SABR for Renal Cancer

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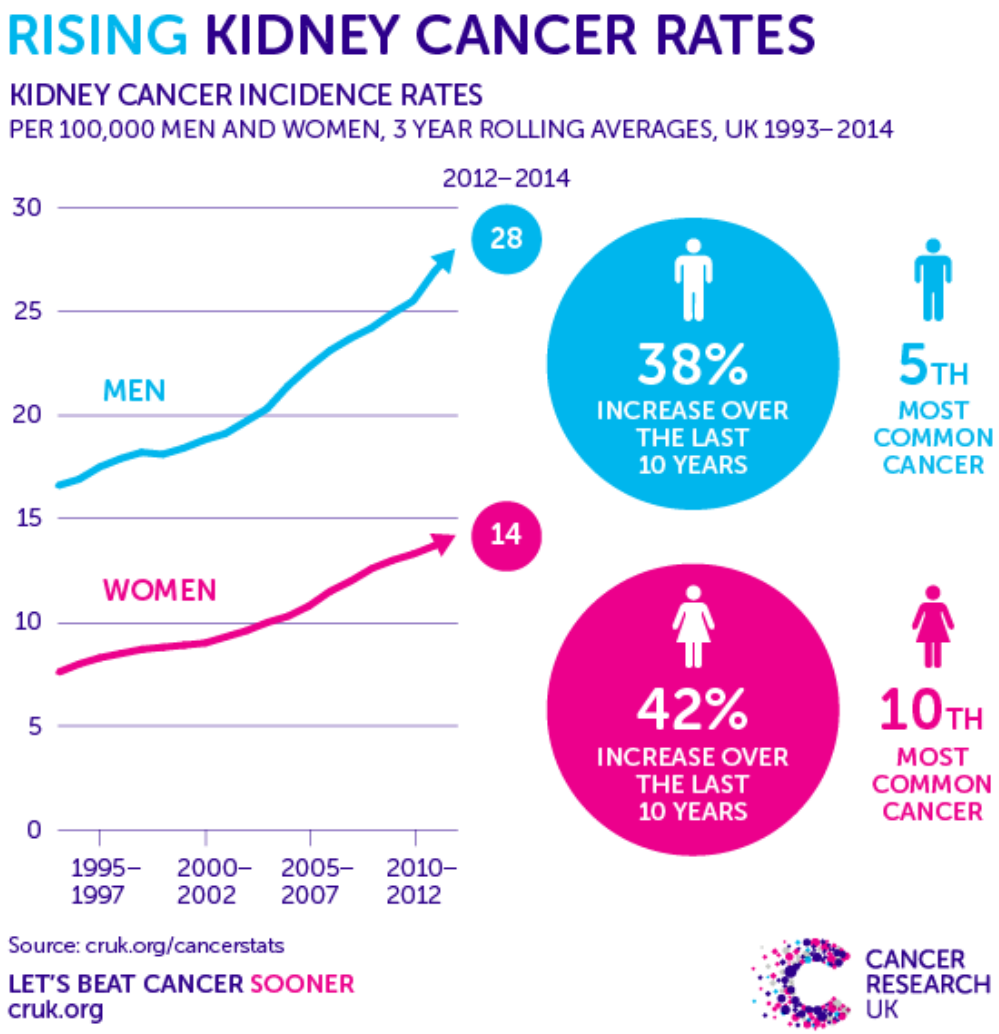
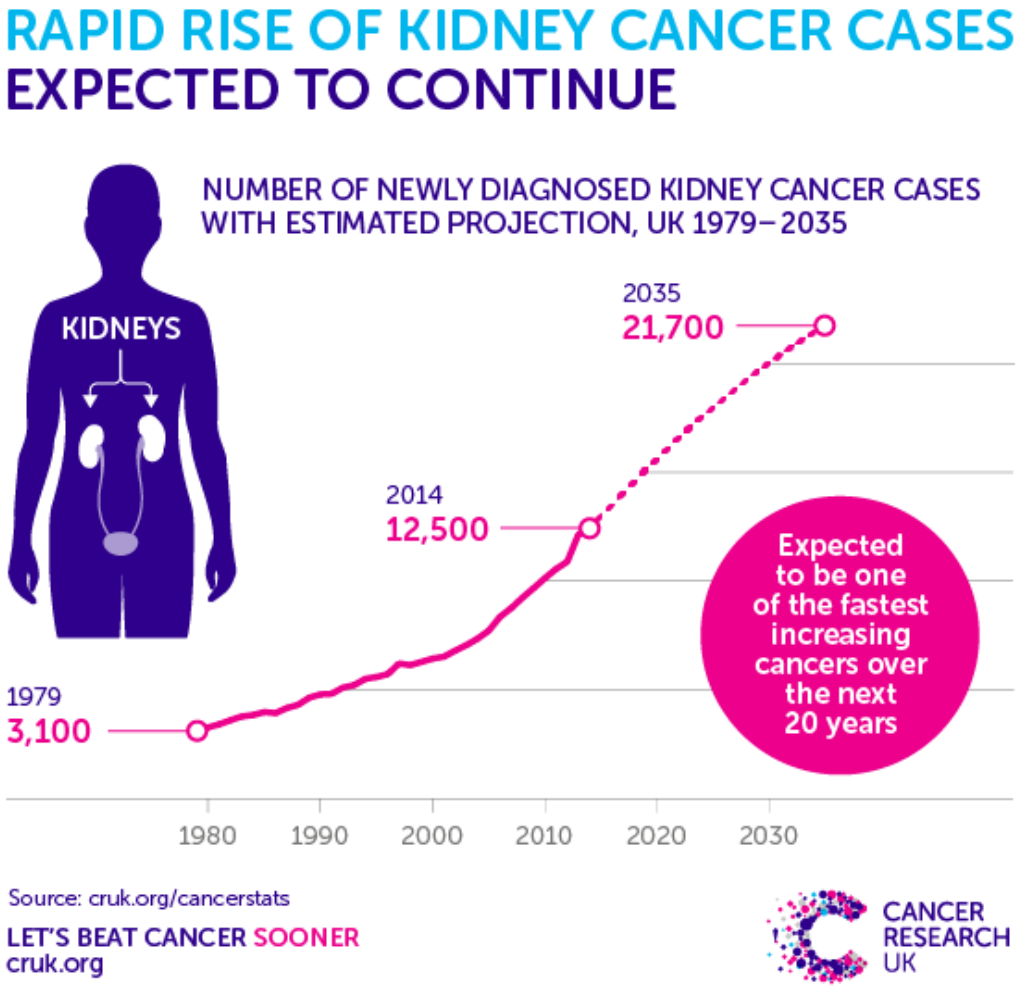
Stereotactic ABlative Radiotherapy (SABR)

