

Evolution in the management of metastatic brain tumors in the 21st Century

Helping patients to live longer and live better through personalized medicine

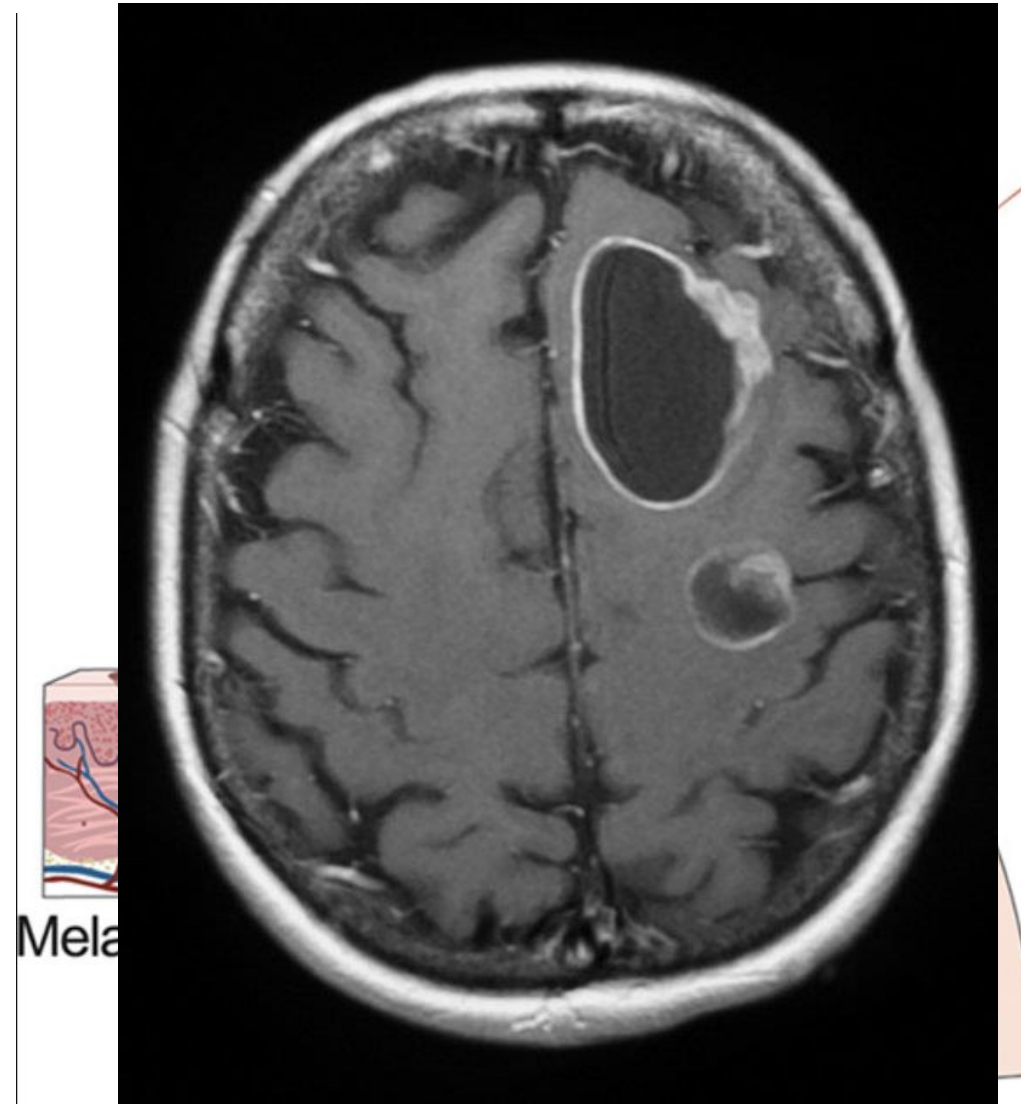
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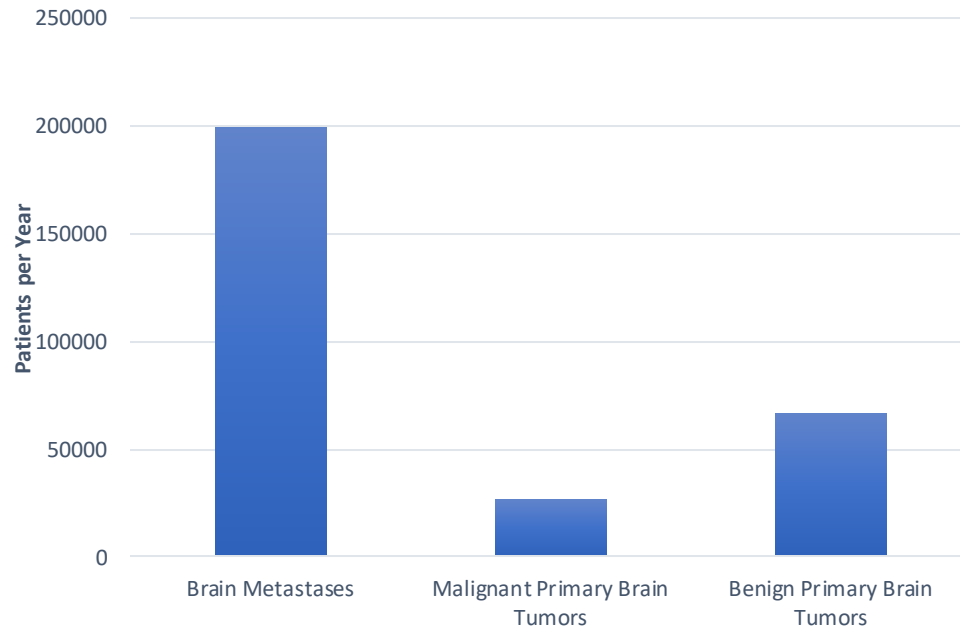
What are brain metastases?

