



NÚCLEO DE QUITO

La radioterapia en el manejo del cáncer

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- Médico UIDE
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- Máster en Docencia Universitaria Universidad Internacional Iberoamericana México/Universidad Europea del Atlántico España
- Médico Tratante SOLCA Quito
- Jefe de Docencia SOLCA Quito
- Docente Universitario UIDE/UDLA
- Investigador Neurall Research Group UCL Inglaterra.

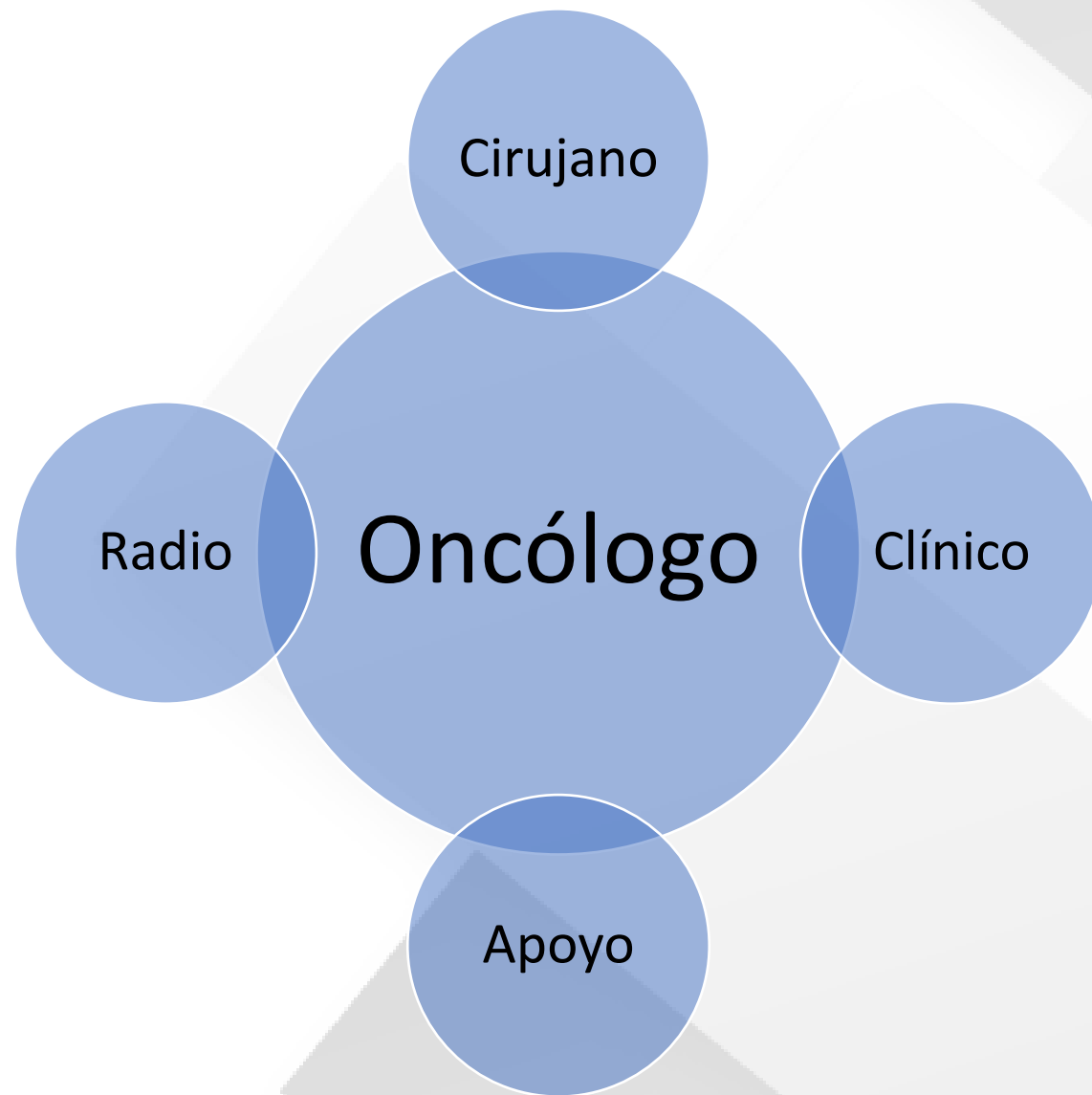


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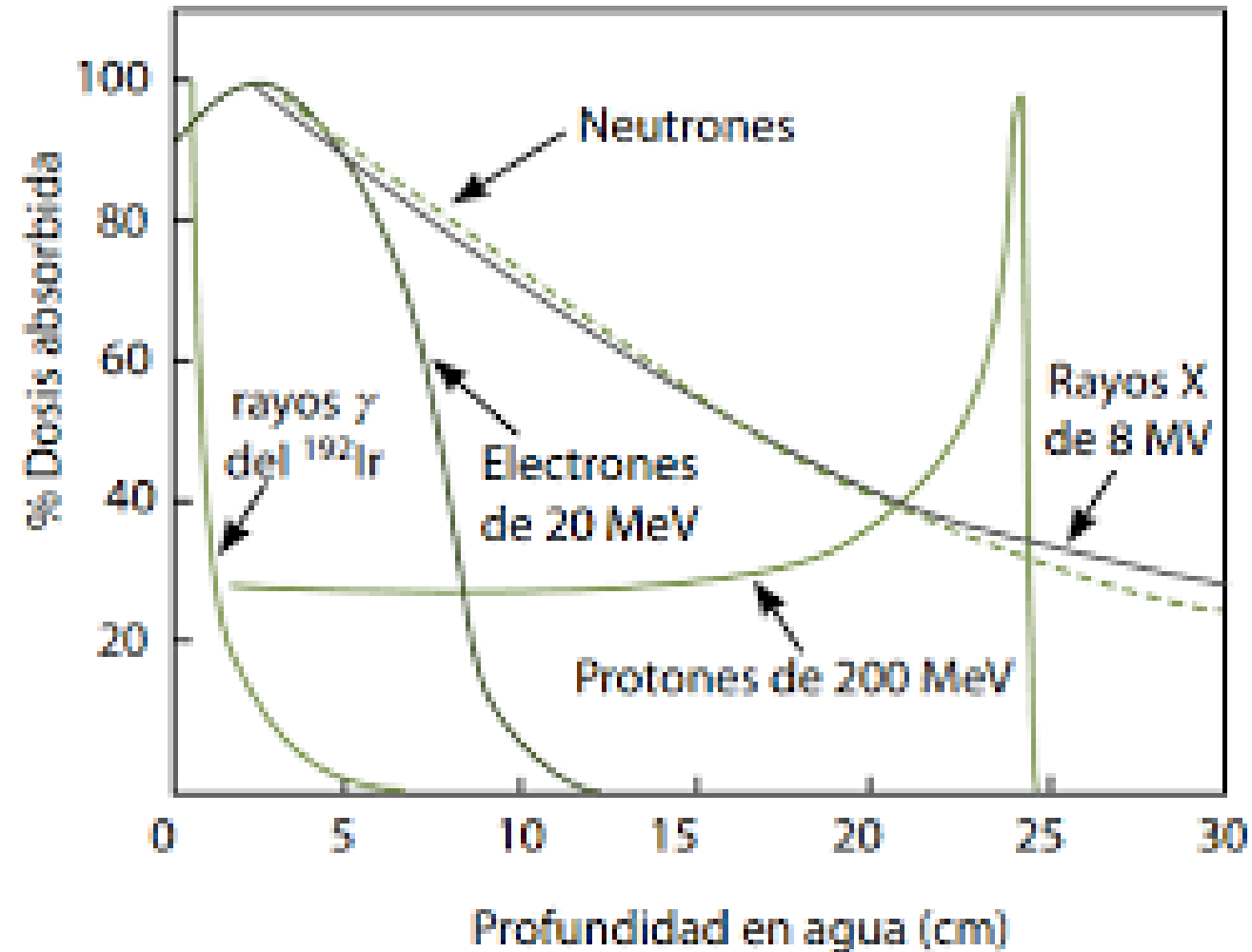
- No tengo conflictos de interés



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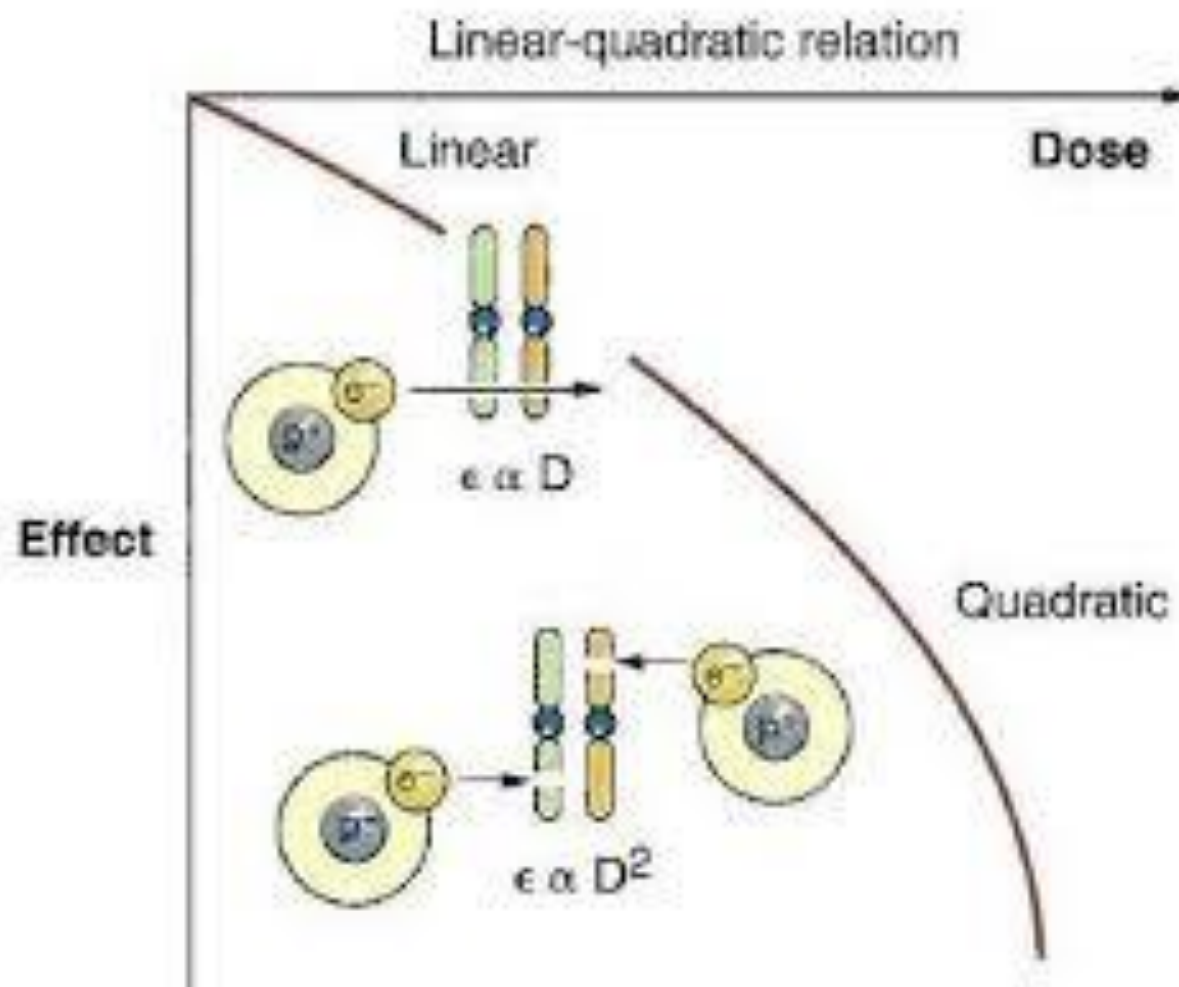


Qué es la radioterapia?