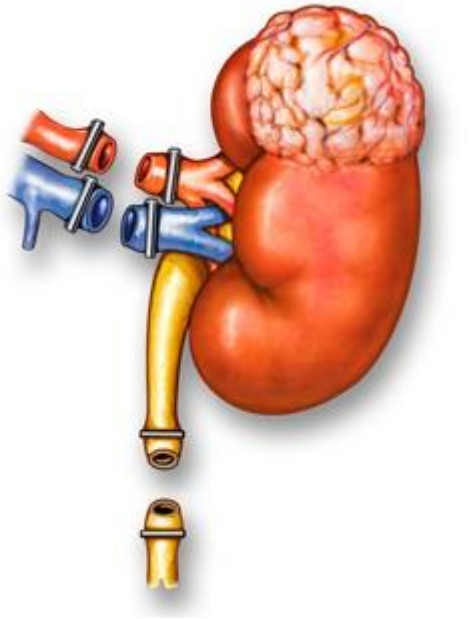
- Stereotactic ABlative Radiotherapy (SABR) or Stereotactic Body RadioTherapy (SBRT).
- High dose radiotherapy, great accuracy, large doses delivered to small volumes of tumour sparing nearby organs.
- Dedicated platform or hardware, software changes to a conventional linac, team of experienced radiographers, physics team and clinician/s.
- SABR treatments comprise 1, 3 or 5 treatments.

Renal Cancer incidence





Nephrectomy remains the gold standard



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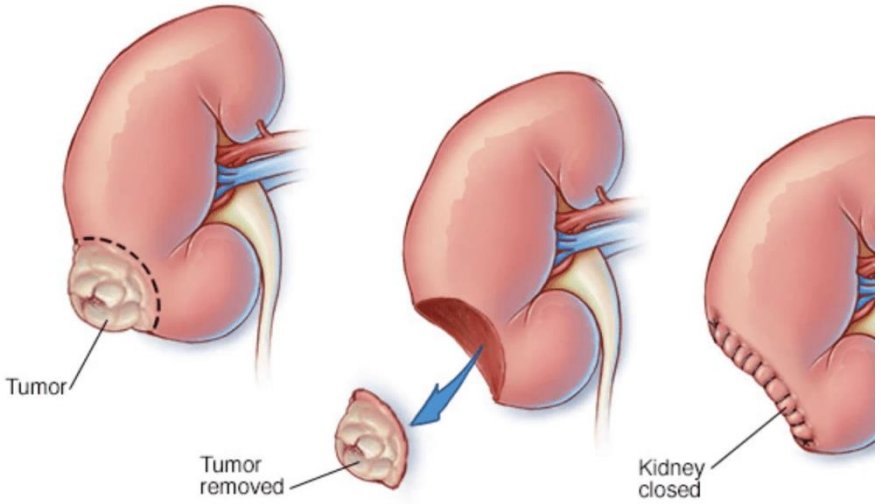
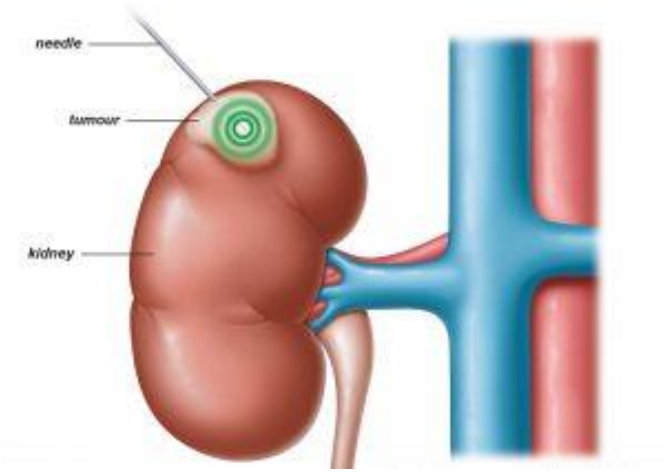


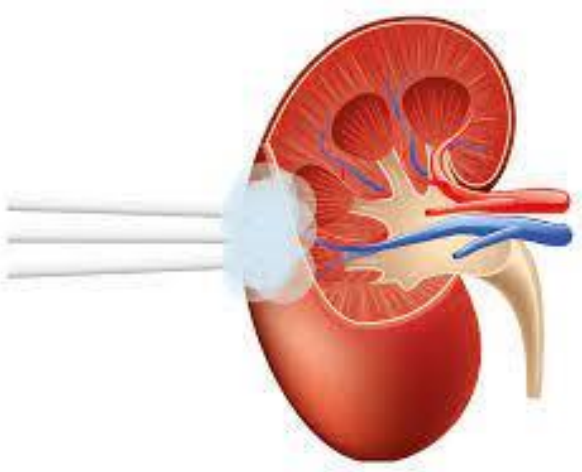
Alternative treatments



Radiofrequency ablation

Thermal ablation

is an alternative but is limited by efficiency
-when masses are >3-3.5cm
-Increased complication for centrally located tumours



