Challenging Paediatric Brain Tumours

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Dr Jane Pears

Consultant Paediatric Oncologist,

Dublin

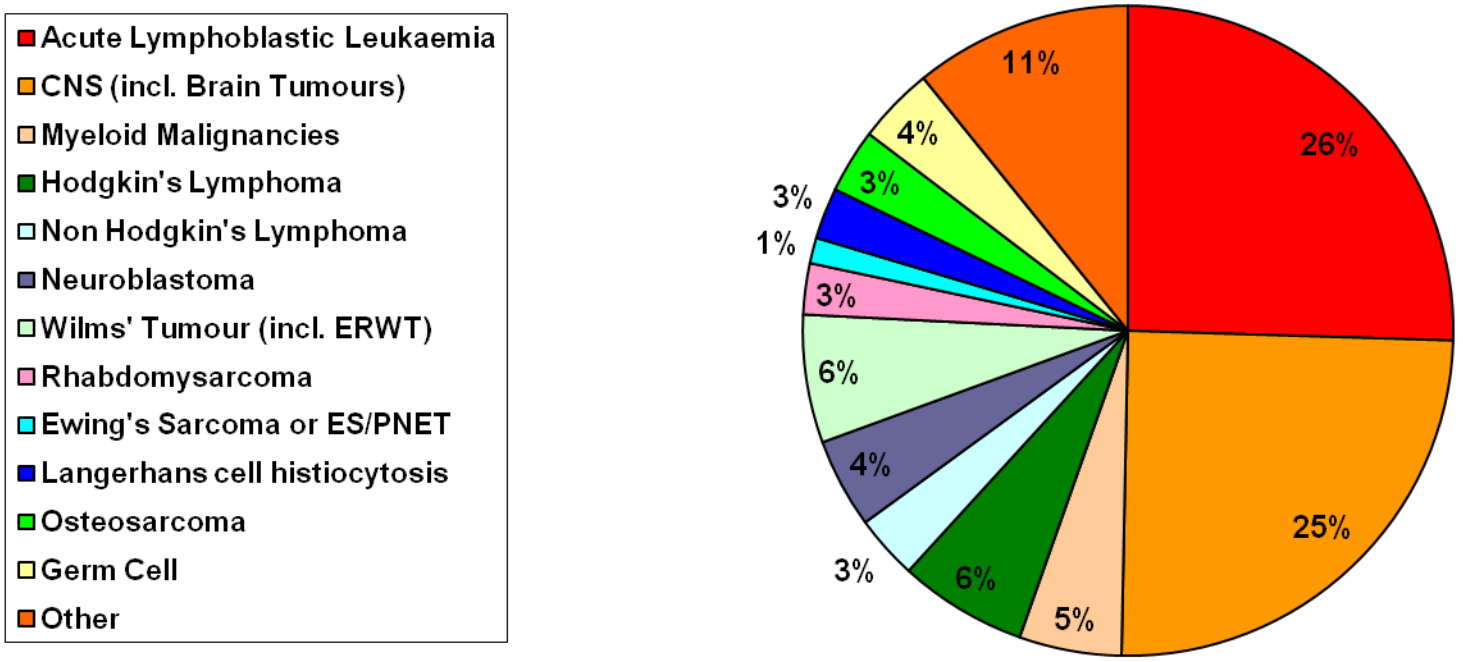
Overview

- (i) Paediatric malignancy
- (ii) Central nervous system tumours
- (iii) Diffuse Intrinsic Pontine Glioma

(i) Paediatric malignancy

- ~1/500 children <16 years will develop a malignancy
- ~200 new cases/year in ROI
- A.L.L most common diagnosis
- CNS tumours most common solid malignancy of childhood

3.12 Malignant Haematology and Oncology main cancer primary groups in 2016



(ii)CNS tumour challenges (1)

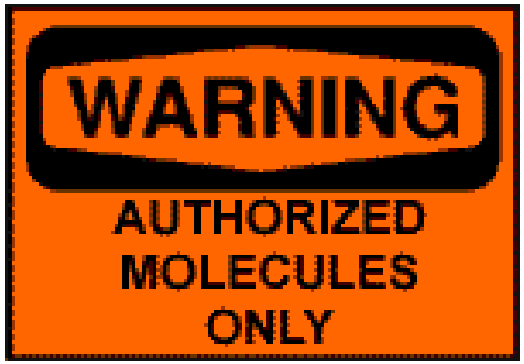
- “Delay” in diagnosis
- Overlap with more common childhood illnesses
- Variety of presenting symptoms and signs
- Perceived as rare
- May result in:
- Lack of faith in medical profession