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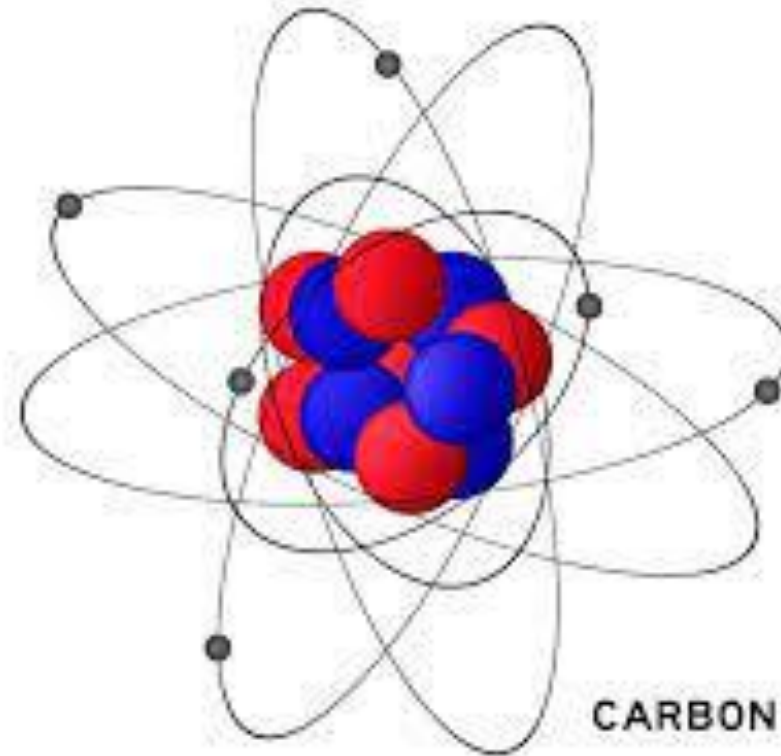
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- Todo esto para entender por que damos la radiación en Gy
- También hay otras unidades como Sievert



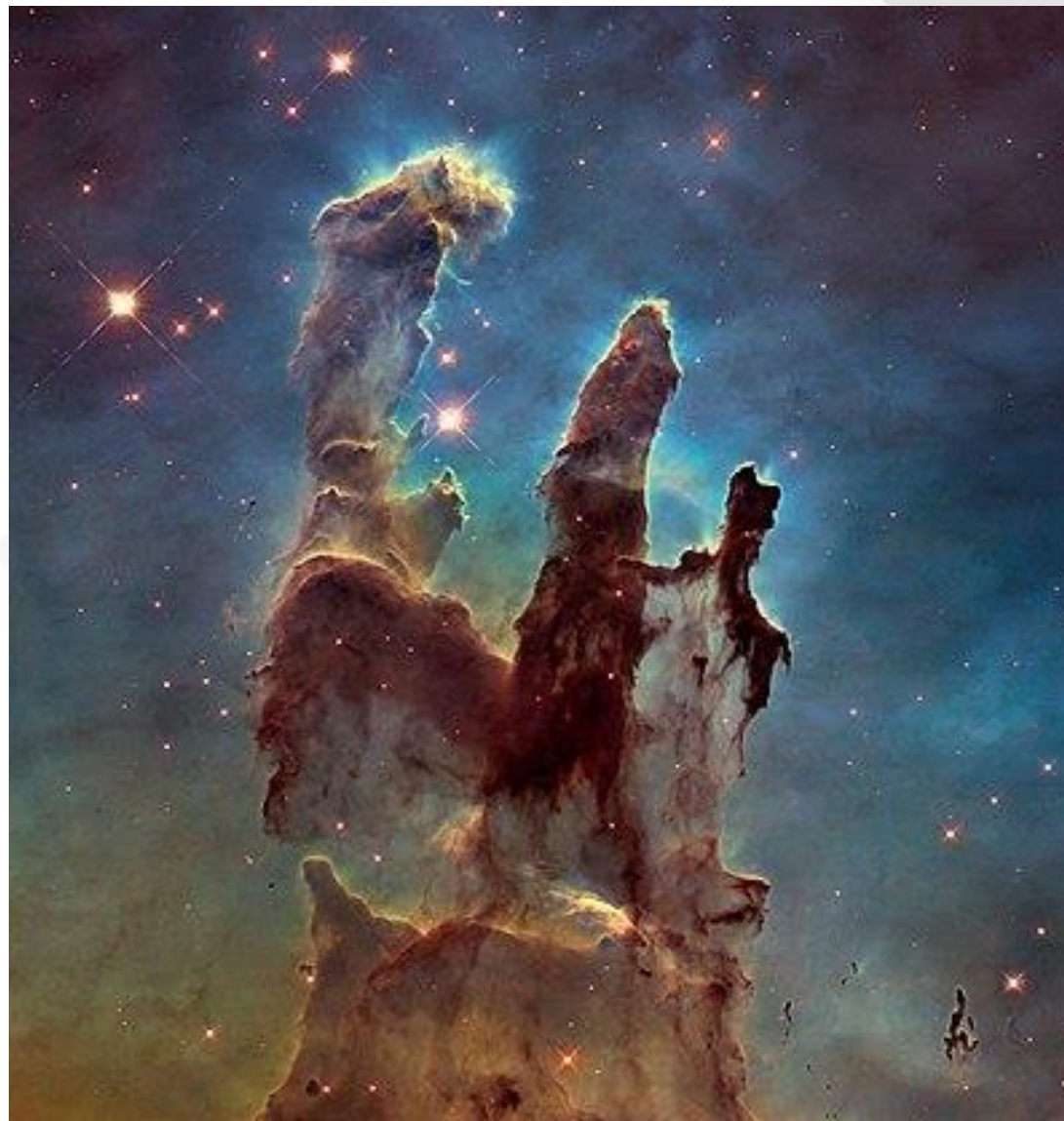
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Qué es la radiación?