- Advanced Cancers develop the ability to travel to new sites in the body through the blood stream
- Common sites of metastasis include the lungs, liver, bone, and brain
- Once they arrive, cancer cells can grow and divide, creating new tumors in the brain
- Tumors can cause pain, seizures, neurological dysfunction, and death

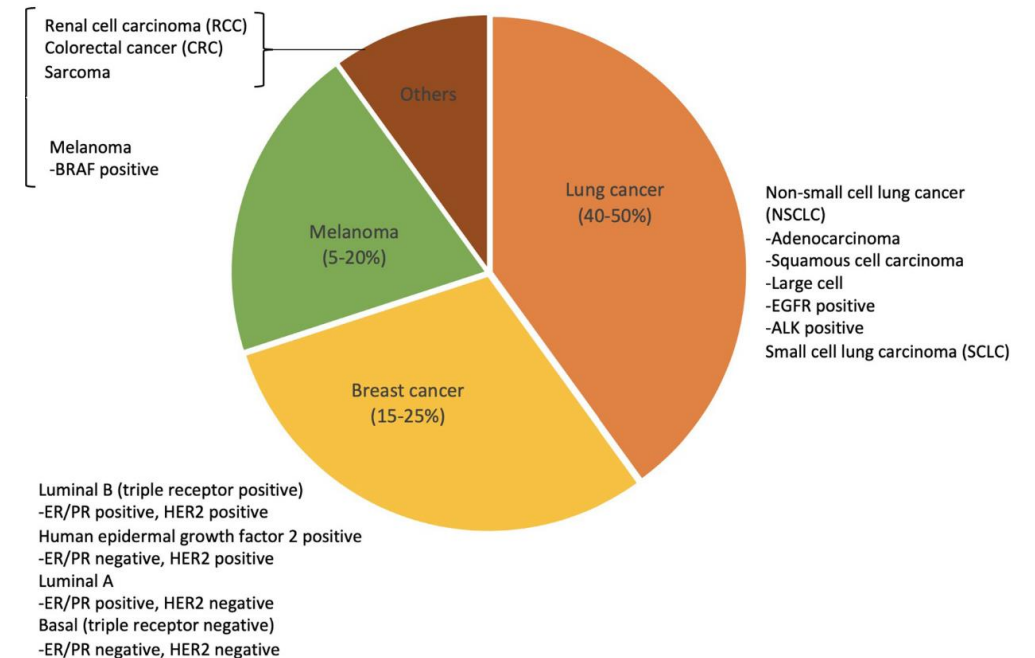


Brain metastases are common in patients with metastatic cancer

Incidence of Brain Tumors in the United States

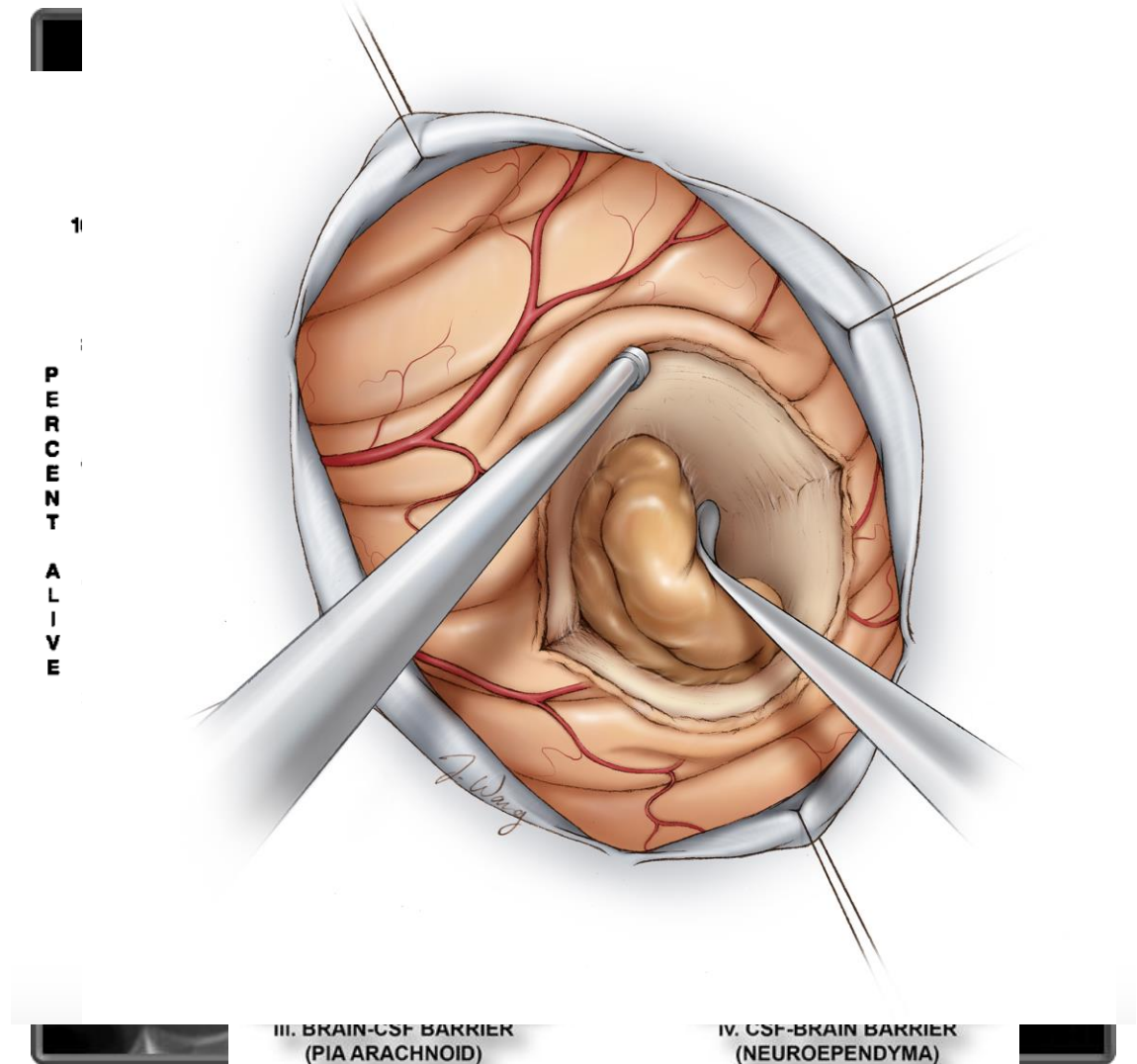


Brain metastases



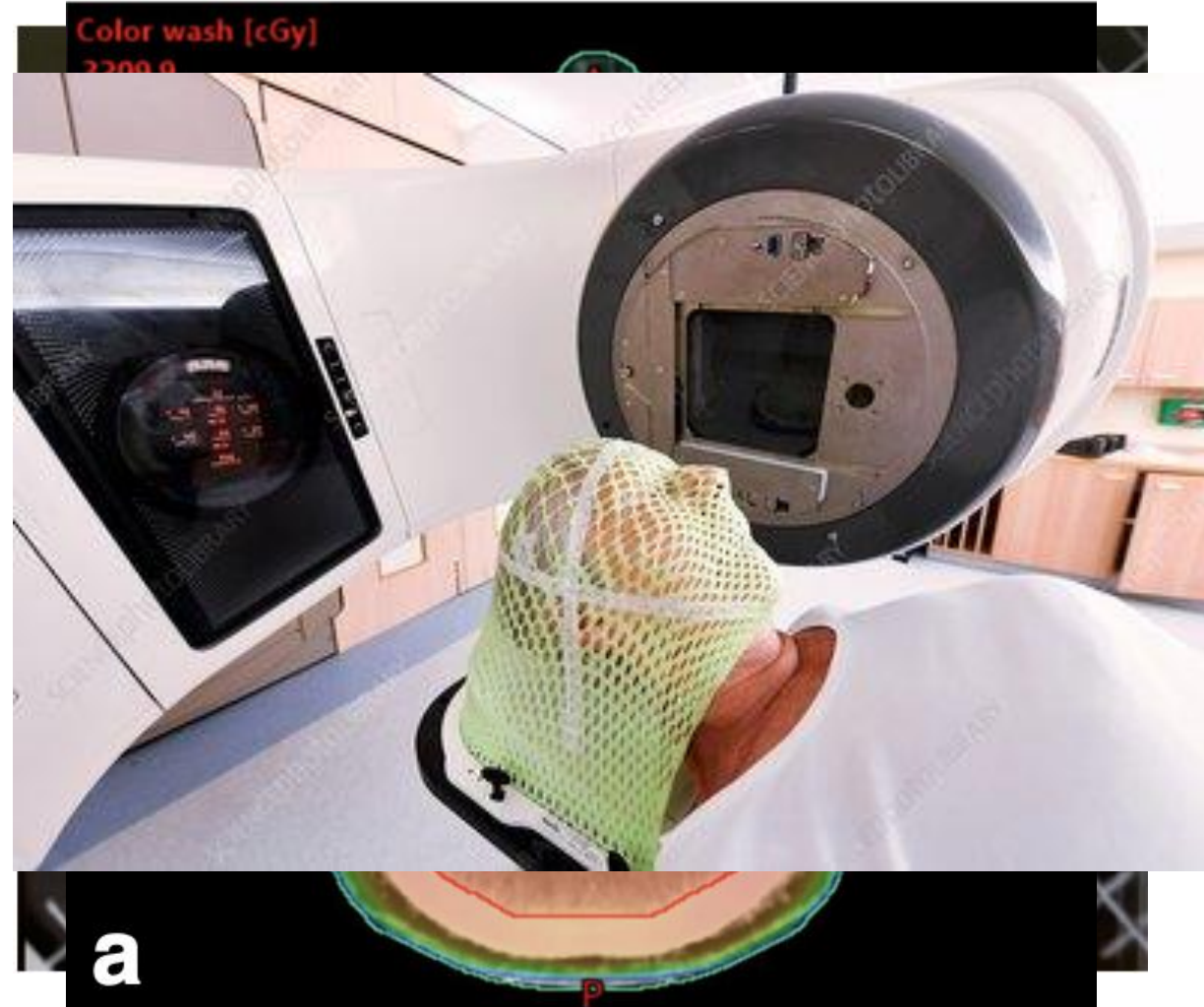
Brain metastasis treatment presents unique challenges