- (Headsmart initiative)

CNS tumour challenges (2)

- Location
- Eloquent areas of brain, not always amenable to surgery
- Irreversible damage before treatment

CNS tumour challenges (3)



Blood Brain Barrier

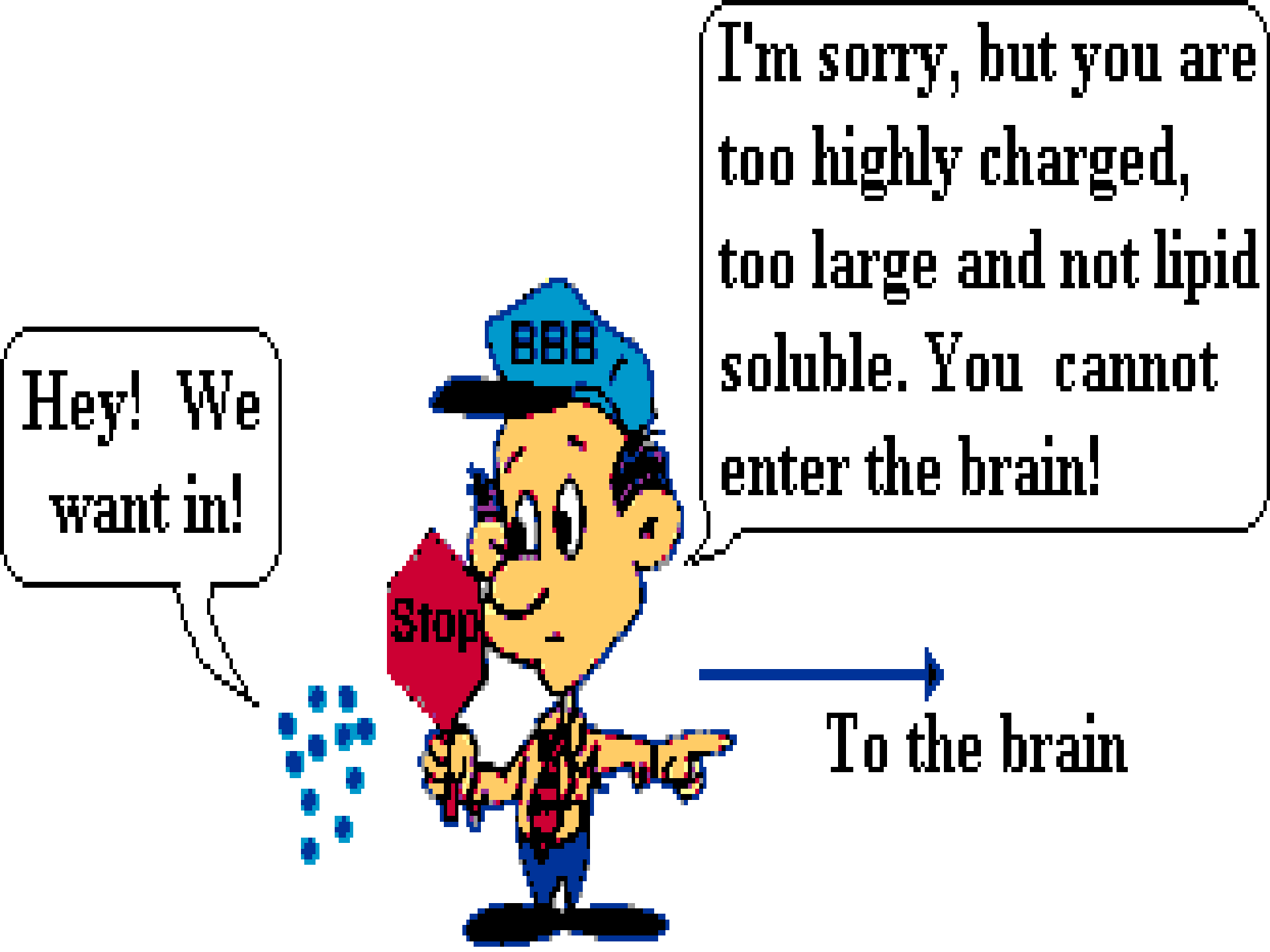
protects:

(i) from potentially damaging substances

(ii) from hormones and transmitters

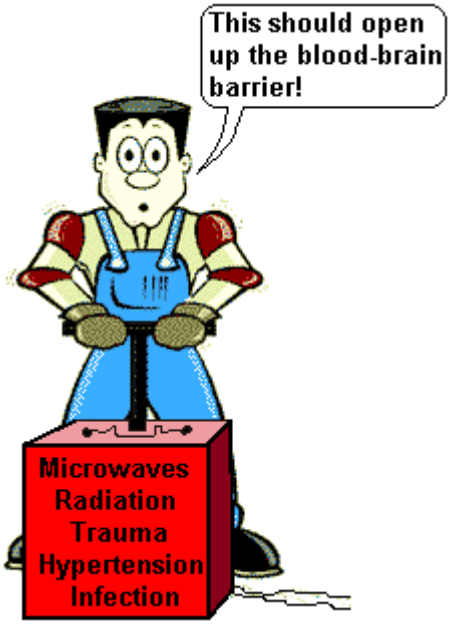
(iii) Constant milieu

(iv) NB: Area postrema / posterior pituitary etc)

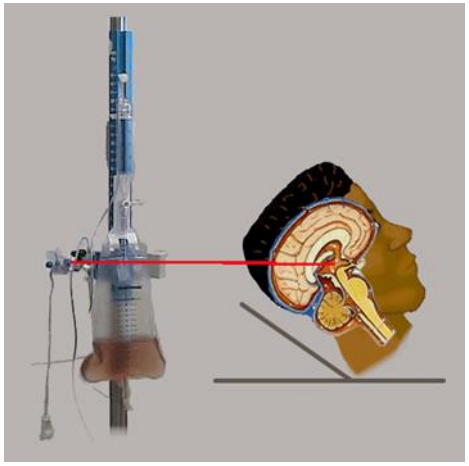

Hey! We want in!
I'm sorry, but you are too highly charged, too large and not lipid soluble. You cannot enter the brain!
BBB
Stop
To the brain

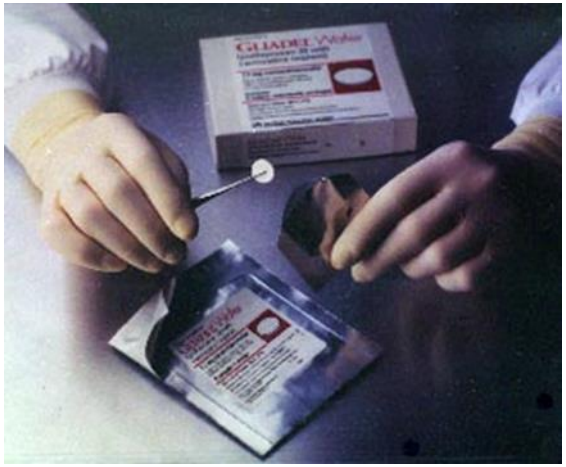
CNS tumour challenges (3)

- To achieve adequate delivery of chemotherapeutic agents to intracranial/ intraspinal tumours with minimal toxicities



Ways in to the brain





CNS tumour challenges (4)

- Late effects on developing brain
- Survival comes at a cost

Sequelae of radiation

- Neuropsychological impairments(Attention, memory, visuospatial skills, motor functions, language, executive functioning)
- Psychosocial impairment (Employment, ability to drive, education, independent living, dating history)
- Neuro-endocrine impairment
- Second malignancy risk

MDT working

- Dedicated neuro-oncology team: Oncologists, radiologists, surgeons, anaesthetists, pathologists, radiotherapists, ophthalmologists, audiologists, psychologists, nursing staff, pharmacists, physiotherapists, speech therapists, occupational therapists, dieticians, school teachers, social workers….

- PALLIATIVE CARE!!!!!!