Cryotherapy

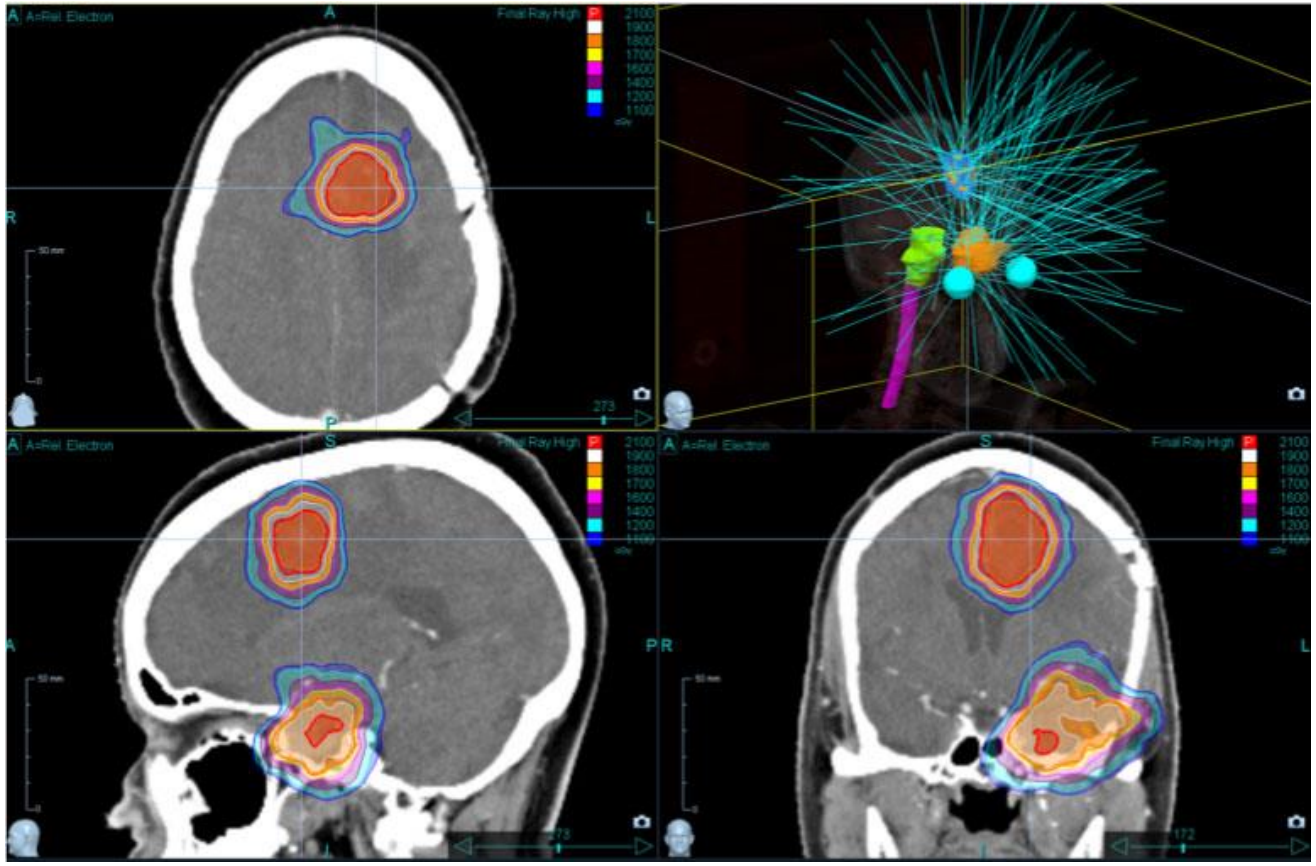
SABR as an alternative may tick all the boxes

Image courtesy of S Siva

Is renal cancer resistant to radiotherapy?

SABR for renal cell carcinoma

- Stereotactic Radiotherapy for RCC brain metastases in 2015
- 810 patients .
- Local control at 1 year 88%.
- Median overall survival range was 7-26 months Grade 3 or 4 toxicity was <5%.
- Comparable with local control of patients with brain metastases of other histologies.

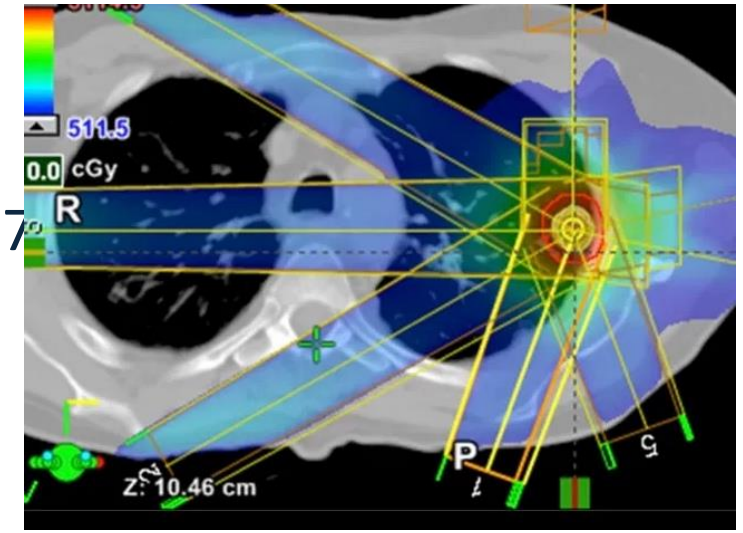


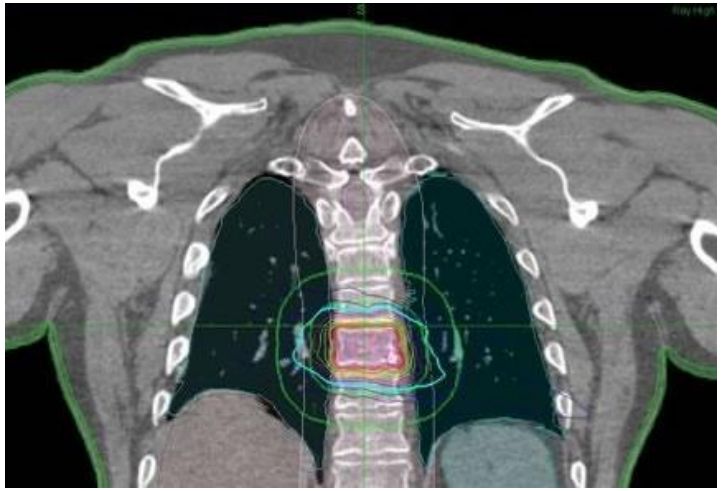
3-Mar-26

Kothari et al Acta Oncologica 2015.