- Can cause symptoms even when small
- Cannot be seen by eye or with x-rays
- Traditional chemotherapies may not cross the blood brain barrier
- The surrounding brain is very important!
 - surgery must be used very selectively



From 1980 – 2000 whole brain radiation was THE standard treatment for brain metastases

- Radiation penetrates the blood brain barrier
- High quality imaging is not required
- Simple treatment machines can reliably deliver the required dose



From 1980 – 2000 whole brain radiation was THE standard treatment for brain metastases

- Advantages

- Effective at controlling growth of brain tumors
- Low risk of causing severe injury to the brain
- Widely available
- Not resource intensive

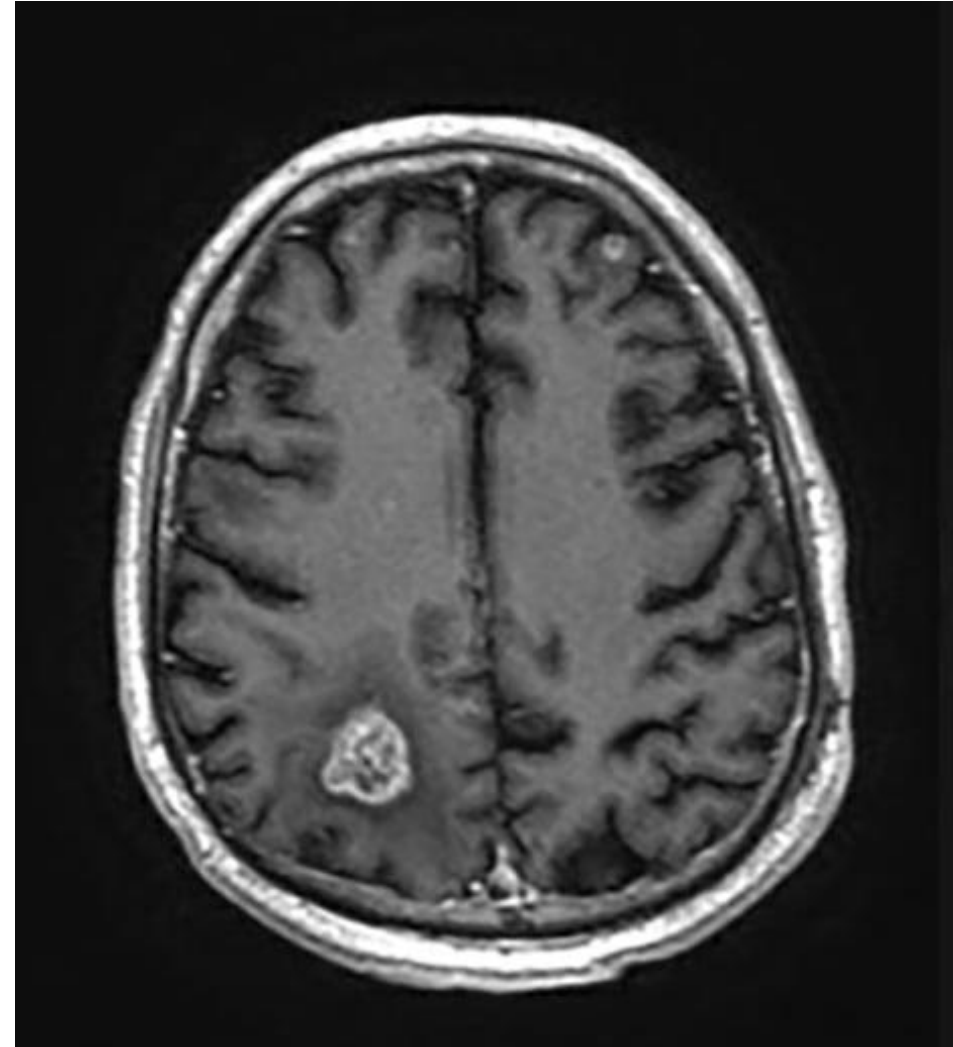
- Disadvantages

- Significant fatigue during and after treatment
- Causes hair loss, skin irritation, sore throat
- Long term cognitive effects – especially short term memory and attention

What has changed in the last 20 years?