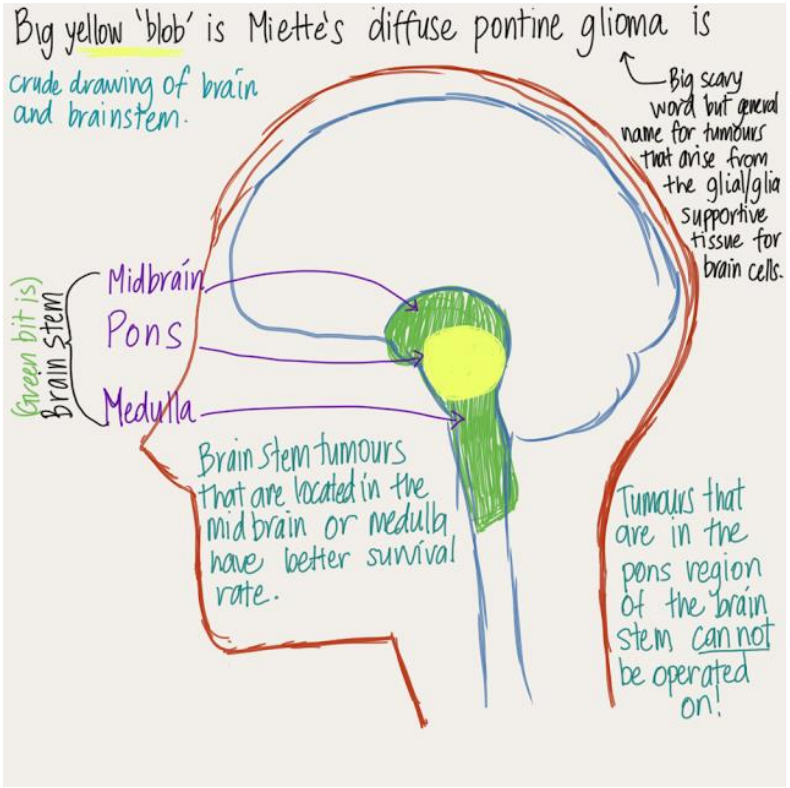
(iii) Diffuse Intrinsic Pontine Glioma

- DIPG
- 10-15% of brain tumours
- Leading cause of brain tumour related death
- Median age 6-7 yrs
- Present with: Cranial nerve deficits, upper motor neuron signs, ataxia

