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finalization was reduced by respectively 0.7 and 0.9 days for the conventional and ConWIP (no patient appointment) workflows. The implementation of RT-Flow reduced greatly the delays of MDs generally having prior long delays.

Conclusion: Implementation of the workflow optimization software RT-Flow has reduced the delays and improved productivity, whilst giving users better control over work and better prioritization for patients. Both conventional workflow and ConWip workflows but also personnel stress levels have proven to be improved. Future work will focus on population TCP optimization and booking curves.

[1] Crop, F., Lacornerie, T., Mirabel, X. & Lartigau, E. Workflow optimization for robotic stereotactic radiotherapy treatments: Application of Constant Work In Progress workflow. Oper. Res. Heal. Care 6, 18–22 (2015).

EP-1456

What is the cost of reducing cardiac morbidities when treating breast cancers with radiotherapy?

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Purpose or Objective: There is no threshold limit for radiation induced cardiac toxicity, making it especially relevant for cardiac sparing radiation delivery in adjuvant breast radiotherapy. Deep inspiratory breath hold (DIBH) technique is one method for reducing the heart dose, however, it is resource intensive. This study analyses the cost of cardiac sparing using DIBH and its associated benefits.

Material and Methods: DIBH technique using Varian RPM, was used to deliver radiotherapy for 50 consecutive patients of left sided breast cancer. The time required in minutes and the number of personnel involved during each step of the planning and the treatment (40Gy in 15 fractions) were recorded. Weighted person hours (WPH) for each step were calculated and all the steps were summed up to arrive at the WPH for each patient. Radiographers, medical physicists and radiation oncologists were given a weightage of 1, 2 and 3 respectively for calculating the WPH. The data was analysed to see if experience reduces the time required. We also calculated the average WPH required for reducing the heart dose by 1 Gy.

Results: The mean age was 51 years. 14 patients were known hypertensive on medications while none of them were known ischemic heart disease patients. Three were suffering from COPD. Twenty nine patients had breast conservation surgery while the remaining 21 patients underwent mastectomy. The mean WPH was 21.49 for the entire cohort. The average mean heart dose (MHD) in the free breathing (FB) technique was 380.96cGy and 160.61cGy in the DIBH technique (p =0.002). Average WPH required for the DIBH planning process was 13.09 and 8.39 for delivery. Patients were divided into 2 cohorts, of 20 and 30 respectively, to assess if practice allowed reduction in DIBH WPH and this showed a decreasing trend of the WPH in the second cohort (22.2 vs 21.0, p=0.36). The average WPH required to reduce the MHD by 2.2 Gy was 22.54 WPH. The average person hours of the oncologist required to reduce the MHD by 2.2 Gy was 0.39 hours, while that of medical physicists and radiographers were 2.89 and 15.9 hours respectively.

	Radiographer	Medical Physicist	Radiation Oncologist
Average Person Hours required for a patient treated by DIBH technique	15.9 person hours	2.89 person hours	0.39 person hours
Formulas Weighted Person Hours = (Weightage x Person involved x Time in Minutes)/60 Person Hours = (Person involved x Time in Minutes)/60			

Conclusion: Although a resource intensive procedure, with practice the time required reduces with experience. On an average 10.25 WPH is required to reduce the MHD by 1 Gy, with 0.18 person hours of the oncologist versus 1.31 person hours of physicist and 7.23 person hours of radiographers time.

EP-1457

Delineation of radiation treatment volumes: a regional network based on the software Radiotherap-e