Imaging has DRAMATICALLY improved

this allows us to better pick the most appropriate treatment for each patient



What has changed in the last 20 years?

We have new technologies that let us target individual brain tumors with millimeter precision – “radiosurgery”

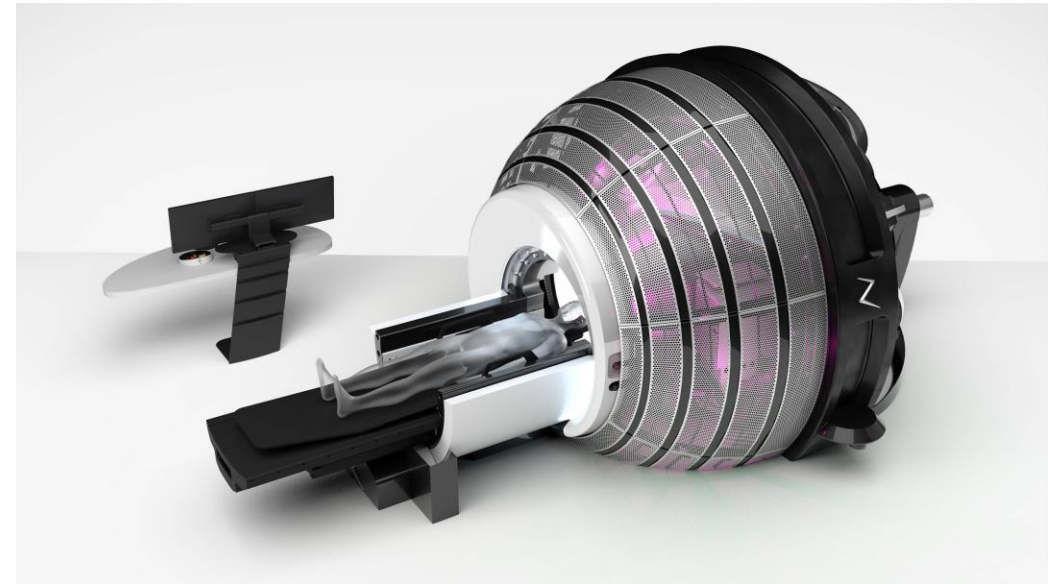