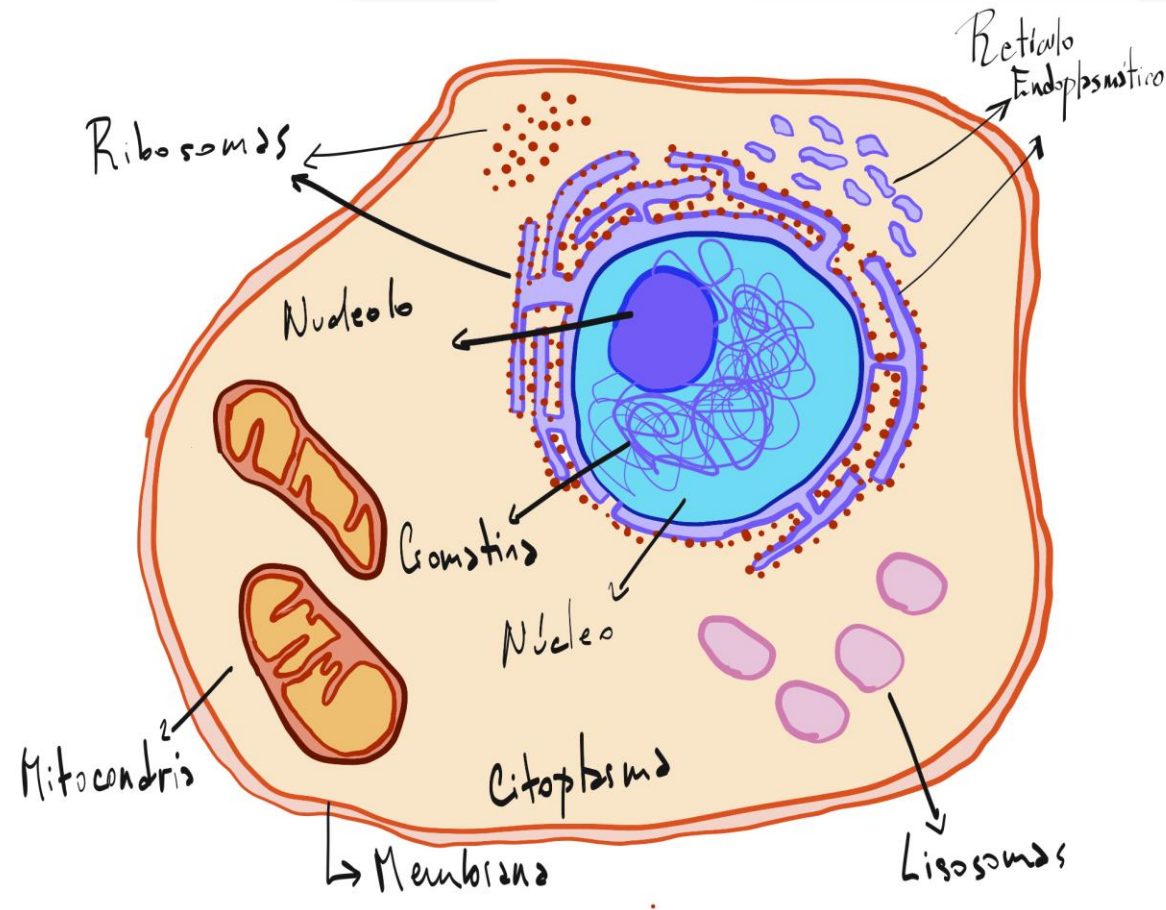
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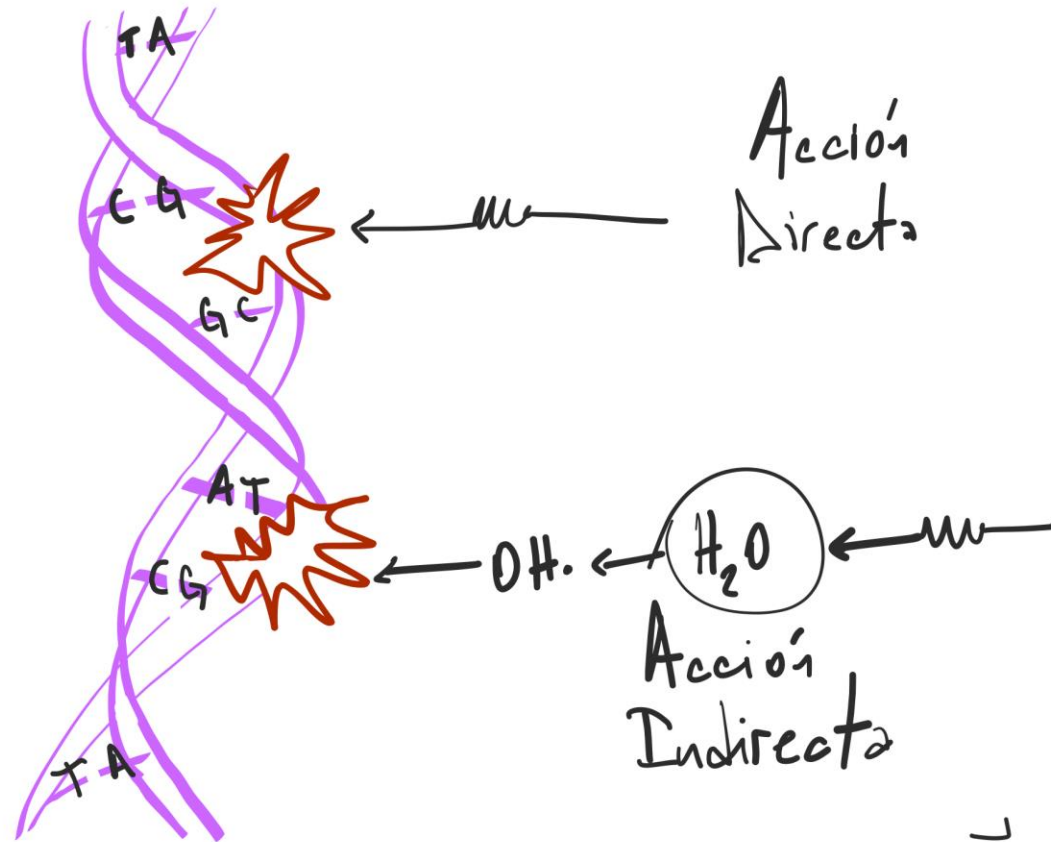
Cómo muere la célula?





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Cómo mueren las células?



Qué modalidades de radioterapia existen?

- Radioterapia externa
 - 3 D conformal
 - IMRT
 - VMAT
 - SRS-SABRT
- Braquiterapia
 - Intracavitaria
 - Intersticial

IGRT



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- Daño celular por radiación
- Menos fracciones es más
- Más radiación por fracción es más
- BED, EQD2: Dosis equivalente a irradiar 2 Gy día

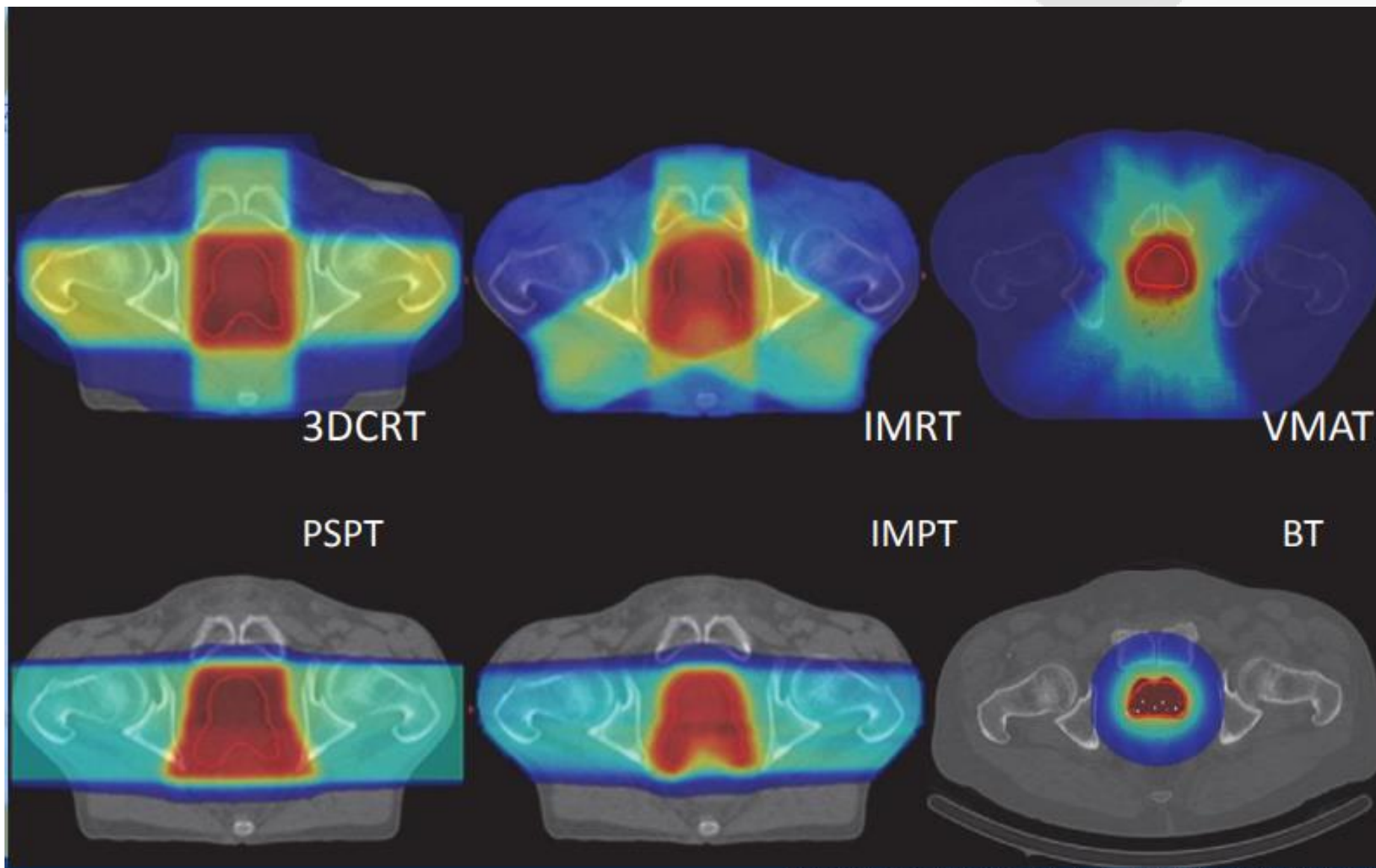


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- Que irradiamos:
 - Tumores primarios
 - Metástasis
 - Lechos tumorales
 - Zonas de riesgo de diseminación tumoral



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Intención del tratamiento

- Radical
- Adyuvante
- Neoadyuvante
- Paliativo
- Emergencias



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Proceso de radioterapia

- Consulta Externa
- Simulación
- Planificación médica
- Dosimetría y planificación física
- Aprobación
- Control de calidad
- Verificación
- Tratamiento



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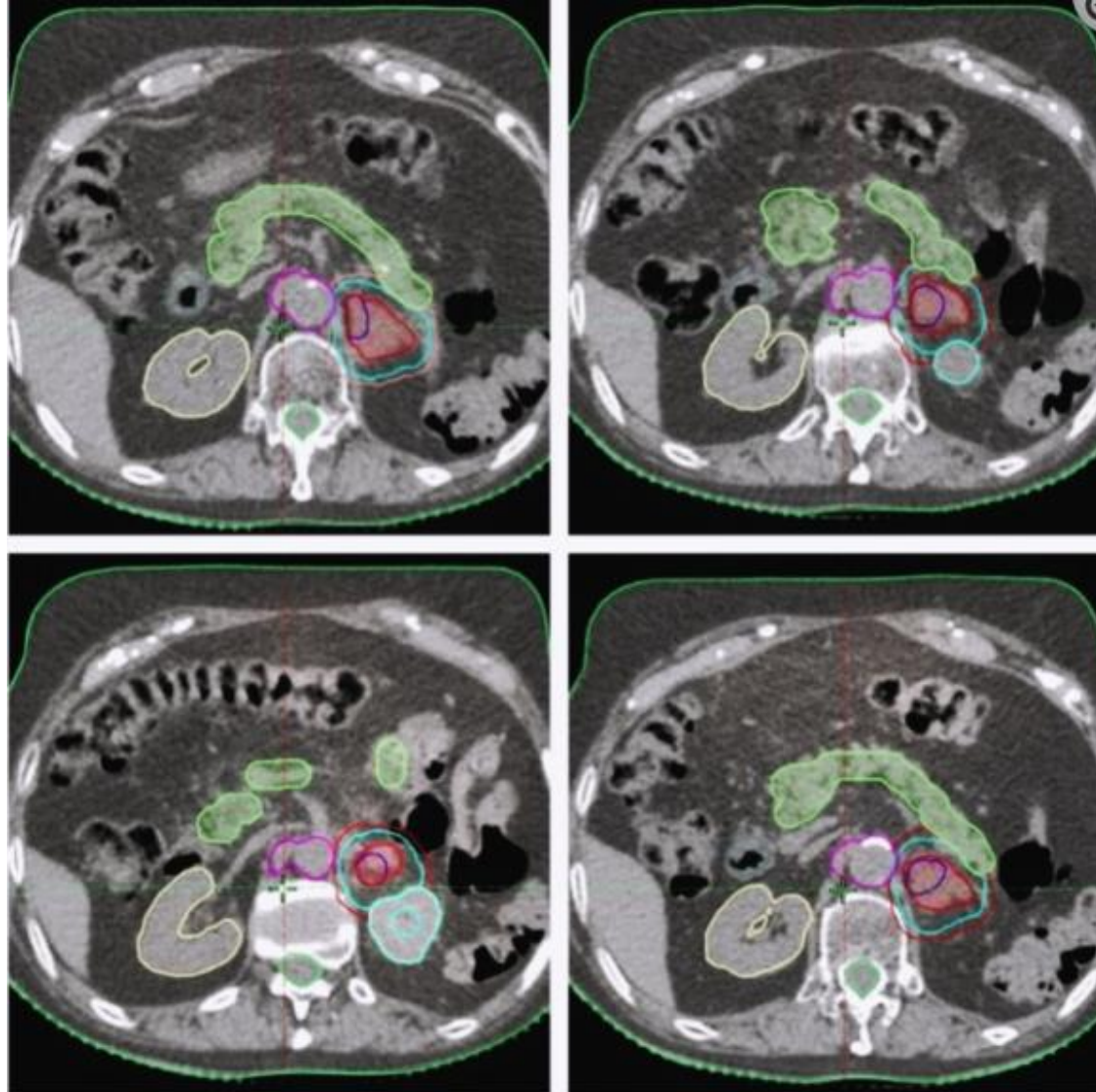
Proceso de la braquiterapia

