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Transforming Lives Through
Comprehensive Care

Ease of Use of AlignRT in DIBH Treatment

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Importance of DIBH in Breast Cancer

- Reduces radiotherapy dose to the heart and Lungs

- Darby et al:

  -2168 women had RT for breast cancer, 1205 controls, 963 events

  -Mean dose to heart: 6.6Gy for left breast and 2.9Gy for right breast, 4.9Gy

  -Rate of coronary event increased by 7.4% for each 1Gy increase mean dose

  -% increase for mean dose

  2Gy----------10%

  2-4Gy----------30%

  5-9Gy----------40%

  10Gy or more------116%

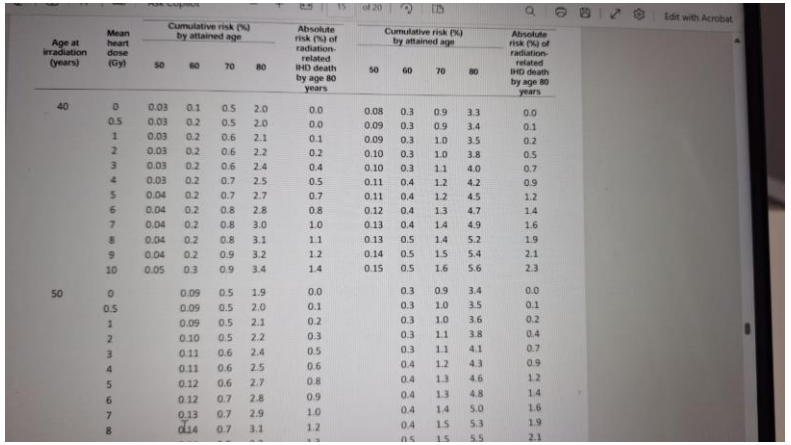
  -% increase no of yrs since radiotherapy