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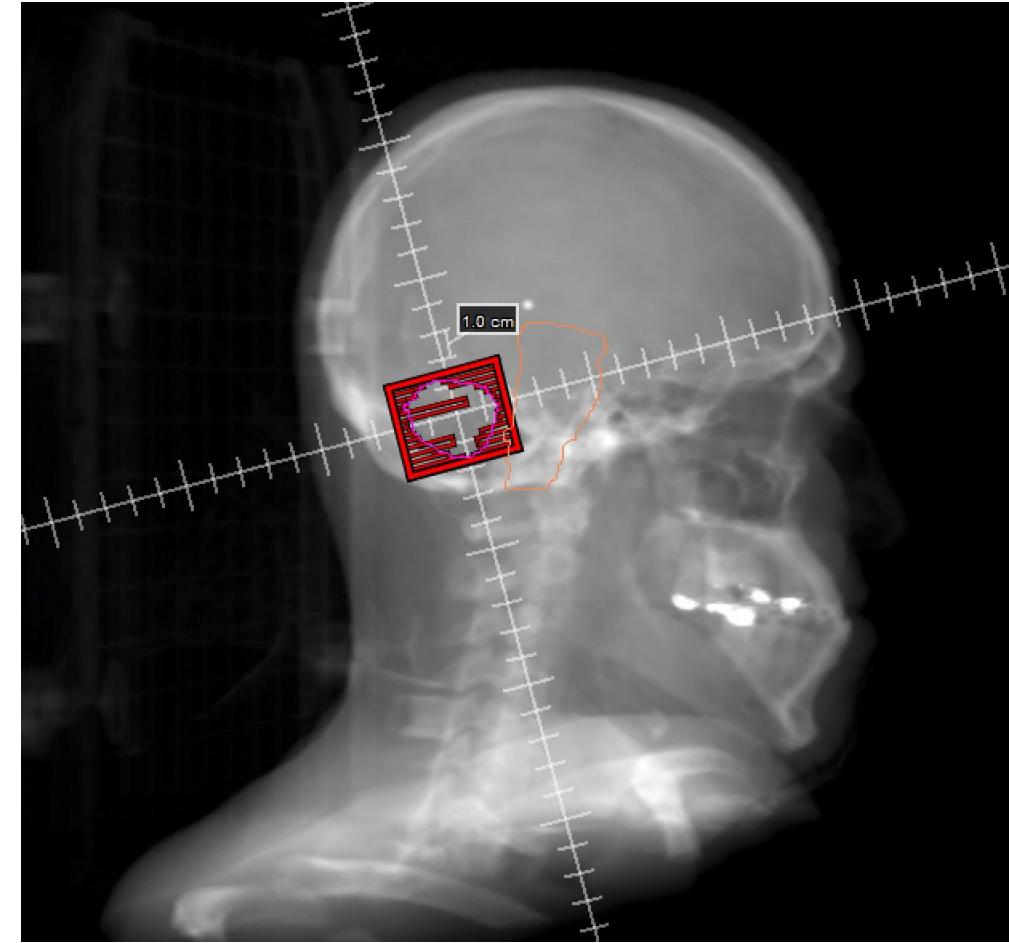
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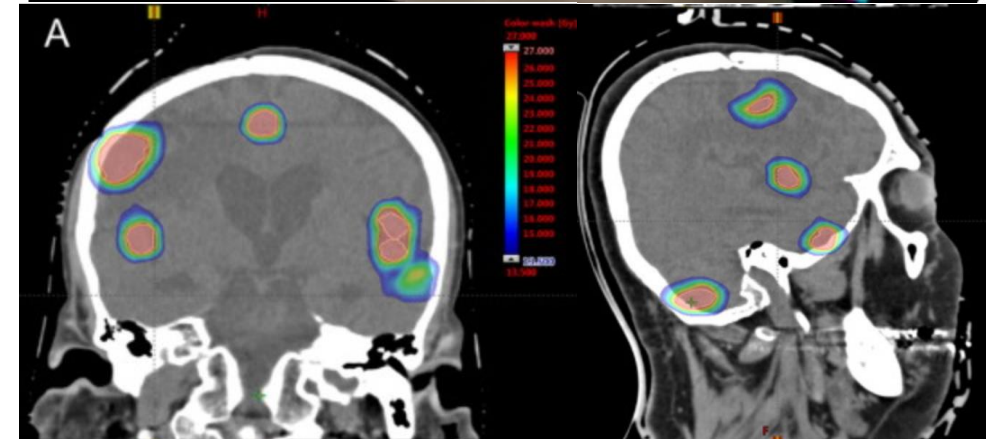
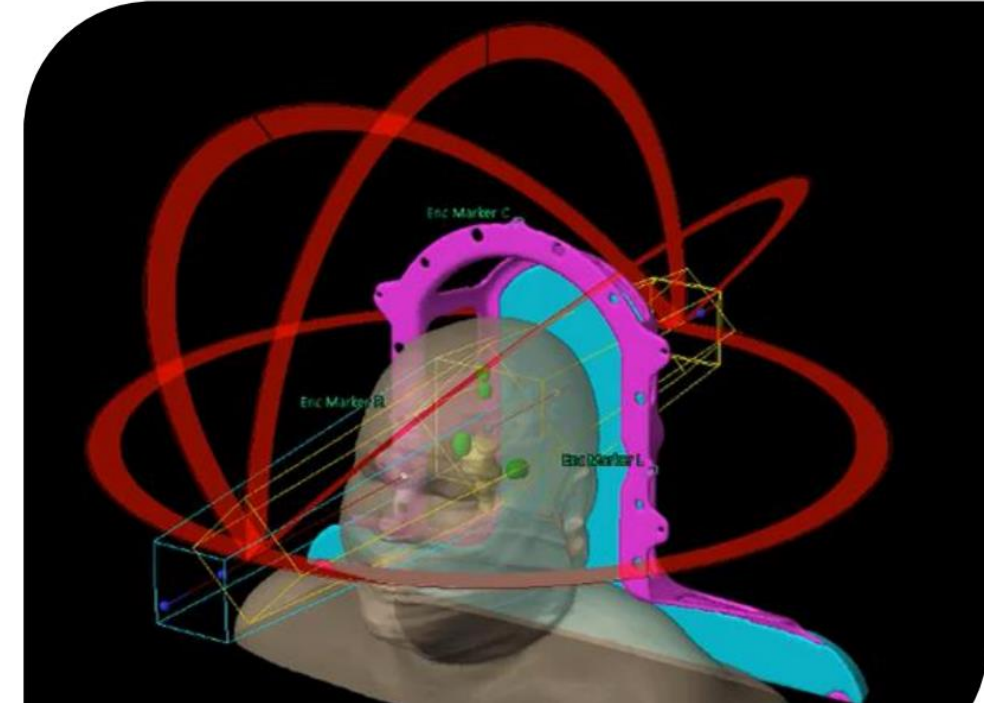
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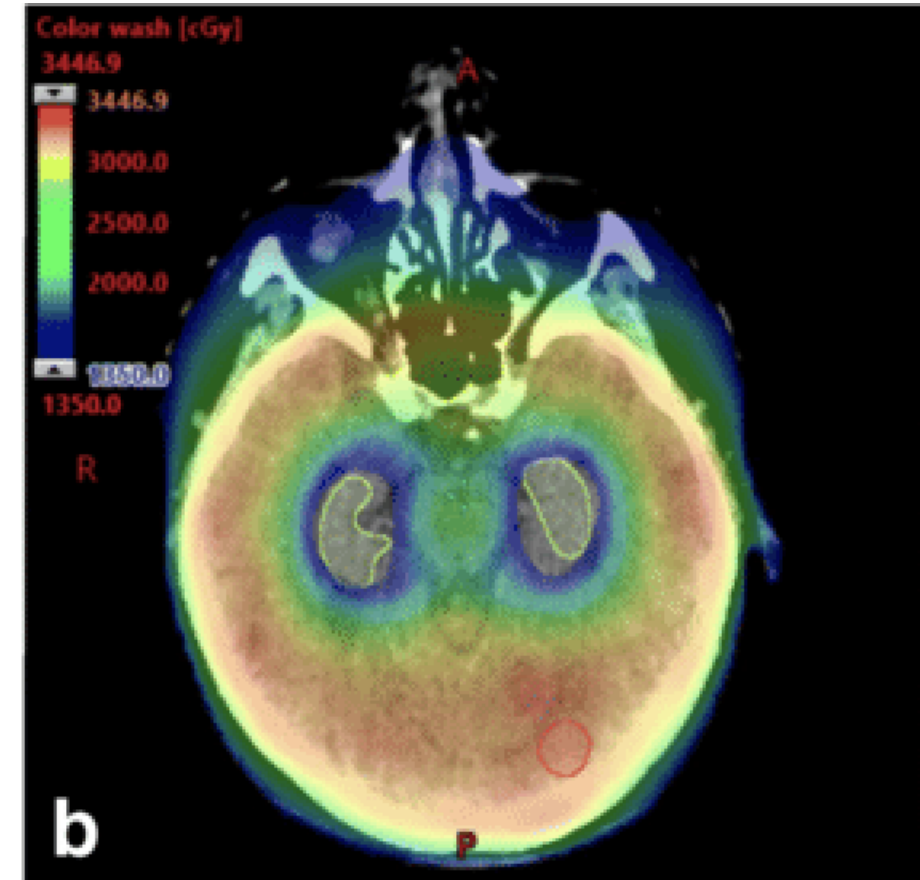