- Consulta Externa
- Internación hospital del día
- Colocación de implantes
- Simulación
- Planificación médica
- Dosimetría
- Planificación física
- Aprobación y tratamiento



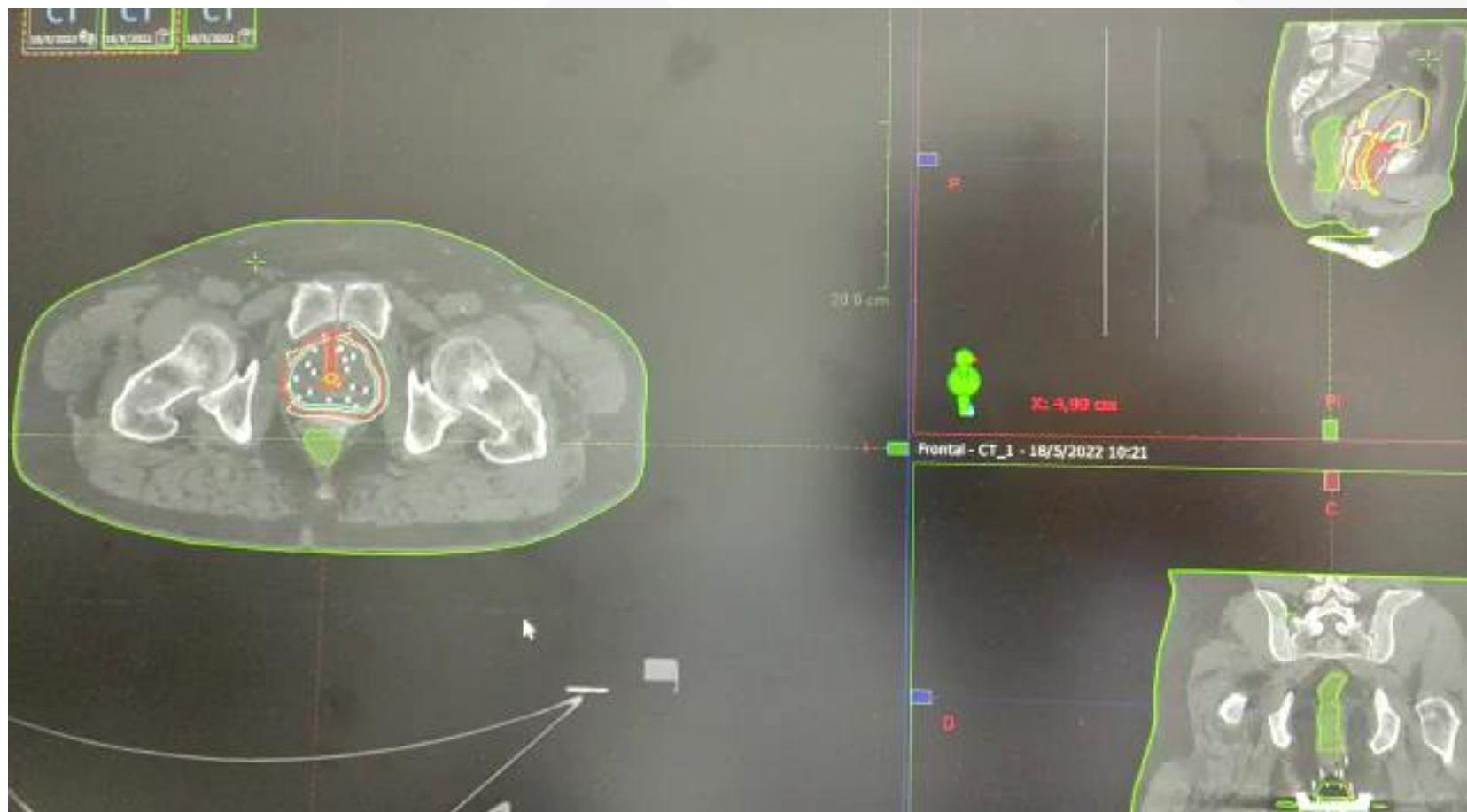
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Proceso de radioterapia



