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.
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 \textbf{THE} standard treatment for brain metastases

\begin{itemize}
  \item \textbf{Advantages}
    \begin{itemize}
      \item Effective at controlling growth of brain tumors
      \item Low risk of causing severe injury to the brain
      \item Widely available
      \item Not resource intensive
    \end{itemize}
  \item \textbf{Disadvantages}
    \begin{itemize}
      \item Significant fatigue during and after treatment
      \item Causes hair loss, skin irritation, sore throat
      \item Long term cognitive effects – especially short term memory and attention
    \end{itemize}
\end{itemize}
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”

this allows us to ablate brain tumors while sparing normal, healthy brain tissue
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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.
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!