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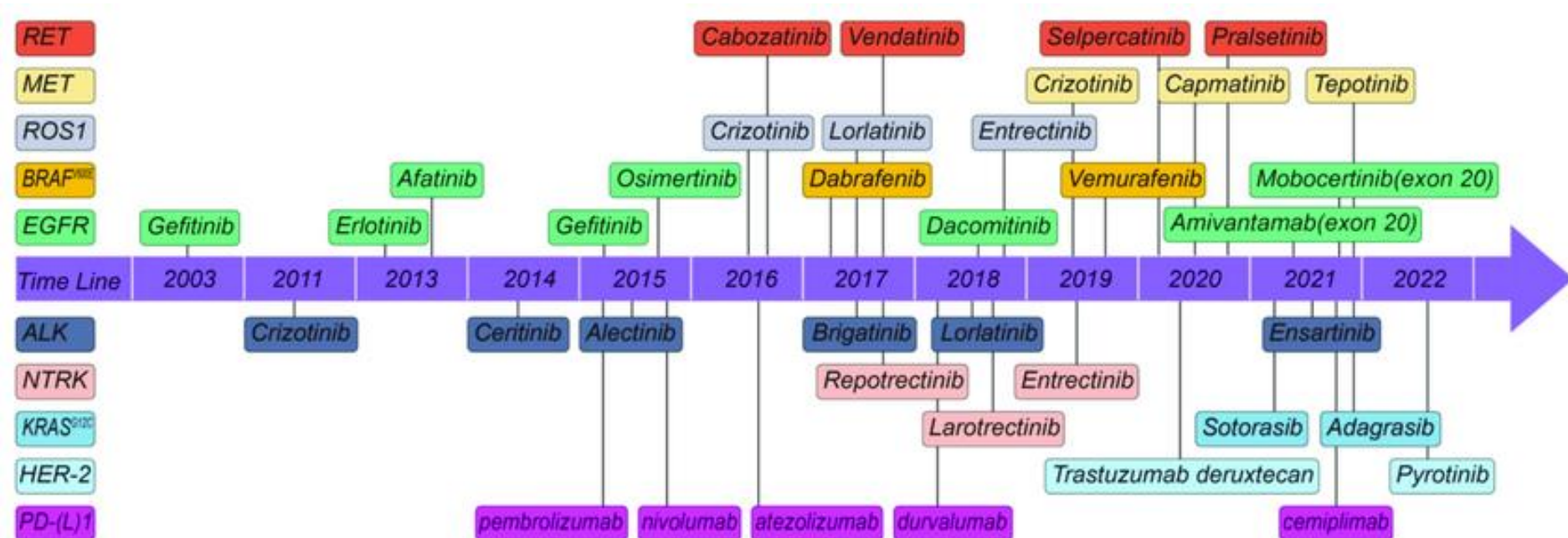
Even patients with many brain metastases now have options for cognition-sparing radiation



What has changed in the last 10 years?