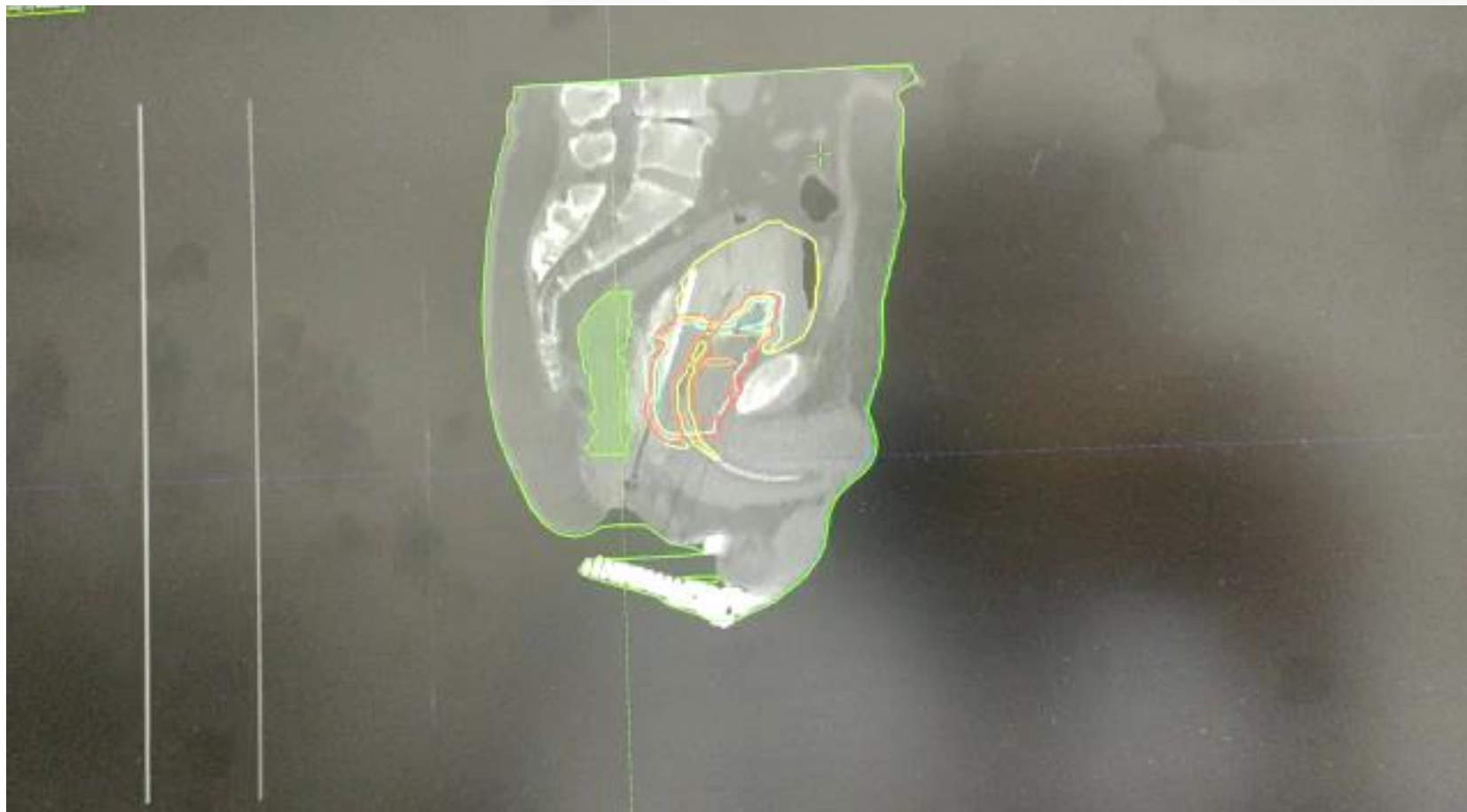


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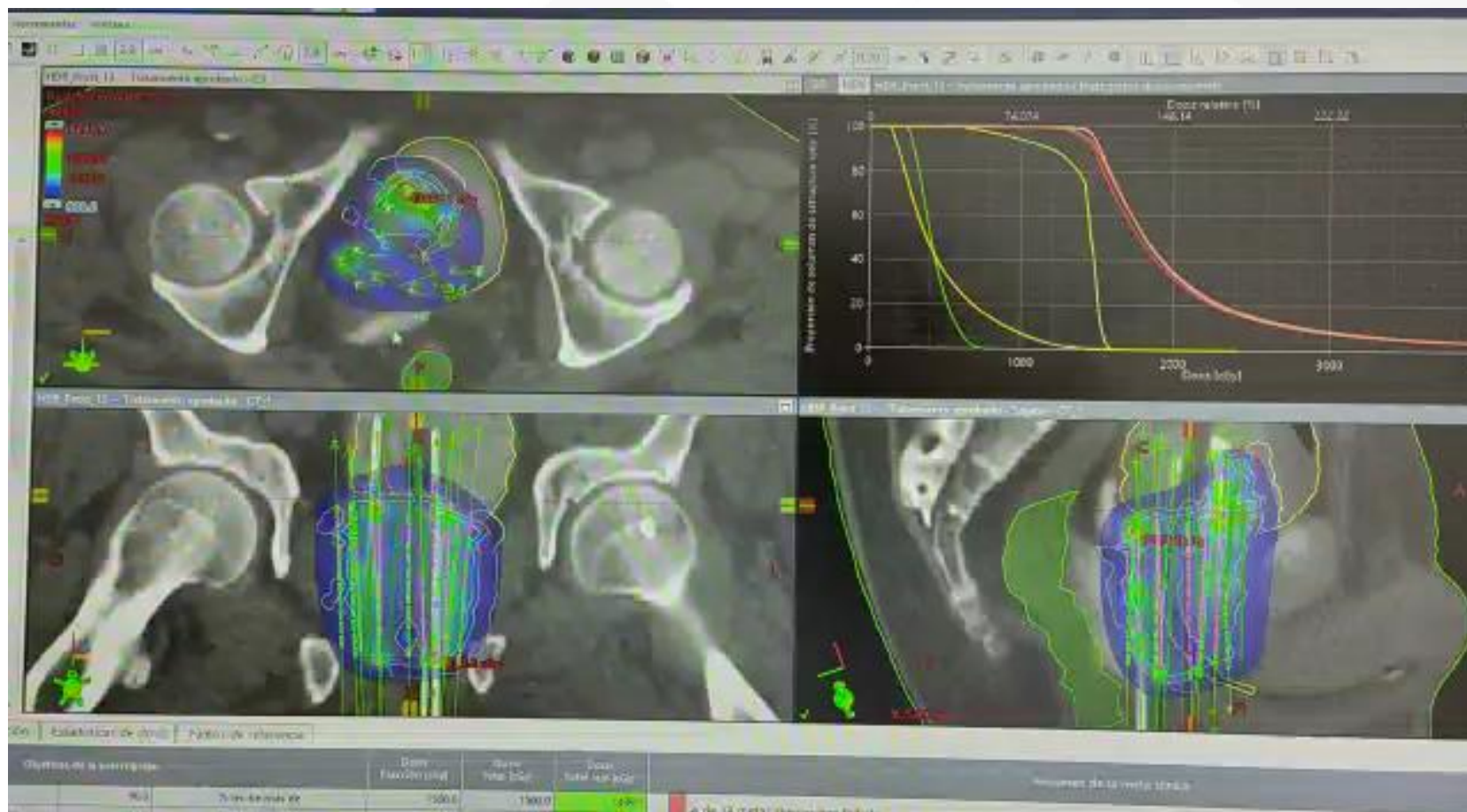


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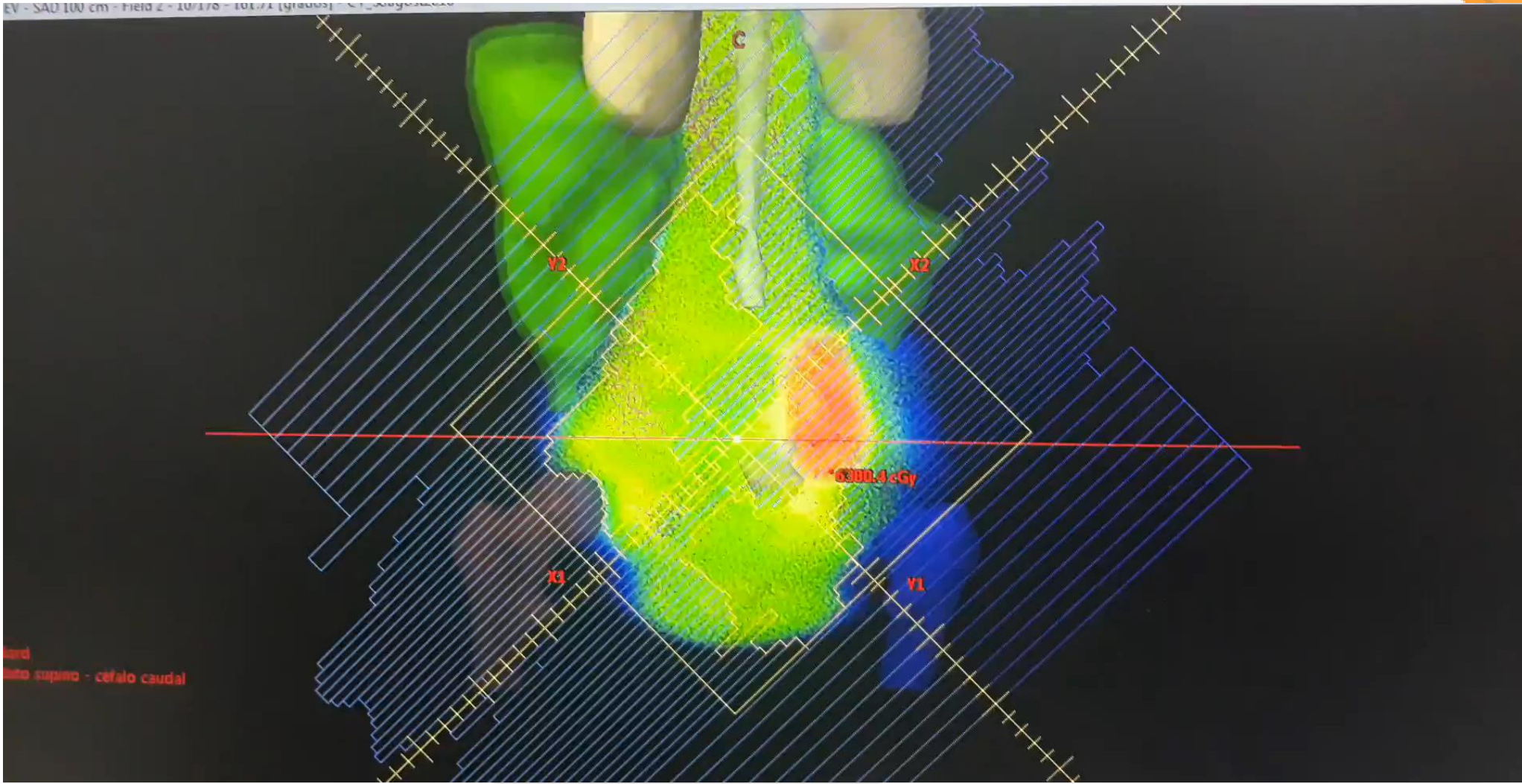


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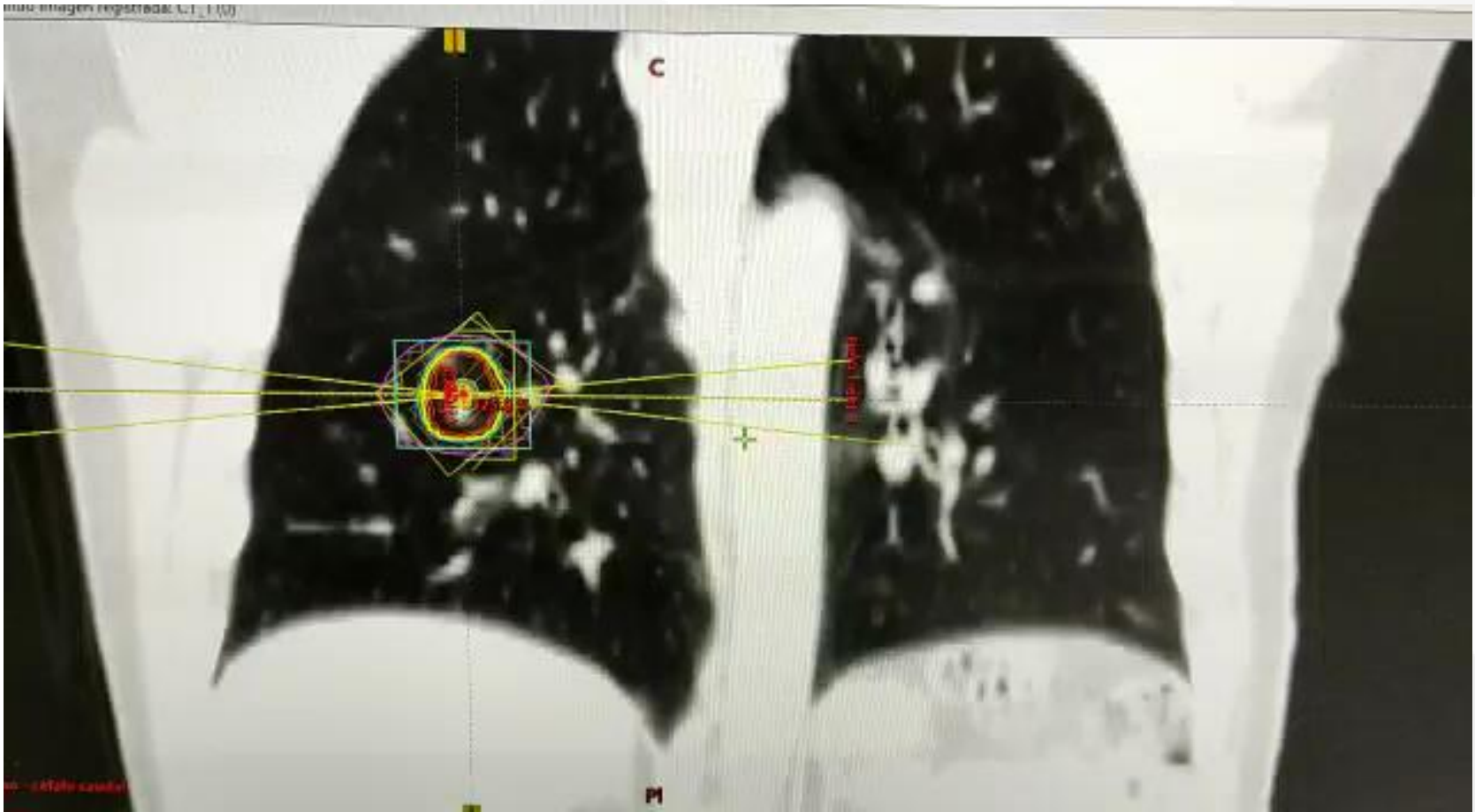
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[Journal List](#) > [Cureus](#) > [v.13\(11\); 2021 Nov](#) > PMC8693538



Cureus

Publishing Beyond Open Access



[Cureus](#). 2021 Nov; 13(11): e19806.