  0-4 yrs----------16.3%

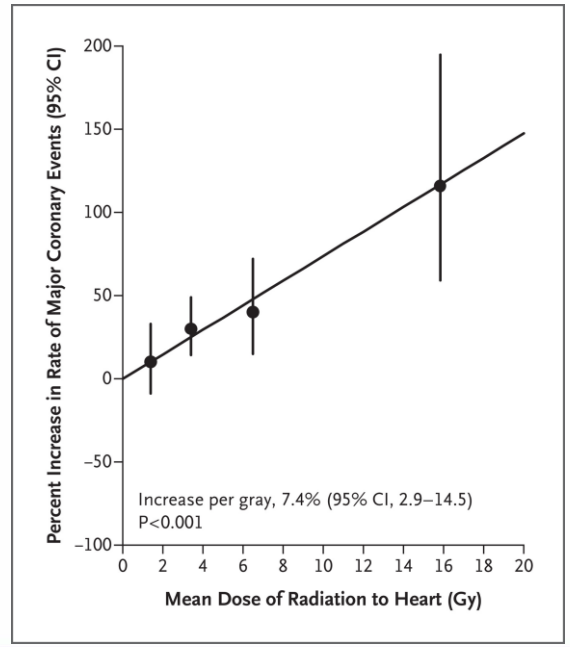
  5-9 yrs----------15.5%

  10-19yrs----------1.2%

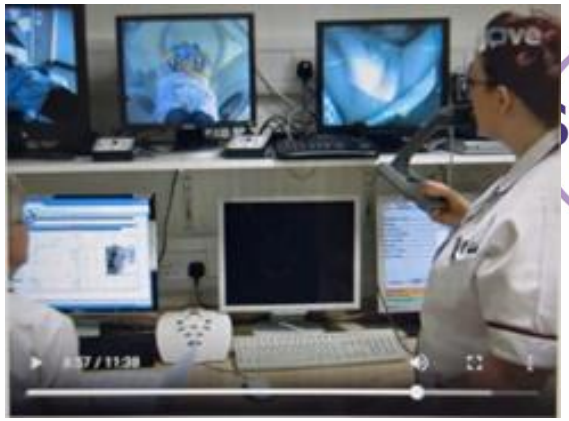
  20 or more----------8.2%



Age at irradiation (years)	Mean heart dose (Gy)	Cumulative risk (%) by attained age 50	60	70	80	Absolute risk (%) of radiation-related IHD death by age 80 years	Cumulative risk (%) by attained age 50	60	70	80	Absolute risk (%) of radiation-related IHD death by age 80 years
40	0	0.03	0.1	0.5	2.0	0.0	0.08	0.3	0.9	3.3	0.0
	0.5	0.03	0.2	0.5	2.0	0.0	0.09	0.3	0.9	3.4	0.1
	1	0.03	0.2	0.6	2.1	0.1	0.09	0.3	1.0	3.5	0.2
	2	0.03	0.2	0.6	2.2	0.2	0.10	0.3	1.0	3.8	0.5
	3	0.03	0.2	0.6	2.4	0.4	0.10	0.3	1.1	4.0	0.7
	4	0.03	0.2	0.7	2.5	0.5	0.11	0.4	1.2	4.2	0.9
	5	0.04	0.2	0.7	2.7	0.7	0.11	0.4	1.2	4.5	1.2
	6	0.04	0.2	0.8	2.8	0.8	0.12	0.4	1.3	4.7	1.4
	7	0.04	0.2	0.8	3.0	1.0	0.13	0.4	1.4	4.9	1.6
	8	0.04	0.2	0.8	3.1	1.1	0.13	0.5	1.4	5.2	1.9
	9	0.04	0.2	0.9	3.2	1.2	0.14	0.5	1.5	5.4	2.1
	10	0.05	0.3	0.9	3.4	1.4	0.15	0.5	1.6	5.6	2.3
50	0		0.09	0.5	1.9	0.0		0.3	0.9	3.4	0.0
	0.5		0.09	0.5	2.0	0.1		0.3	1.0	3.5	0.1
	1		0.09	0.5	2.1	0.2		0.3	1.0	3.6	0.2
	2		0.10	0.5	2.2	0.3		0.3	1.1	3.8	0.4
	3		0.11	0.6	2.4	0.5		0.3	1.1	4.1	0.7
	4		0.11	0.6	2.5	0.6		0.4	1.2	4.3	0.9
	5		0.12	0.6	2.7	0.8		0.4	1.3	4.6	1.2
	6		0.12	0.7	2.8	0.9		0.4	1.3	4.8	1.4
	7		0.13	0.7	2.9	1.0		0.4	1.4	5.0	1.6
	8		0.14	0.7	3.1	1.2		0.4	1.5	5.3	1.9



Typical DIBH options in Breast Cancer



- Voluntary breath hold

  UK Heartspare Study—Radiother Oncol. 2013 Aug;108(2):242-7. doi: 10.1016/j.radonc.2013.04.021. Epub 2013 May 29.
  -https://pmc.ncbi.nlm.nih.gov/articles/PMC4211647/-
  -Easy to use, no need for any equipment
  -More suitable with 3D-CRT, close monitoring during treatment
  -Outcomes similar but Patients felt more comfortable with vDIBH

- Spirometry based Breath hold

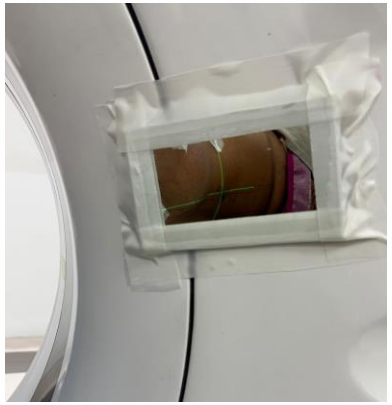
  -Tracks patient's lung volume, needs cooperation from patient