SABR for renal cell carcinoma

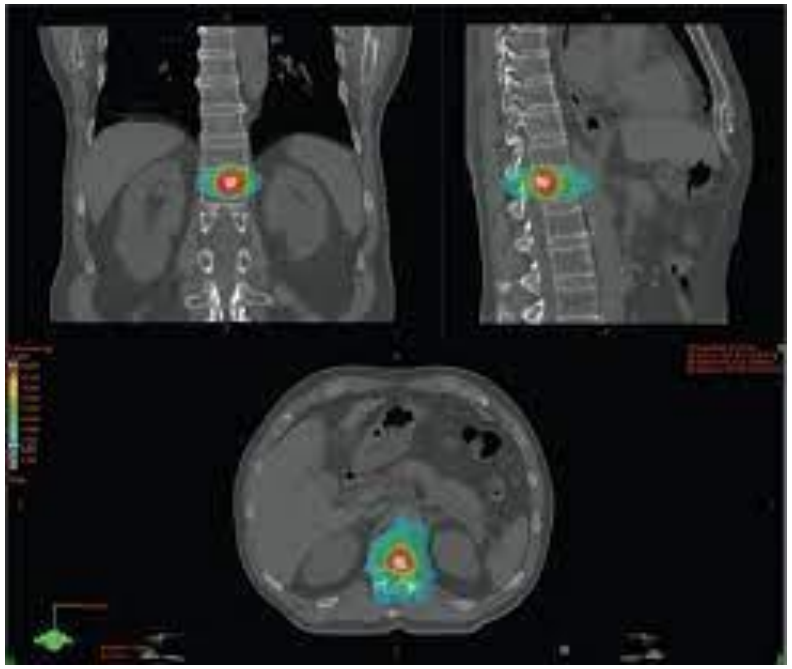
- SABR for RCC lung metastases Reiber et al, J Thoracic Dis 2017
- Multicentre retrospective analyses of treatment
- 46 patients with 67 lung mets
- Local control was 92% at 3 years
- Overall survival was 84% at 1 year and 43.8% at 3 years
- Grade 3 or 4 toxicities were reported in 6.5%
- Grade 3 or 4 toxicity was 1.1%

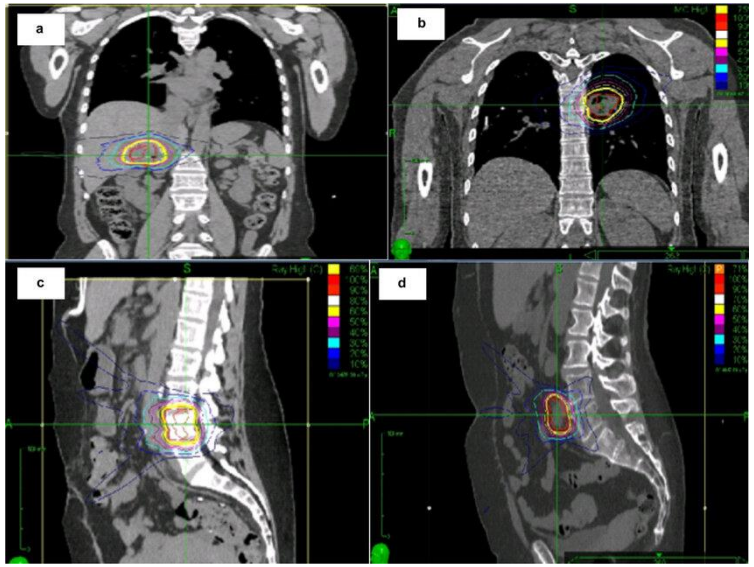




SABR for renal cell carcinoma

- SABR for RCC oligomets – meta-analyses
- 28 studies, 1602 patients
- 3892 lesions
- Extra cranial lesions local control at 1 year 89.1%
- overall survival 86.8% at 1 year
- Toxicity Grade 3 or 4 was 0.7%
- Intracranial lesions local control at 1 year was 90.1%
- Overall survival at 1 year was 49.7%