Published online 2021 Nov 22. doi: [10.7759/cureus.19806](https://doi.org/10.7759/cureus.19806)

PMCID: PMC8693538

PMID: [34956790](https://pubmed.ncbi.nlm.nih.gov/34956790/)

Management of an Unusual Central Nervous System Metastasis With Linear Accelerator Radiosurgery in a Low-Middle Income Country

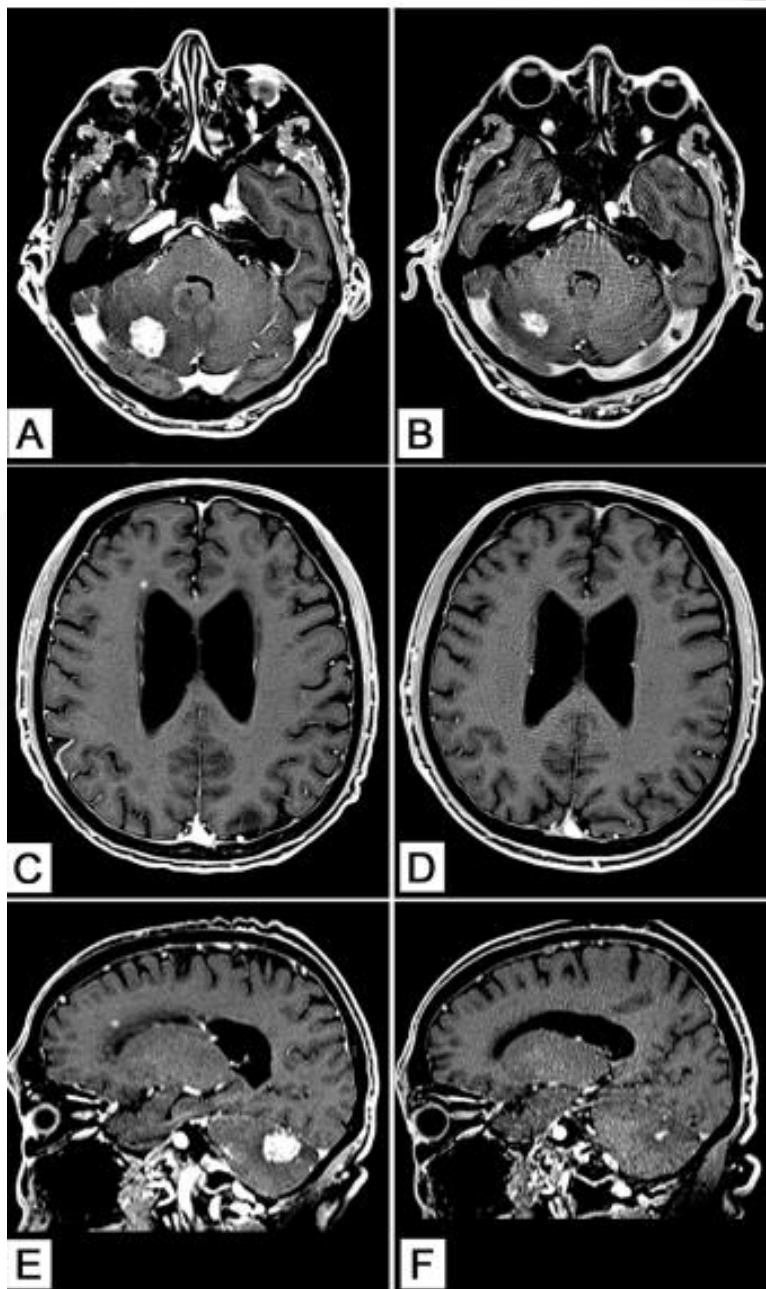
Monitoring Editor: Alexander Muacevic and John R Adler

[Martin Mosquera](#)^{1,2} [Raul Puente-Vallejo](#)^{1,2,3} and [Jose E Leon-Rojas](#)^{1,2}

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[Journal List](#) > [Cureus](#) > [v.14\(2\); 2022 Feb](#) > PMC8923247



Cureus
Publishing Beyond Open Access



[Cureus](#). 2022 Feb; 14(2): e22178.

Published online 2022 Feb 13. doi: [10.7759/cureus.22178](https://doi.org/10.7759/cureus.22178)

PMCID: PMC8923247

PMID: [35308681](https://pubmed.ncbi.nlm.nih.gov/35308681/)

Management of an Unusual Metastasis of Cervical Cancer in the Adrenal Bed With Stereotactic Ablative Body Radiation Therapy

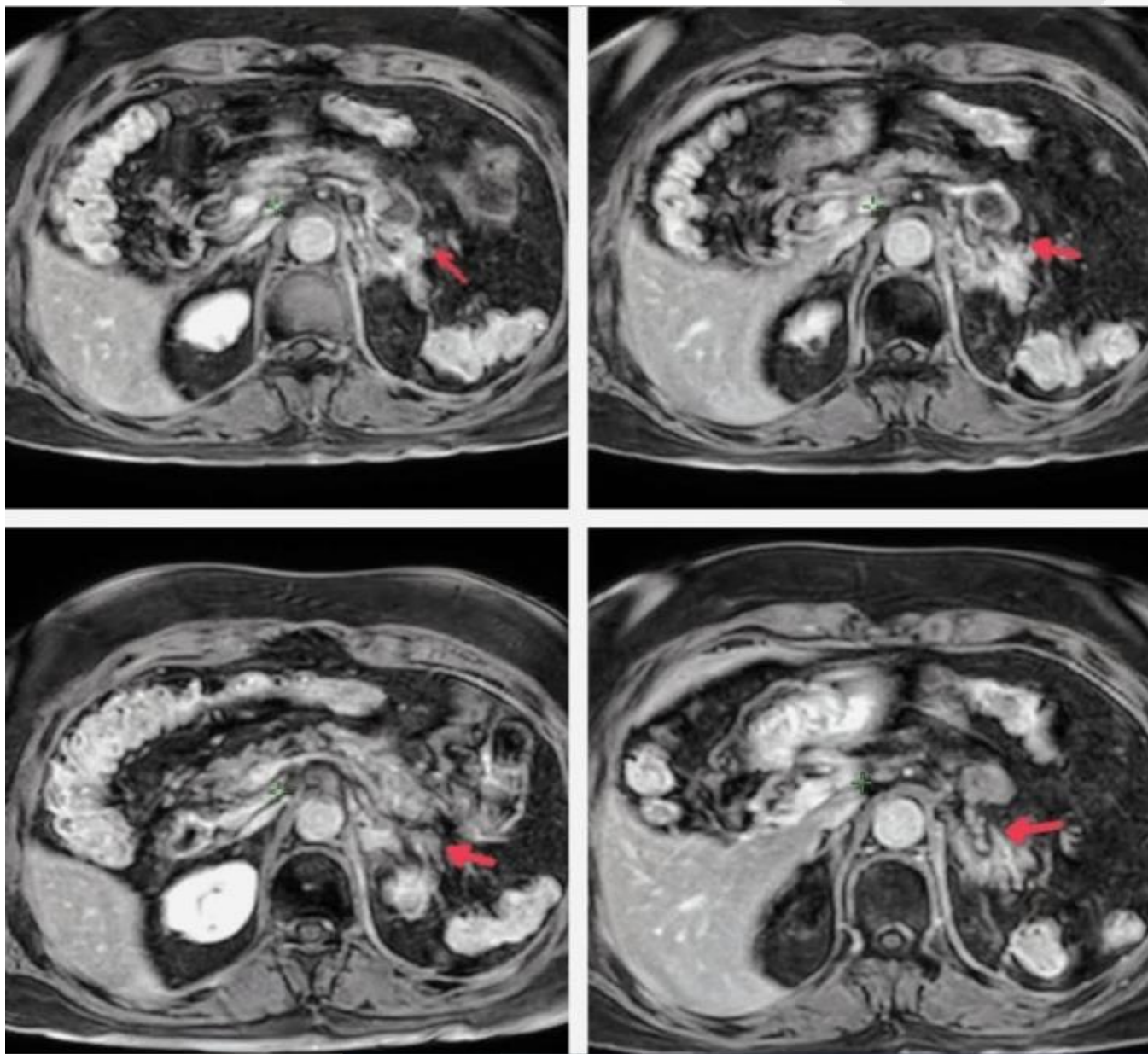
Monitoring Editor: Alexander Muacevic and John R Adler

[Raul Puente-Vallejo](#),^{1,2,3} [Pamela Ochoa](#),^{1,3} [Cristina Núñez](#),² and [Luis De Los Reyes](#)²

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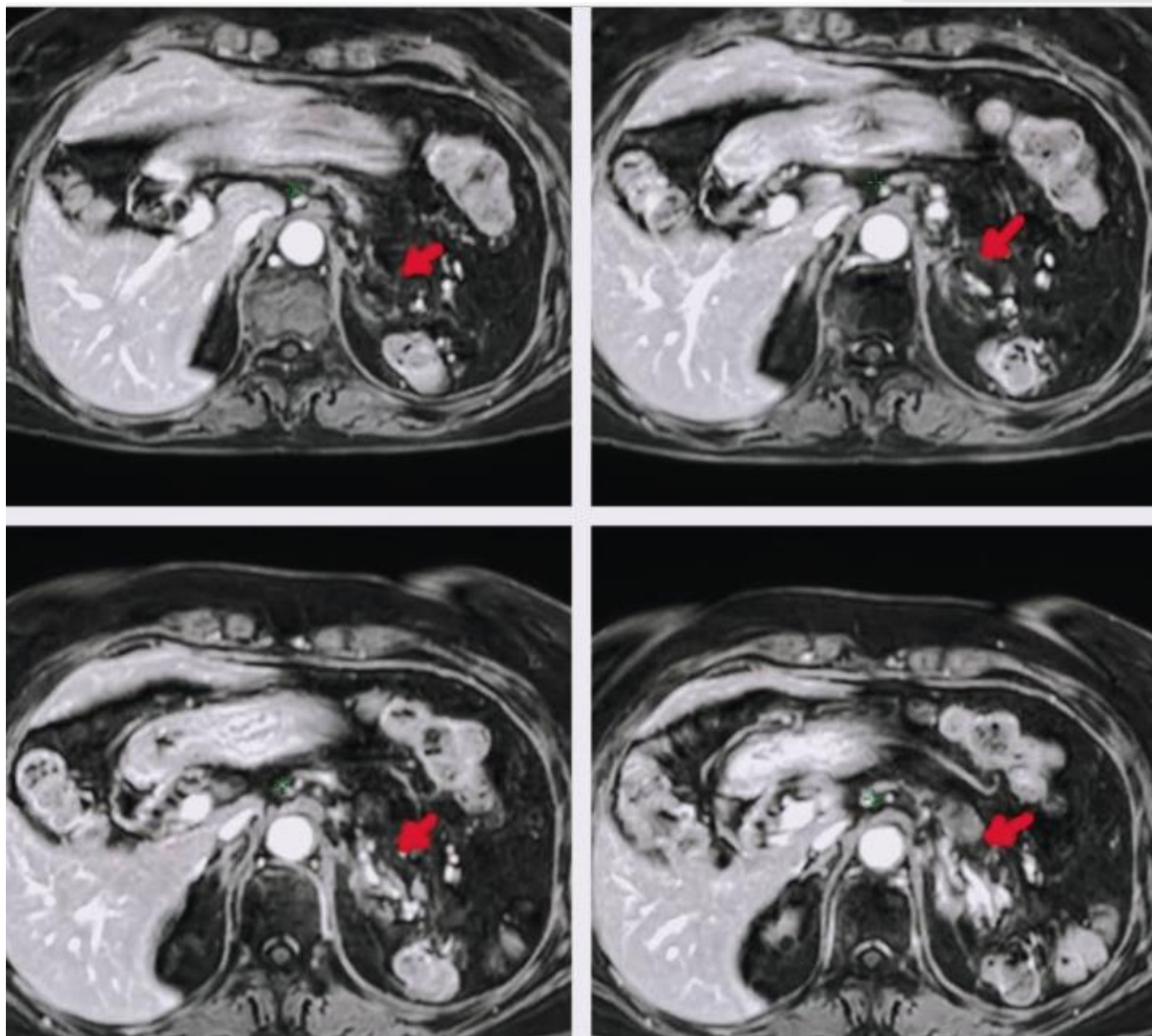