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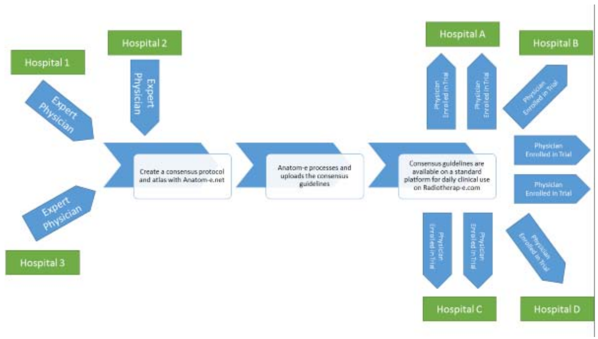
Purpose or Objective: Modern radiotherapy is able to provide highly precise and focused dose delivery with simultaneous target volume coverage and normal tissue avoidance. Proper selection and accurate definition of treatment volumes is of paramount importance. Anatom-e (Anatom-e Informations System Ltd, Houston, Tx) is a new platform able to drive, simplify, accelerate and standardize the contouring process in different oncological scenarios. Radiotherap-e is an online upgraded version providing the possibility to create an online network to share, discuss, control and optimize clinical cases, radiological images, radiotherapy contours and treatment approaches. We worked on the implementation of the aforementioned software in the Oncological Regional Network of Piedmont, Italy.

Material and Methods: Four pilot centers within the Oncological Regional Network of Piedmont, Italy were connected with the online Radiotherap-e platform. Challenging clinical cases (head and neck, lung, esophageal and rectal cancers) were exchanged within the system (Figure 1). Treatment choices and volume delineation strategies were analyzed and compared before and after the use of the software.



Results: The use of a unified distribution platform was able to eliminate compatibility issues based on different equipment or different treatment planning systems from site to site. Creation of consensus guidelines and common approaches took about 4 hours. Variation of treatment policies and contouring approaches due to platform use is under evaluation.

Conclusion: The online software Radiotherap-e provided a common platform to share clinical, radiological and radiotherapic informations and allowed standardization and optimization of contouring strategies within a regional oncological network.

EP-1458

CBCT-Based On-site Simulation, Planning, and Delivery (OSPD) for whole brain radiotherapy

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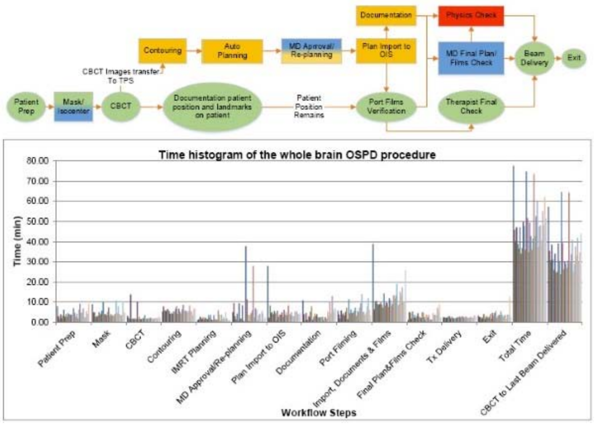
Purpose or Objective: To demonstrate the feasibility of a CBCT-based on-site simulation, planning, and delivery (OSPD) for whole brain radiotherapy, in which all steps from imaging, planning to treatment delivery are performed at the treatment unit in one appointment time slot. This work serves as the proof of concept for future OSPD single fraction radiation therapy.

Material and Methods: An integrated on-site imaging, planning and delivery workflow was developed and tested for whole brain radiotherapy. An automated two-opposed-oblique-beam plan is created by utilizing the treatment planning system scripting and simple field-in-field IMRT. The IMRT plan is designed with maximum 8 control points to cover the target volume consisting of the brain to C1/C2 of the spinal cord, with dose homogeneity criteria from -5% to +7% of the prescription dose. Due to inaccuracy of reconstructed Hounsfield unit numbers in CBCT images, the dose distribution is calculated with non-heterogeneity correction introducing only clinically insignificant dose discrepancy. A coherent and synchronized workflow was designed for a team of attending physician, physicist, therapists, and dosimetrist to work closely with the ability to quickly modify, approve, and implement the treatment.



Results: Thirty-one patients have been treated with this OSPD treatment, without compromising the plan quality compared to our regular clinically used parallel apposed 2D plans. The average time for these procedures are 48.02 ±11.55 minutes from the time patient entered the treatment room until s/he exited, and 35.09 ±10.35 minutes from starting CBCT until last beam delivered. This time duration is comparable to the net time when individual tasks are summed up during our regular CT-based whole brain planning and delivery.

