X, Y, Z coordinates for different structures were : **LAD** 0.31(± 0.13), 0.83(± 0.08), 0.37(± 0.20); **LV** 0.28(SD 0.±), 1.01(± 0.20), 0.48(± 0.13); **LCX** 0.19(± 0.04), 0.95(± 0.19), 0.61(± 0.21); **RCA** 0.24(± 0.09), 0.75(± 0.17), 0.38(± 0.12).
Conclusions: Cardiac activity causes minimum movement of cardiac structures in cranio-caudal (CC) direction and large movement in anterio-posterior (AP), left-right (LR) direction whereas respiratory movements cause maximum movement in CC direction and minimum in LR direction. For CAs, LV radial margin of 6mm and CC margin of 4mm in breath hold radiotherapy, and radial margin of 6 mm and CC margin of 1cm in free breath radiotherapy will cover the range of movements induced by cardiac and respiratory activity and can be recommended as internal risk volume (IRV) for these structures.

OC-0282
Considerable intra-breath-hold motion and inter-breath-hold position variation of pancreatic tumors
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Purpose/Objective: The use of a breath hold (BH) technique for radiotherapy of pancreatic tumors may be beneficial, as it is expected to reduce intra-fractional motion. The aim of this study is to evaluate the pancreatic tumor motion during BH as well as the variation in tumor position between consecutive BHs.
Materials and Methods: In this pilot study, we included 6 consecutive pancreatic cancer patients. All had 2–4 intratumoral gold fiducials implanted. Patients were asked to perform 3 consecutive 30-second end-inhale BHs on day 5, 10 and 15 of their three-week treatment. During BH, airflow through a mouthpiece was measured using the SpiroDynr'X system (Dyn'R, France) and patients were given visual feedback to optimize the stability and reproducibility of their lung volume during BH. Any inadvertent flow of air during BH was monitored for all patients.
We measured intra-BH motion and inter-BH position variation of the tumor on lateral fluoroscopic movies (45 in total) made during BH. Therefore, in each movie the fiducials as a group were tracked over time in superior-inferior (SI) and anterior-posterior (AP) direction using 2-D image correlation between consecutive frames, directly yielding the intra-BH motion. For each measurement day, the inter-BH position variation was measured by comparing the positions of the fiducials in the first frame (*i.e.* at the start of BH) of all 3 movies of that day.
We determined for each patient the range of intra-BH motion over all movies as well as the range of inter-BH position variation over all measurement days; for both we also determined the absolute mean per patient and from these the absolute means and standard deviations (SDs) for the entire patient group. Additionally, we investigated the relation between inadvertent airflow during BH and the intra-BH motion measured for that BH.
Results: We found intra-BH tumor motion of up to 12.5 mm (Figure; range, 1.0–12.5 mm) in SI direction and up to 8.0 mm (range, 1.0–8.0 mm) in AP direction. The absolute mean motion over the patient population was 4.7 (SD: 3.0) mm and 2.8 (SD: 1.2) mm in the SI and AP direction, respectively (Table). Patients were able to perform stable consecutive BHs; for only 20% of the movies we found very small airflows (≤65 ml). These were mostly stepwise in nature and could not explain the continuous tumor motions we observed. We found inter-BH tumor position variations of up to 9.1 mm. The mean absolute inter-BH position variation over all patients was 3.2 (SD: 1.5) mm and 2.1 (SD: 1.0) mm in the SI and AP direction, respectively (Table).
Conclusions: We found substantial (up to 12.5 mm) pancreatic tumor motion during BHs, as well as considerable position variations between BHs (up to 9.1 mm). However, patients were able to perform a stable BH, since we only found minimal inadvertent airflow, seen in only a minority of patients, and this did not explain the obtained results. Future research is required to investigate possible causes for the obtained results and to develop strategies to improve the stability and reproducibility of BH.

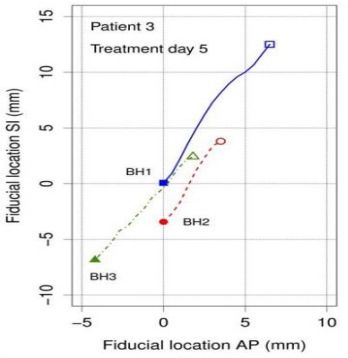

Figure: Motion of a fiducial during three consecutive 30-second breath holds. Solid symbols indicate start of each trace and open symbols indicate the end. Differences in symbol position illustrate inter-breath-hold position variation.

Pat. (tumor location, number of movies)	Intra-BH (mm)		Inter-BH (mm)	
	SI (SD)	AP (SD)	SI (SD)	AP (SD)
1 (head, n=7)	8.7 (1.0)	2.5 (0.7)	1.9	1.5
2 (head, n=9)	4.7 (2.3)	4.6 (1.6)	4.3	1.4
3 (head, n=5)	7.6 (3.5)	3.8 (1.6)	5.5	3.4
4 (body, n=9)	1.4 (0.4)	1.6 (0.5)	2.5	1.5
5 (head, n=6)	3.8 (0.8)	2.4 (0.7)	2.0	1.7
6 (head, n=9)	1.7 (0.5)	1.8 (0.4)	3.0	3.4
Group	4.7 (3.0)	2.8 (1.2)	3.2 (1.5)	2.1 (1.0)

Table: Mean absolute intra-breath-hold motion and inter-breath-hold position variation in superior-inferior (SI) and anterior-posterior (AP) direction per patient and for the entire patient group. No standard deviation (SD) was calculated for the inter-BH variation of each patient because we had only 2 or 3 measurement days per patient.

Symposium with Proffered Papers: Psycho-social aspects of radiation therapy: Acute side effects

SP-0283
Delivering cost-effective acute psycho-oncology care
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There is good evidence that a range of psychological treatments can help reduce distress in people with cancer, but the challenge remains to deliver them in a cost effective manner. Cognitive behavioural therapy has established itself as the leading treatment for anxiety and depression in oncology patients. It can also contribute to the management of physical symptoms such as chronic pain, insomnia and fatigue. The evidence for its effectiveness will be reviewed and then a stepped care model considered which offers some ways to deliver cost effective psychological support. One component of this involves dissemination of psychological skills to health care professionals who may be able to integrate psychological support into their work without delivering formal 'therapy'. Evidence will be presented that "First Aid" CBT skills can be taught to a range of health professionals: these skills include basic formulation skills, 'curious questioning', problem identification and goal setting, and simple behavioural and cognitive techniques. This training gives professionals confidence in understanding, tolerating and managing emotional distress in their patients.