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Doing More with Less

Technological Improvements in Low- and Middle-Income Countries (LMICs): A Review of the Literature and the “Sociedad de Lucha Contra el Cáncer” (SOLCA) Institutional Experience in Neuro-Radiosurgery During the Coronavirus Disease 2019 (COVID-19) Pandemic

Pamela Ochoa ^{1, 2}, Raul Puente-Vallejo ^{1, 2, 3}  , Felipe Loza ^{1, 2}, Fiorella Cueva ^{1, 2}, Jose E. Leon-Rojas ^{1, 2}



Hospital Solón Espinosa Ayala of Quito Timeline

Top-tier radiotherapy center specialized in cancer management in Ecuador

2018



- The hospital set as an institutional objective to update the technology in VMAT radiotherapy and radiosurgery of both the central nervous system SRS (stereotactic radio surgery) and the SBRT structure (stereotactic body radiotherapy).
- The hospital conducted on-site trainings and training courses abroad. Hospital staff traveled to specialized centers with state-of-the-art expertise.

2019



- The hospital had 3 pieces of equipment: (1) Two Linear Accelerator (LINAC) Varian 2x1 with capacity to perform 3D therapy, which had 15 years of antiquity and (2) a LINAC Varian Unique which performs IMRT therapy (Intensity modulated radiation therapy) which had 15 years of antiquity.
- The institution replaced the LINAC Varian EX21 with a TrueBeam equipment unit.
- The hospital acquired a Radixact Tomotherapy, with the capacity to perform Helical IMRT, SRS, SBRT, Hypofractionation and other advanced techniques.
- The institution implemented training programs (operation of the new machine, use of the new software for medical planning and dosimetric planning and quality control) designed for the Hospital's radiotherapist, physicist and radiation oncologist operators.

2020



- In early 2020 the True Beam became operational, however the presence of the Covid-19 pandemic delayed additional abilitation of the equipment and all on-site and overseas training for hospital staff.
- The initiation of advanced techniques in the True Beam was delayed by 6 months.
- The first brain radiosurgery was performed in October 2020 and the first lung SBRT in December 2020.

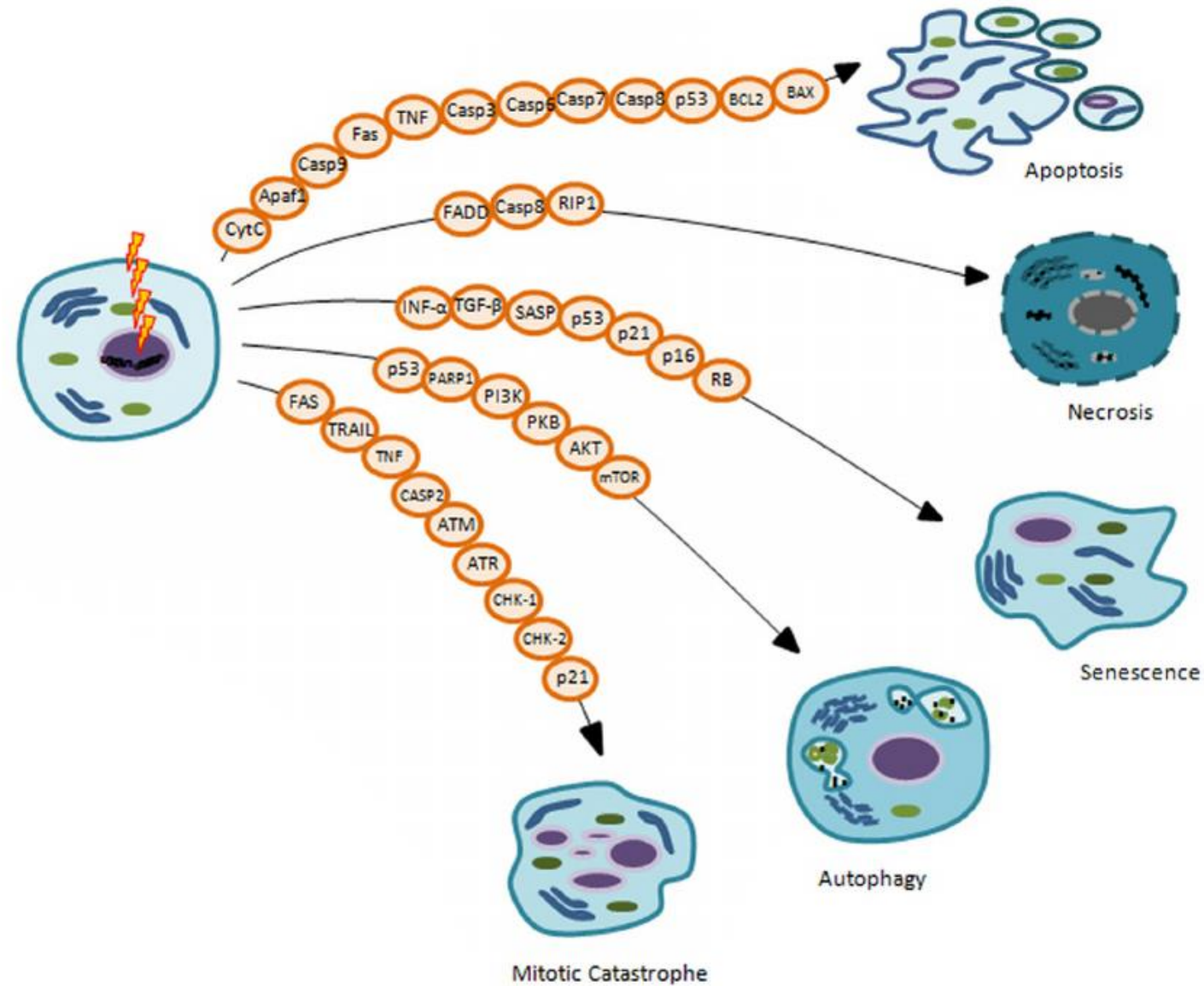
2021



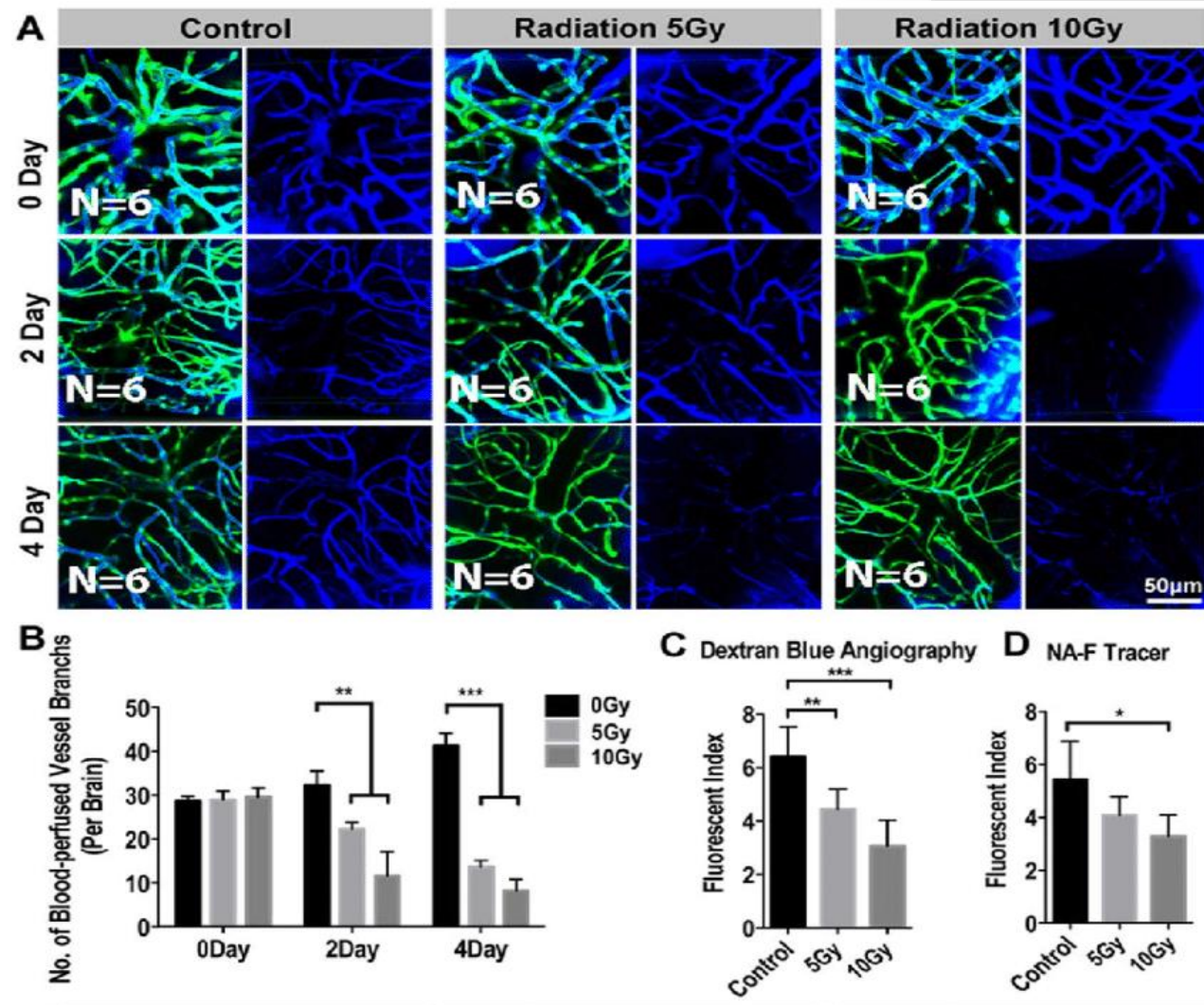
- Up to date, about 15 CNS radiosurgeries and 10 SBRTs have been performed, including lung, prostate, spine and sarcomas.
- The second True Beam has been in operation since August 2021