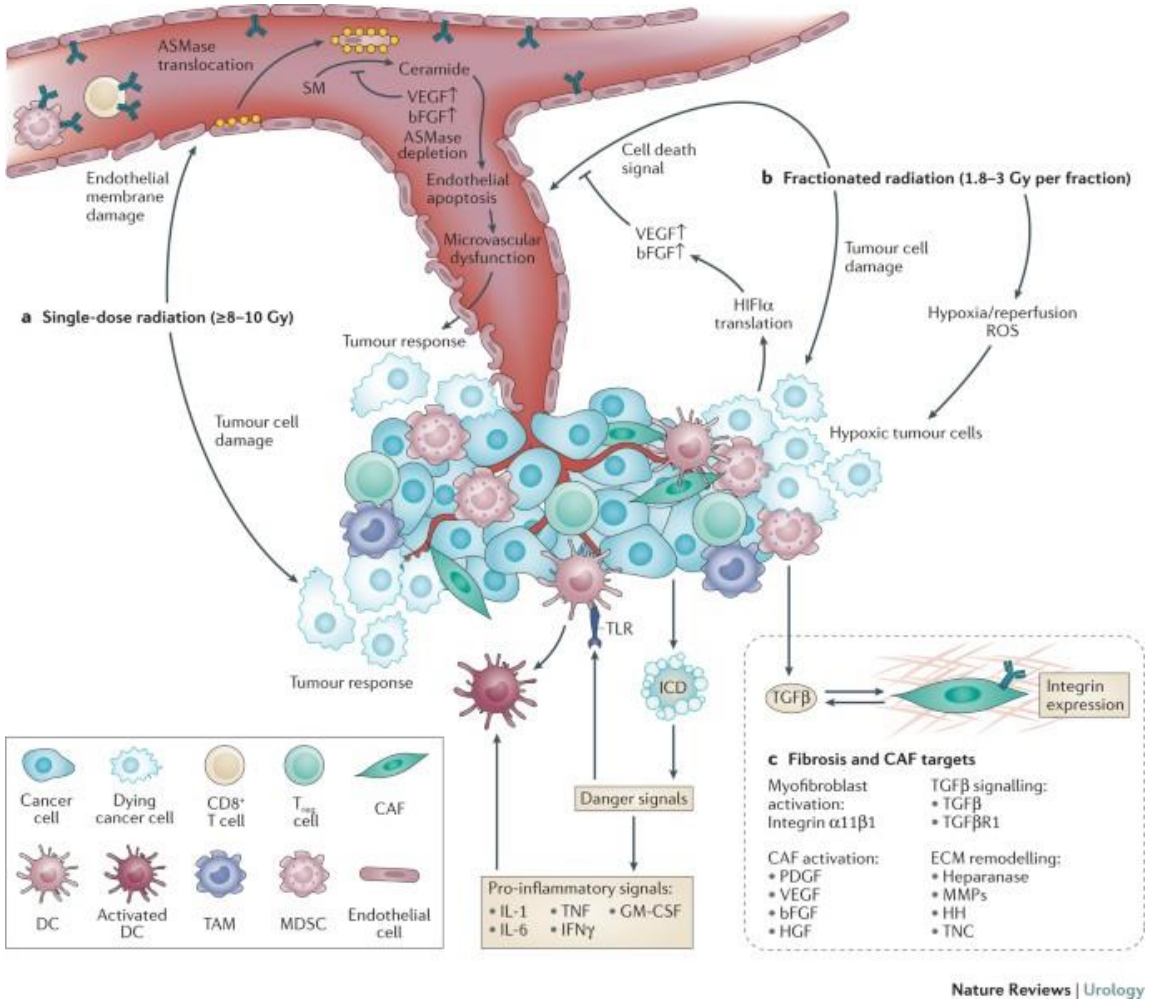


Zaorsky N et al Eur Urol Oncol 2019

Alternative putative mechanisms of cell kill with SABR

Siva S, et al Radiotherapy for renal cell carcinoma: renaissance of an overlooked approach

- Pro-inflammatory signalling for adaptive immunity
- Ceramide/sphingomyelinase induced cell death
- Endothelial apoptosis



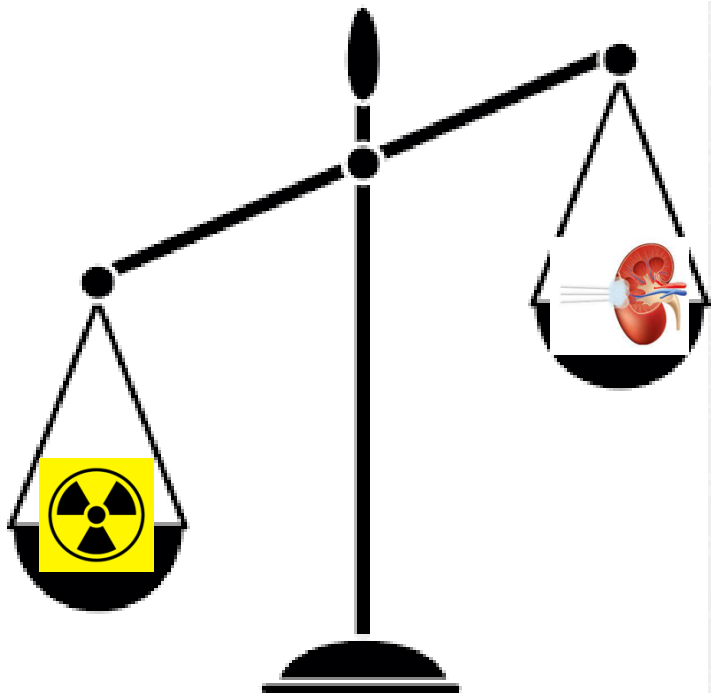
Nature Reviews | Urology

Comparing evidence to thermal ablation

More than 12 prospective trials compared to none for Thermal Ablation

ISRS Practice Guideline 2024:
The prospective trials

1st Author, Year	Patients	Tumor Size (median, cm; unless stated)	Dose & Fractions	Local Control (%)	Change in eGFR (mLs/min)
Svedman, 2006	5	NR	30-45Gy in 2-4 fractions	80	NR
McBride, 2013	15	3.4	21-48Gy in 3	80	-18
Staehler, 2015	29	33.7 cm^3	26Gy in 1	100	-6.5
Ponsky, 2015	19	57.9 cm^3	24-48Gy in 4	100	NR
Siva, 2017	33	4.8	26Gy in 1 or 42Gy in 3	97	-11
Singh, 2017*	14	NR	15Gy in 1	*	*
Correa, 2018	12	8.7	25-35Gy in 5	100	-9.9
Kasuya, 2019	8	4.3	66-72Gy in 12 (CIRT)	100	-10.8
Funayama, 2019	13	2.28	60 or 70 Gy in 10	92.3	-16.7
Grubb, 2021	11	3.7	48,54,60Gy in 3	90	-7
Kirste, 2022	7	2.8	50Gy in 5 (1 pt had 60Gy in 8)	100	-7.1
Lapierre, 2023	13	3.3	32, 40 or 48 Gy in 4, or 40Gy in 5	100	-5.9
Hannan, 2023	16	3.2	36 Gy in 3 (63%) OR 40Gy in 5	94	-12.1