- Surface based systems

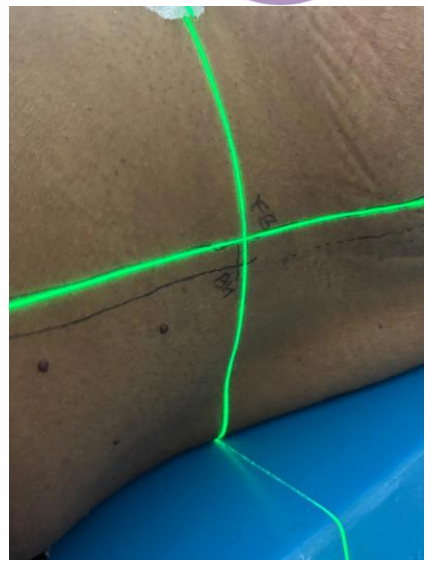
  -Use projectors and cameras for real time 3d surface of the chest
  Eg: SGRT

Our DIBH workflow using SGRT

- Patient explained to about DIBH- suitability assessed
- Patient seen in RT department-explained about DIBH procedure
- Ideally, at least 1 day time given to practice breath hold
  - -up to 80% of full inspiratory capacity
  - -check chest vs abdominal breathing
- Patient taken for planning CT scan
- Mirror placed on CT scan allows CT technicians to observe breath hold consistency



Our DIBH workflow using SGRT



- Patient practices breath hold on CT Couch
- Skin marks placed using lasers in free breathing and breath hold positions
- Displacement of skin marks noted between free breathing and breath hold positions
  >6mm, we consider suitable, 1cm-1.2cm, ideal
- CT scan done in free breathing and Breath hold

Our DIBH workflow using SGRT

- Treatment planned with 3D-CRT using field in field technique, IMRT or VMAT
- If VMAT, we plan with 2 tangential arcs except when IMN also treated
- Heart doses aimed for while planning

	40Gy/15#	**26Gy/5#**
	V10 < 5%	V7Gy < 5%
	V2 < 30%	V1.5Gy < 30%

- Mean Heart Dose----------3.2Gy, max 4.0Gy (RTOG 1005)
- Our Data for Mean heart dose----2.29Gy with DIBH and 3.6Gy without DIBH

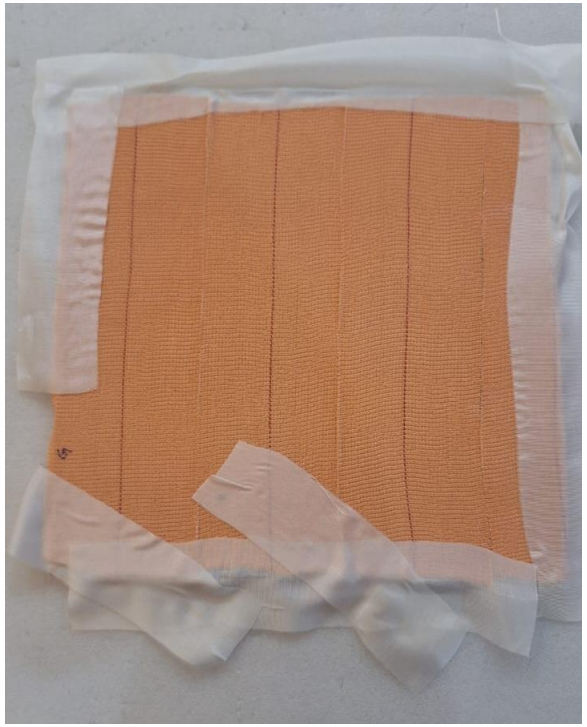
Our DIBH workflow using SGRT

- Patient set up in position using postural video, position verified in free breathing and breath hold using SGRT
- CBCT done in breath hold to confirm accurate positioning
- Once CT verified, patient instructed to breathe in and hold breath, beam switches on. Breath hold held for 20 secs.
- Patient specifically instructed to breathe in and hold for fist 2-3 fractions
- After that, most patients able to do the procedure by themselves

Our DIBH workflow using SGRT

Our DIBH workflow using SGRT

- Chest Wall treatment with bolus



In Conclusion

- DIBH an essential part of treatment in breast cancers, especially left breast cancers
- Helps reduce heart dose and also lung doses
- Different techniques available to do DIBH
- SGRT using AlignRT, in our experience
  - -Excellent patient comfort
  - -Very accurate
  - -Easy to setup and implement
  - -Easy for RT Technologists to monitor patients
  - -More consistent and measurable results

Thank You

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