We have new systemic therapy options that can penetrate the blood brain barrier

This allows us to sometimes delay, reduce, or even eliminate radiation therapy



New treatments have led to better outcomes

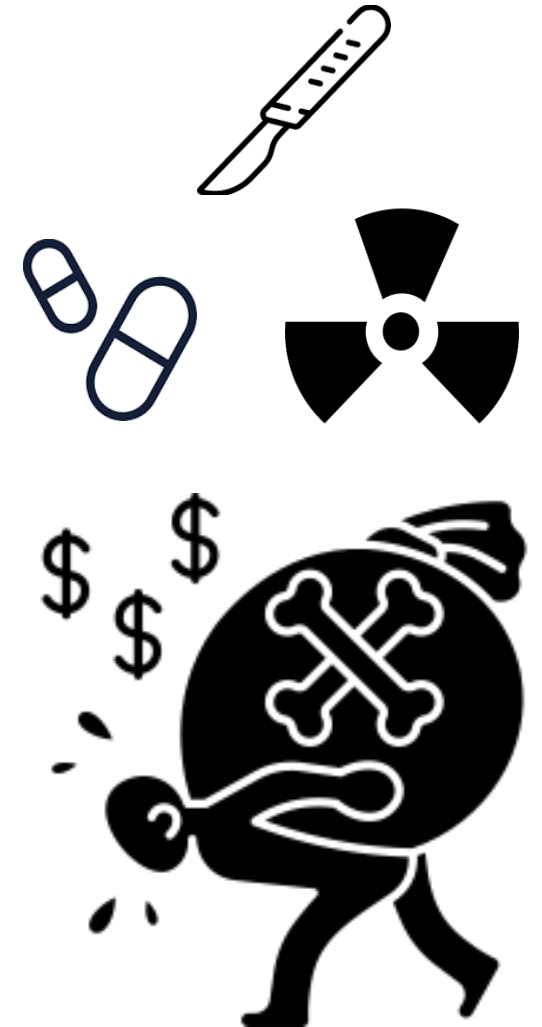
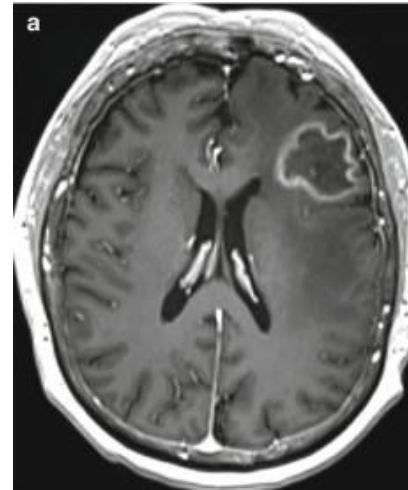
Table 2. Patients Who Experienced Cognitive Deterioration by 3 Months and Difference Between Groups

	No. (%) of Participants		Mean Difference, % (95% CI)	P Value ^a
	SRS Alone (n = 63)	SRS Plus WBRT (n = 48)		
Change from baseline ^b				
HVLT-R				
Immediate recall				
Deterioration	5 (8.2)	14 (30.4)	22.2 (5.4 to 39.1)	.004
No deterioration	56 (91.8)	32 (69.6)		
Delayed recall				
Deterioration	12 (19.7)	24 (51.1)	31.4 (12.1 to 50.7)	<.001
No deterioration	49 (80.3)	23 (48.9)		
Recognition				
Deterioration	14 (22.6)	19 (40.4)	17.8 (-1.5 to 37.2)	.06
No deterioration	48 (77.4)	28 (59.6)		
TMT-A time to complete				
Deterioration	10 (16.7)	14 (30.4)	13.8 (-4.4 to 32.0)	.11
No deterioration	50 (83.3)	32 (69.6)		
TMT-B time to complete				
Deterioration	11 (19.0)	16 (37.2)	18.2 (-1.4 to 37.9)	.07
No deterioration	47 (81.0)	27 (62.8)		
COWAT total				
Deterioration	1 (1.9)	8 (18.6)	16.7 (2.4 to 31.0)	.01
No deterioration	52 (98.1)	35 (81.4)		
GPS total seconds				
Deterioration	17 (29.3)	21 (47.7)	18.4 (-2.4 to 39.3)	.07
No deterioration	41 (70.7)	23 (52.3)		
Outcome for cognitive progression at 3 mo				
Stable	23 (36.5)	4 (8.3)	-28.2 (-44.2 to -12.2)	<.001
Progression	40 (63.5)	44 (91.7)		

^aNSCLC, non-small-cell lung cancer;

With better outcomes come new challenges and new opportunities

- How do we optimally integrate promising new treatments with older, established strategies?
- How do we manage treatment side effects as patients live longer?
- How do we best control costs and expand access to care?



Thanks for your attention!



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