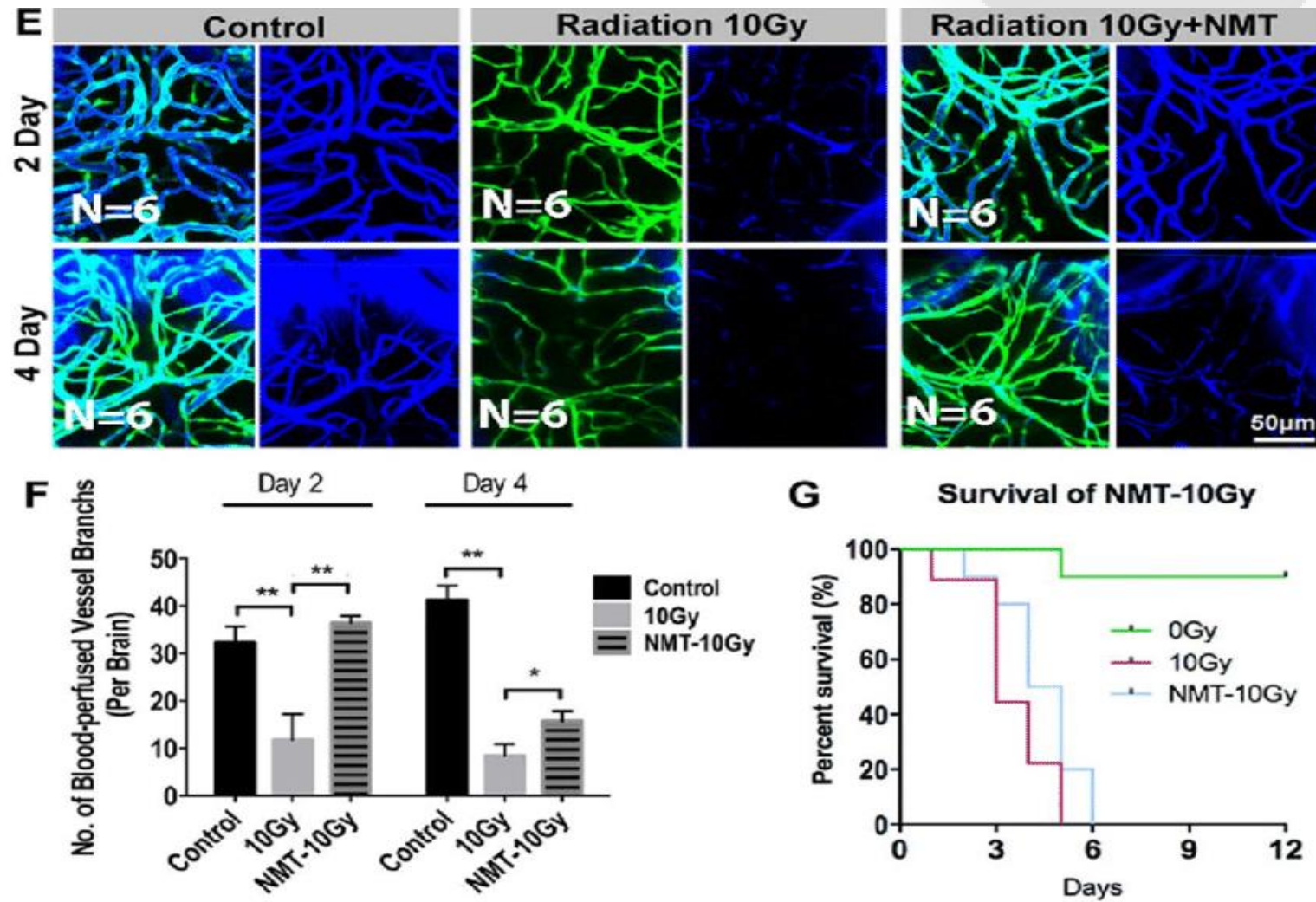
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Minafra L, Bravatà V. Cell and molecular response to IORT treatment. Transl Cancer Res 2014;3(1):32- 47. doi: 10.3978/j.issn.2218-676X.2014.02.03



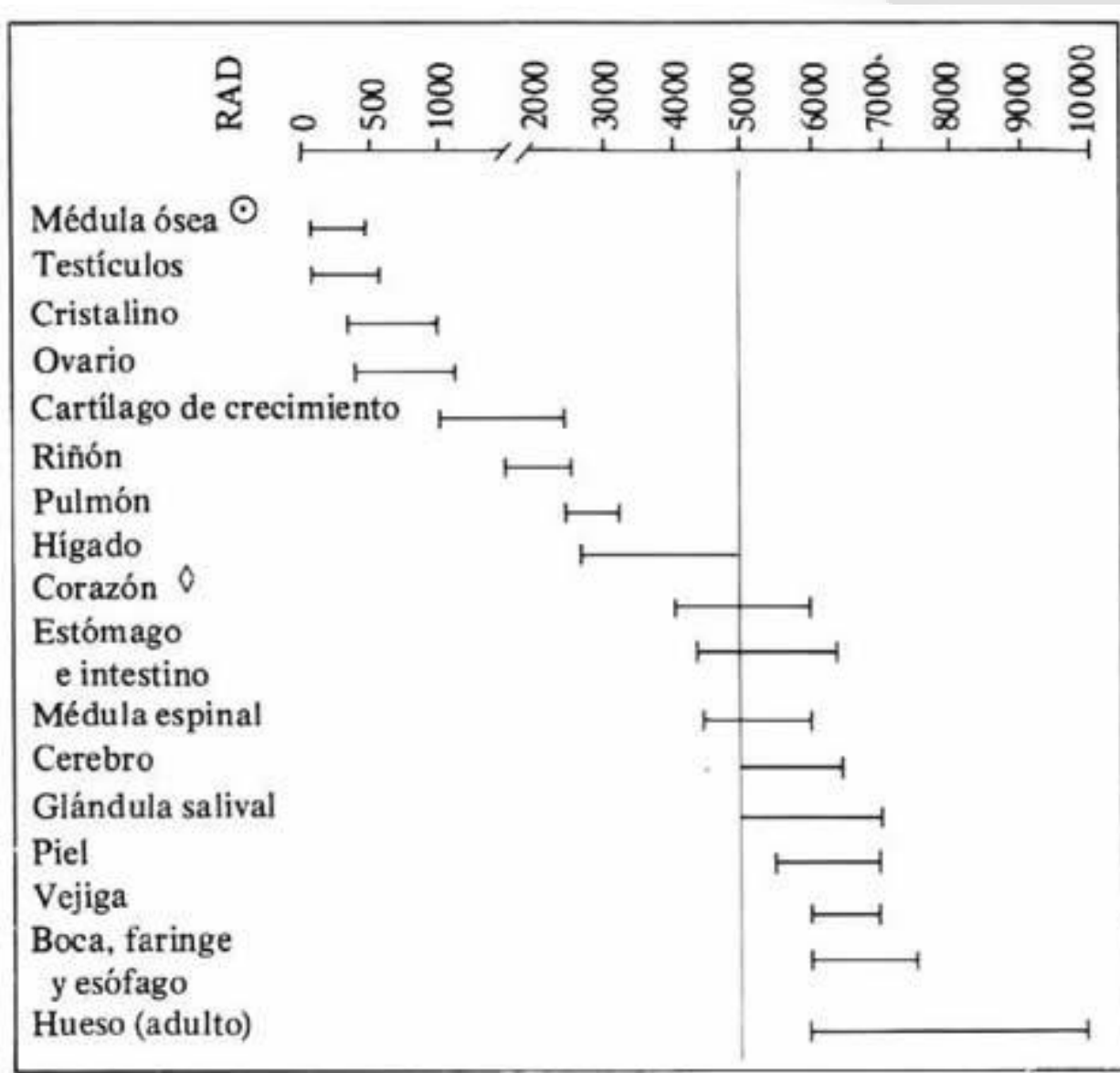
Ai, X., Ye, Z., Yao, Y. *et al.* Endothelial Autophagy: an Effective Target for Radiation-induced Cerebral Capillary Damage. *Sci Rep* **10**, 614 (2020). <https://doi.org/10.1038/s41598-019-57234-9>



Ai, X., Ye, Z., Yao, Y. et al. Endothelial Autophagy: an Effective Target for Radiation-induced Cerebral Capillary Damage. *Sci Rep* 10, 614 (2020). <https://doi.org/10.1038/s41598-019-57234-9>



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(Tomado de Fajardo LF. Pathology of radiation injury. New York: Masson Publishing, Inc.;1982).



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Efectos adversos

- Van a depender:
 - Del sitio de tratamiento
 - De la dosis
 - De las comorbilidades
 - De si hay concurrencia

En primera instancia el manejo debe ser dado por una enfermera

ONS Guidelines™ for Cancer Treatment–Related Radiodermatitis

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Mark Vrabel, MLS, AHIP, ELS, and Rebecca L. Morgan, PhD, MPH



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- Se clasifican del estadio 1 al 4
- Según diferentes sistemas RTOG, NCI, etc.
- La sintomatología varía independientemente de la dosis, “probabilístico”
- Los estadios 3 y 4 generalmente requieren manejo del médico especialista y muchas veces multidisciplinario.



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- Gracias