Siva et al Lancet Oncology Volume 25, January 2024

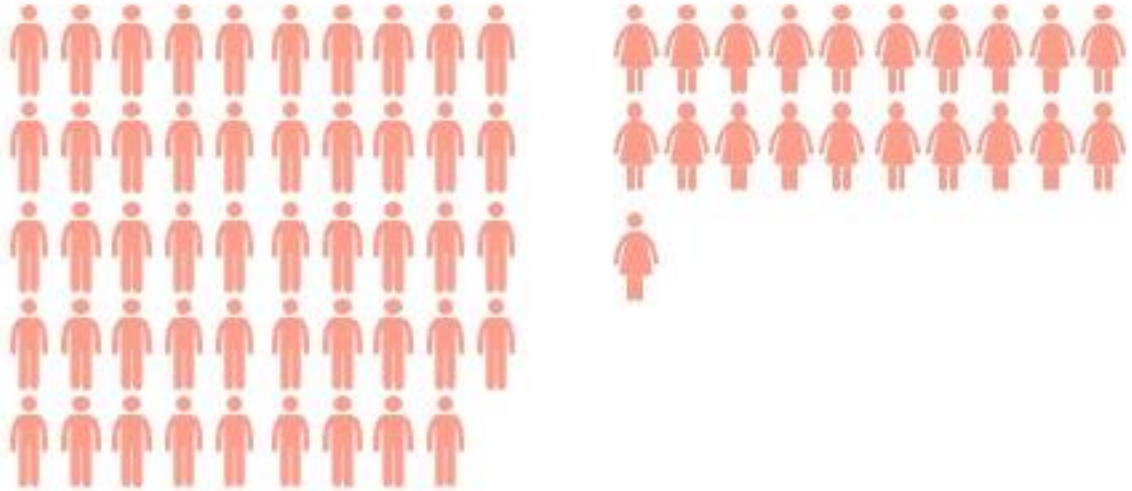
Focal Ablative STereotactic RAdiotherapy for Cancers of the Kidney

- Multicentre phase II trial
- Median tumour size 4.6cm
- Biopsies in 100%
- 1 or 3 fraction SABR
- 70% serial growth measurement at enrolment

Focal Ablative STereotactic RAdiotherapy for Cancers of the Kidney

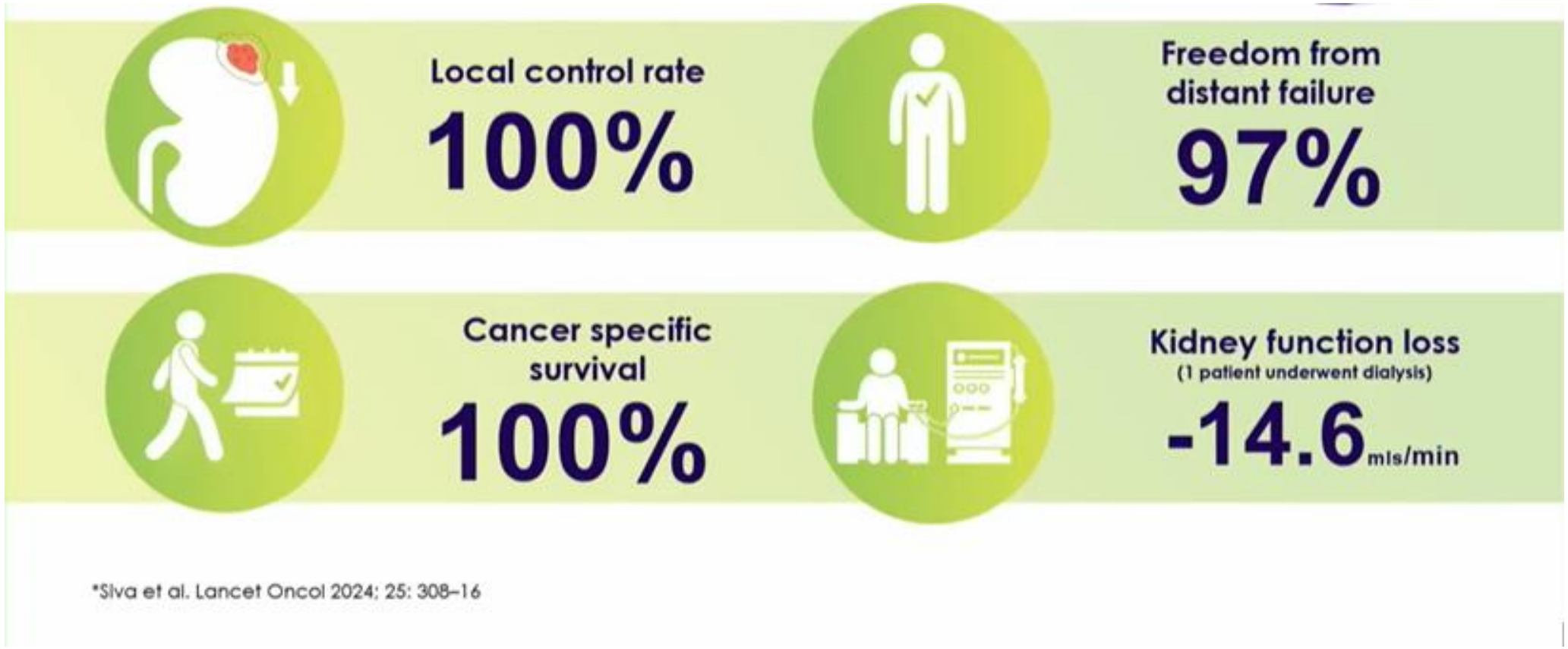
70 patients

Recruited between Jul. 2016 and Feb. 2020



FASTRACK II Clinical Outcomes

Median Follow up of 43 months



Longer term outcomes:

5 year outcomes: International Radiosurgery Consortium of the Kidney (IROCK)

Siva et al Lancet oncology 2022 Lancet oncology Dec 23(12)

Follow up schedule over 5 years +

Avoid scanning initially as pseudoprogression may occur as late as 3 months after SABR

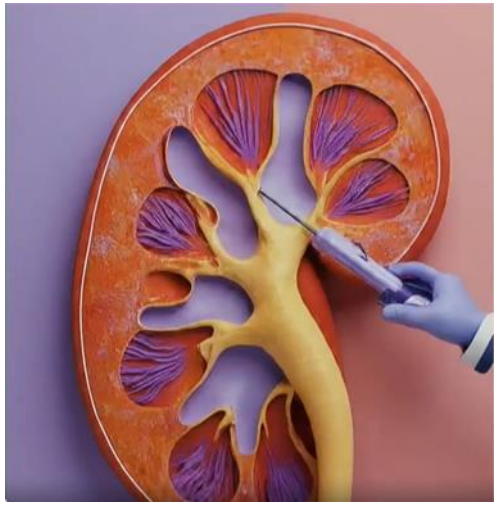
	CT Chest/Abdo	eGFR	Split Renal Function and calculated GFR
Baseline	✓	✓	✓
Year 1	At 6, 9 and 12 months	3 monthly	
Year 2	6 monthly	6 monthly	
..Until year 5	9 monthly	9 monthly	
5+ years	Annually	Annually	
At progression	✓	✓	✓