Workflow Steps	Time (min) $\bar{x} \pm \sigma$
Preparation/Setup	4.25 ± 2.29
Mask	5.11 ± 2.28
CBCT	2.76 ± 2.59
Contouring	5.89 ± 1.24
IMRT planning	2.28 ± 1.23
MD approval (include re-planning)	5.90 ± 7.86
Plan import, documents & films	12.18 ± 6.34
Plan Import to OIS	5.25 ± 4.49
Documentation	4.27 ± 2.95
Port filming	5.89 ± 2.79
Final plan& films checks	3.56 ± 1.80
Beam Delivery	2.54 ± 0.36
Exiting	3.56 ± 1.98
Total (patient enters and exits)	**48.02 ± 11.55**
Total (CBCT to last beam delivered)	**35.09 ± 10.53**

Conclusion: The OSPD whole brain treatment has been tested to be clinically feasible. The next step is to further improve the efficiency and to streamline the workflow. Other disease sites will be also tested with this new technology.

EP-1459

Testing the self-sufficiency of the Radiotherapy Department of Ospedali Riuniti Marche Nord

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Purpose or Objective: For reasons of logistics in Italy, many public radiotherapy (RT) department deliver treatments to wide geographical areas. It is important that RT capacity is in the right place and that patients (pts) don't have to travel too far for their treatments. The aim of this study is to analyse the mobility for RT involving the RT Department of Ospedali Riuniti Marche Nord (AORMN) naturally devoted to satisfy RT needs of cancer pts living in Pesaro-Urbino (PU) province.

Material and Methods: The Nomogramma di Gandy (NdiG) is a high-level tool which measures the degree to which an area or region is self-sufficient in the delivery of a specified public service. NdiG has been used to diagrammatic represent cancer pts flows for RT at AORMN. District and local datasets were used to obtain the number of local pts being treated by AORMN (Rr), the number of local pts irradiated by other RT Departments (E, “Exported” from an area), and the ones coming from outside that AORMN treated (I, “Imported” into an area). The three data enable to calculate two key indicators: X = The Percentage of Cancer pts Irradiated who were Residents = (Rr × 100) / (Rr + I) Y = The Percentage of Residents Irradiated Locally = (Rr × 100) / (Rr + E), useful to determine the Catchment Population for AORMN = Resident Population × (Y/X).

Results: Between January and December 2013, 646 cancer pts living in PU district and 20 not resident pts were treated by AORMN, while 24 patients residing in PU area received RT by neighbouring RT centres. So during 2013, AORMN coordinates were as follows: X =96,99%, Y=96,42% and Y/X =0,99 (figure 1). Further analysing datasets, 35% of “Imported” pts received IMRT for Head and Neck cancers while the 67% of “Exported” pts underwent Stereotactic Radiation Therapy (SRT) not yet implemented at AORMN (50% stereotactic body radiation therapy and 17% stereotactic radiosurgery for brain metastasis).

Conclusion: AORMN RT Service shows a great deal of self-sufficiency, having values of both X and Y >90%. The degree to which people access their local RT services is important for planning and developing services themselves, thus the use of NdiG to compare access across many geographical areas or across many time periods could be a useful method for planning and commissioning RT centres at a local or regional level. The analysis of patients' flow pattern at AORMN suggests that the implementation of SRT could be useful to further reduce the number of PU users who should travel for RT.

Electronic Poster: Clinical track: Communication

EP-1460

Knowledge, attitudes and decision-making preferences of men considering clinical trial participation

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Purpose or Objective: Only 5-10% of cancer patients eligible for randomized clinical trials (RCT) actually participate. The RAVES RCT (Trans-Tasman Radiation Oncology Group 08.03), compares adjuvant radiotherapy with early salvage radiotherapy for men with high risk features after prostatectomy. We aimed to determine attitudes and knowledge of potential participants regarding RAVES and RCTs, and examine decision-making preferences and decisional-conflict in men deciding on RAVES participation.