased from 2% to 7%.

When comparing patient characteristics broken down by neo(adjuvant) treatment, patients with pre-operative RT/ChT are marked by: a younger age; a lower surgical risk and a tumour site more frequently located in the distal rectum, and this in both periods.

The crude local recurrence rate at 1 year of follow-up was 3.1%.

The results of the univariate COX regression analyse showed a local-recurrence rate hazard ratio of 1.9 for the group of patients that did not receive any radiotherapy versus the group that received preoperative radiotherapy (p=0.019). In the multivariate COX regression analysis, TNM stage, type of neo(adjuvant) treatment and type of surgical intervention were independent predictors of risk of local recurrence at 1 year of follow-up.

Further follow-up is ongoing.

**Conclusions:** Centralising surgery into high volume providers could be associated with improved adherence to radiotherapy recommendations, possibly as a result of more structured multidisciplinary decisions.

**PO-0703**

**Safety and efficacy of image guided intensity-modulated radiation therapy in the treatment of anal canal cancer**

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**Purpose/Objective:** Intensity modulated radiotherapy (IMRT), including volumetric arc therapy (VMAT) and helical IMRT (HT) techniques, has been only recently introduced in the treatment of anal canal cancer patients. We retrospectively assessed efficacy and safety of IMRT, VMAT, HT and daily image-guided RT (iGRT) for anal canal cancer.

**Materials and Methods:** Data of patients with a diagnosis of anal canal squamous-cell carcinoma treated with curative intent in two academic radiation oncology departments were analyzed. Local control (LC) and grade 3 or more toxicity rate (CTC-AE v.4.0) were the primary endpoints. Overall (OS), disease-free (DFS), and colostomy-free survival (CFS) are also reported. Anal canal, mesorectal, pelvic, andinguinal nodes received a total dose of 36 Gy (1.8 Gy/fr) using IMRT or VMAT or HT (depending on the treating center). A sequential boost to the anal canal and positive nodes (total dose: 59.4-60 Gy,1.8-2 Gy/fr) was delivered with IMRT, VMAT, HT or 3D-conformal RT (CRT). Planning target volume was obtained adding 5-mm margin to the clinical target volume.

**Results:** Between 03.2006 and 05.2014, a total of 137 patients was treated; 15, 62, 31 and 28 patients presented...
stage I, II, IIIA, and IIIB, respectively. Median age was 61.7 years (range: 35-87). After a median planned gap of 2 weeks (range, 0-4; no gap in 25 patients since 2011), a boost dose was delivered with either IMRT (n = 16, until 2011), VMAT (n = 16), HT (n = 37) or 3D-CRT (n = 68). Concomitant CTX was delivered in 127 patients, mainly using a mitomycin-capecitabine combination (n = 117). Median follow-up was 42 months (range: 2-97). Four-year LC, OS, DFS, and CFS rates were 80%, 84%, 78% and 90%, respectively. Time to progression was 4 months (range: 0-41). A total of 24 patients presented a recurrence (local only in 14, locoregional in 1, locoregional and distant in 1, regional only in 2, and distant only in 3 patients). Twelve patients underwent a colostomy because of local recurrence (n = 12) or pretreatment dysfunction (n = 2). Grade 3 acute toxicity was observed in 33 patients (2.4%); i.e. erythema (26/33) or diarrhoea (9/33). No late G3 cutaneous toxicity was recorded. At the time of analysis, 127 patients presented more than 6 months of followup and were considered evaluable for late toxicity: 5 of 127 patients present a late G3 gastrointestinal toxicity (analg incontinence). No G4 acute or late toxicity was recorded. No significant difference was observed in terms of local control or acute G3 toxicity between IMRT techniques and 3D-CRT boost techniques. Conclusions: A total dose of 59.4 Gy to the anal canal and involved nodes, including 36 Gy to the uninvolved nodes, is effective and safe when delivered using modern IMRT techniques and daily IGRT. For these reasons, VMAT or HT and concurrent CTX are the standard of care in our institutions.

PO-0704
Proton beam therapy for hepatocellular carcinoma with extensive portal vein tumor thrombosis
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Purpose/Objective: To evaluate the efficacy of proton beam therapy (PBT) for hepatocellular carcinoma with extensive tumor thrombosis in the main trunk or major branches of the portal vein.

Materials and Methods: Eighty patients with hepatocellular carcinoma were treated by PBT. There were 65 men and 15 women, and the median age was 65 years old (range: 25 - 88). The CTV ranged from 15.2 cm³ to 1687 cm³ (median: 238.9 cm³). The clinical stages were 3B, 3C, 4A, and 4B in 65, 1, 5, and 9 patients, respectively. Thirty-two patients had primary tumors, and 48 had recurrent tumors. The delivered total dose ranged from 70 to 80.47 Gy (median: 80.47 Gy) in terms of equivalent dose in 2Gy fractions.

Results: Seventy-seven patients (96.3%) completed the planned treatment. Median survival rate for all the patients was 12 months. MST for the patients treated with PTV that encompassed all the detectable lesions was 26.9 months, and MST for the patients who had viable tumor outside of their PTV was 6.3 months. Local recurrence after PBT was observed in 3 patients. Forty-five patients died of tumor progression, and 28 of them had recurrence out of the PTV. Multivariate analysis revealed existence of viable tumor outside of the PTV, clinical stage, and value of des-gamma-carboxy prothrombin as significant factors affecting the OS.

Conclusions: PBT was effective for patients with extensive portal tumor thrombus, if the PTV encompassed all the detectable lesions.

PO-0705
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Purpose/Objective: Some studies already showed that acute toxicity during chemo +/- radiotherapy (CT +/- RT) was correlated to the clinical response of the tumor. In this retrospective study, we report our analysis of acute toxicity of rectal cancer patients treated with an homogenous schedule of CT +/- RT.

Materials and Methods: Between 01/2010 and 08/2014, 83 locally advanced rectal cancer patients consecutively treated in our institution were analyzed. All these patients received long-course neoadjuvant chemoradiotherapy (45 Gy on pelvic nodes and mesorectum and 50 Gy on gross tumor volume and corresponding mesorectum, delivered with a simultaneous integrated boost). All patients were treated with helical Tomotherapy (HT) and daily image guided radiotherapy, and all of them underwent radical surgery. Concomitant chemotherapy with oral capecitabine was delivered in all the patients. Primary endpoint of this study was to report the rate of acute toxicity (G2 or more) of this therapeutic approach and to correlate acute toxicity to the Mandand tumor progression rate (TRG). Toxicity were retrospectively scored using CTC-CE score (v. 4.0). The considered acute toxicity were: skin toxicity, diarrhoea, blood loss, cystitis, anorectal pain. We performed logistic regression analyses, and we correlated the TRG with the presence of acute toxicity (any grade), the presence of any acute toxicity grade ≥ 2, and with a ‘sum of toxicity’ (ST) of each toxicity grades (i.e: this ST in a patient presenting a G2 bladder toxicity , a G1 pain and a G3 diarrhoea was 6, 2+1+3).

Results: Globally, 22/83 patients presented an acute ≥ G2 toxicity (26.5%), with only one patients presenting a G3 acute skin toxicity. Data about TRG were available for 69 patients. Logistic regression showed that better TRG have been found in patients presenting higher TS, both when TRG was considered as an ordinal (p=0.028) or as a continuous variable (p<0.03).