Taken from S Siva https://oncodaily.com/insight/13151

Follow up

Points to note

- Contrast enhancement is not recommended to evaluate response – different to Thermal Ablation
- Biopsy is not recommended after SABR as a positive biopsy does not predict for local or distant progression
    - Only recommended if there are imaging findings concerning for progression
- Pre-treatment biopsy is recommended



Renal SABR commissioning status in the United Kingdom

Renal SABR has been commissioned in Wales since June 2024 after documents produced by the UK SABR consortium Renal cancer subgroup were submitted to NHS Wales

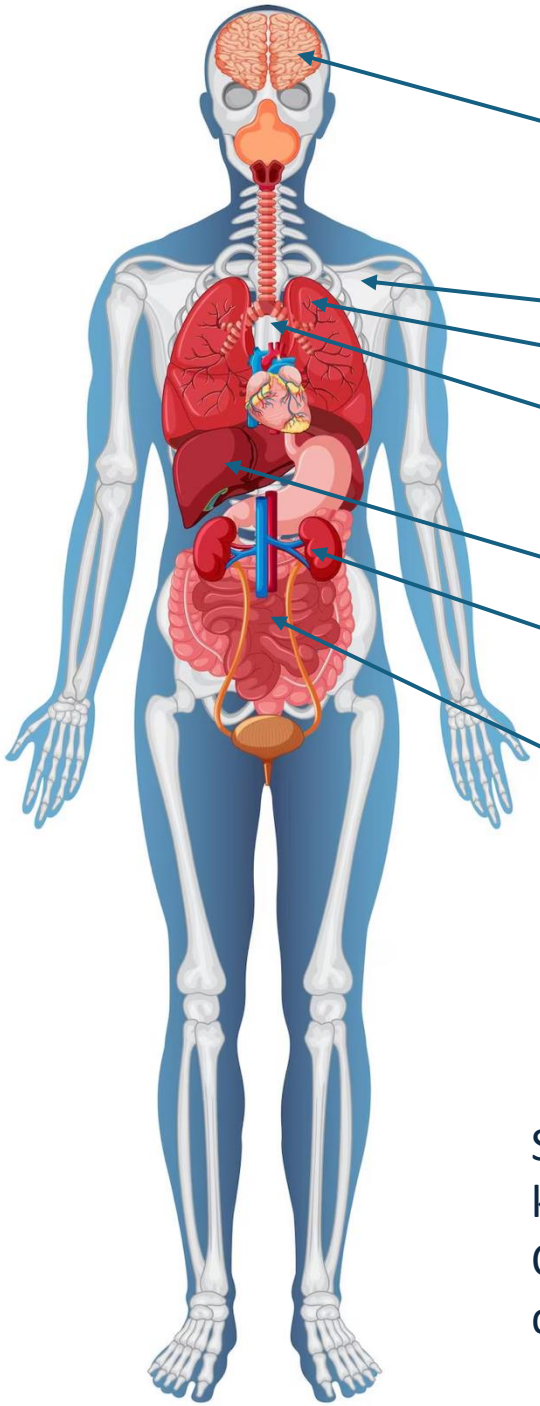
Official announcement of Commissioning of Renal SABR in England is finally expected imminently after several attempts by the UK SABR consortium Renal Cancer subgroup.

2.1 Inclusion criteria
Patients should meet all the following inclusion criteria:
· Single renal mass up to 7cm
· Consensus opinion that patient requires radical treatment
· Surgery not appropriate due to: patient refusal, technically inoperable, solitary kidney, medical comorbidities
· Age: 18 or more, PS: 0-2,
· Written informed consent
· Treatment agreed appropriate in Urology and SABR MDT
· Biopsy proven Renal Cell Carcinoma

Renal SABR provides an alternative treatment option for those patients not suited to surgery or percutaneous ablation

Notes here

SABR for oligo metastatic disease



Brain

Bone (spine is common)

Lungs

Lymph nodes

Liver

Kidney and adrenal gland

Pancreas

SABR has been used to help control Renal cancer that has spread beyond the kidney for several year.
Oligometastatic kidney cancer = cancer that is present in up to 3 sites (or 5 depending on where you work)

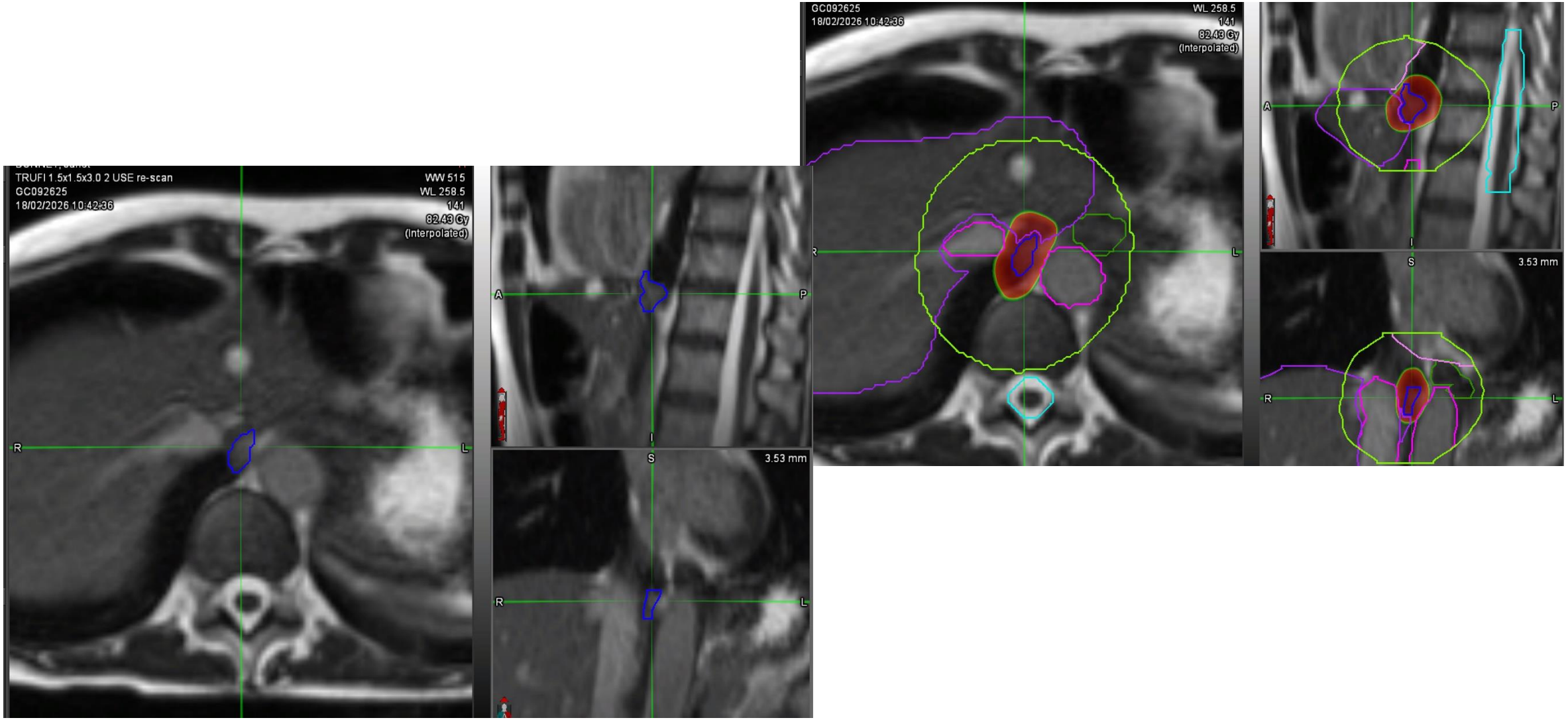
SABR for oligo metastatic disease

The European Society for Medical Oncology guidelines state one can consider SBRT for selected patients with low metastatic burden after multidisciplinary team review

Approximately 15–25% of non-metastatic patients will eventually develop metastases.

Various studies support the use of SABR to either avoid the use of systemic therapy, or to prolong the action of a current therapy where there seems to be progression in only a small number of sites.

The combination of SABR with systemic therapy such as TKIs or immunotherapy does not result in significant additional side effects.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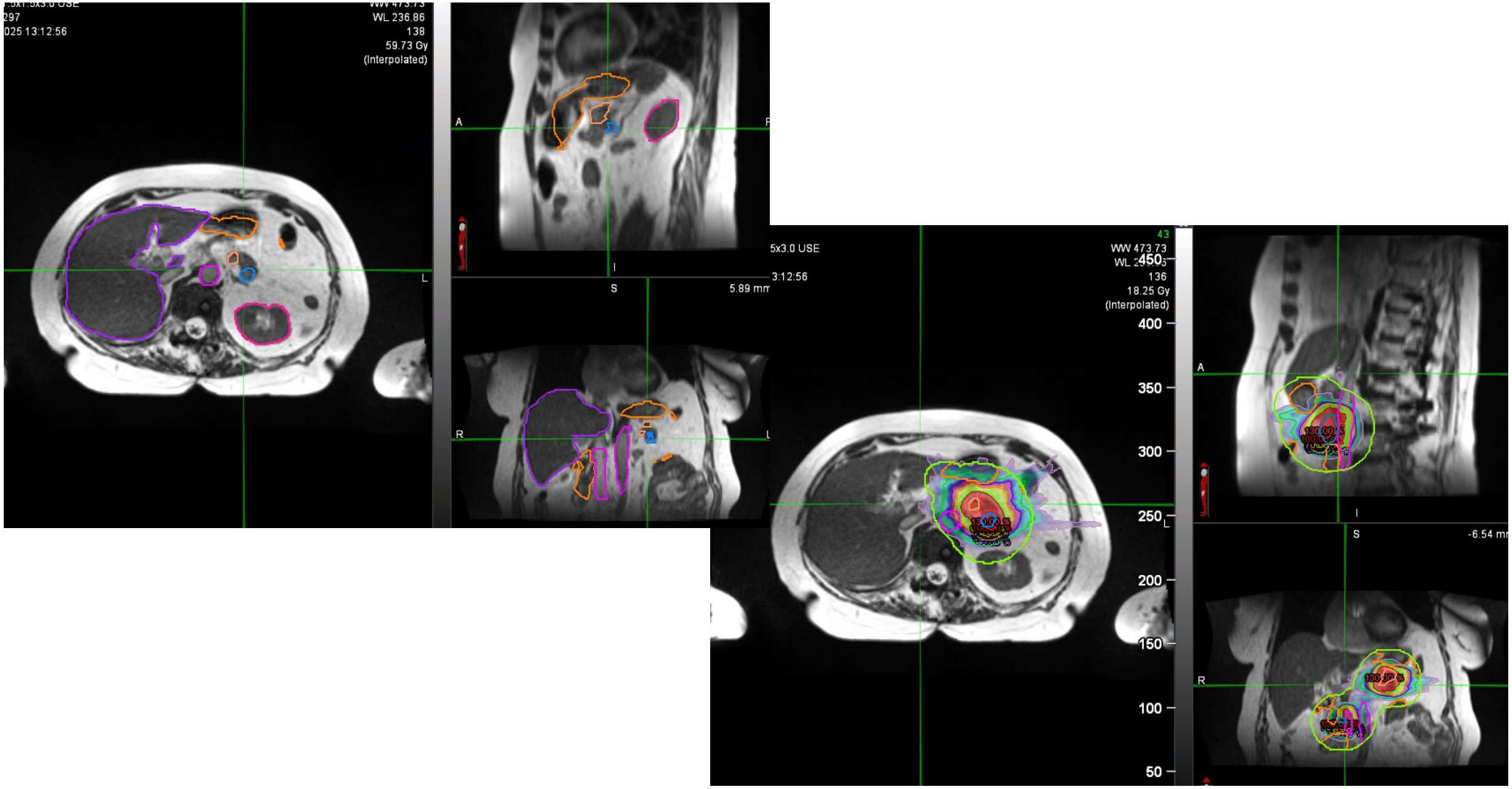
WL 236.86
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100
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-6.54 mm

GenesisCare