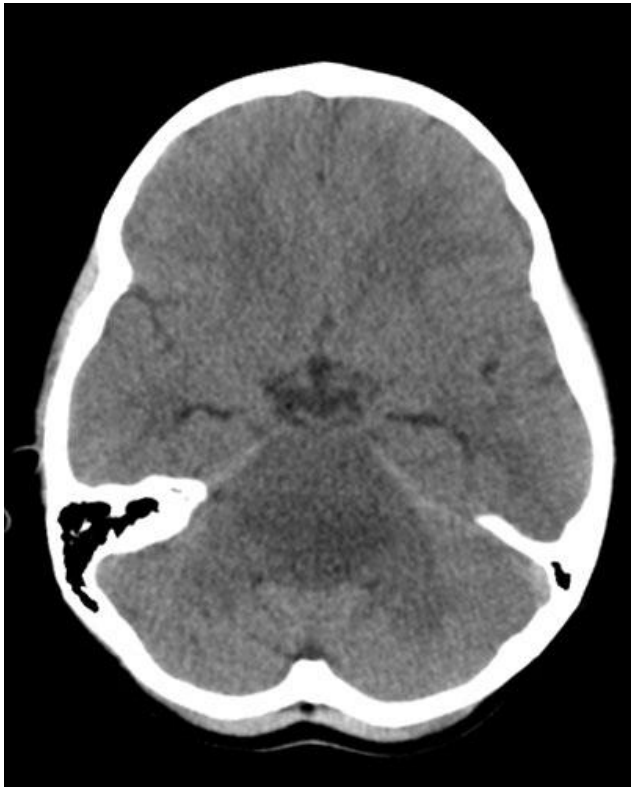
Diffuse Intrinsic Pontine Glioma

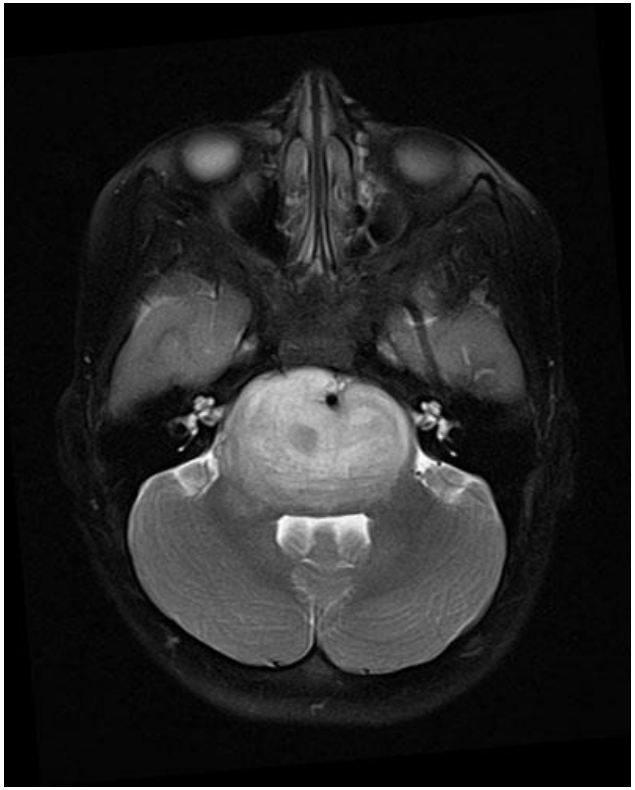
- Radiological diagnosis (MRI)
- T1 hypointense, T2 hyperintense, variably enhancing
- Expansile mass >/= 50% of pons
- +/- leptomeningeal dissemination

Diffuse Intrinsic Pontine Glioma

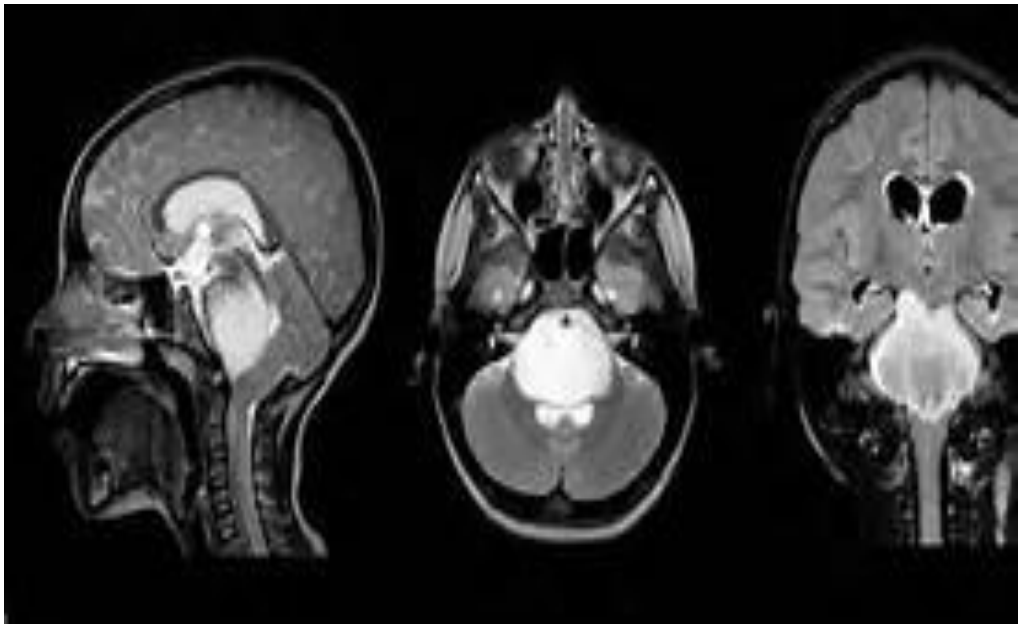


Diffuse Intrinsic Pontine Glioma





Diffuse Intrinsic Pontine Glioma



Diffuse Intrinsic Pontine Glioma

- Median survival 9 months from diagnosis
- Radiotherapy *as palliation*
- Chemotherapy ineffectual
- Progress in treatment hampered by lack of tissue

Diffuse Intrinsic Pontine Glioma

- International efforts to obtain tissue
- Post mortem
- Up front, stereotactically

Diffuse Intrinsic Pontine Glioma

- DIPG Registries

- Database of demographic, clinical, radiological and pathology data
- Repository of molecular data

- To enable a solid research infrastructure

DIPG : Diagnosis

- Clinical – radiological entity
- MRI
- Clinical symptoms: CN deficits, ataxia, long tract signs of <6 months duration

- Hemiplegia, dysphagia, hiccups, hoarseness
- Personality changes, night laughter
- Only~20% present with hydrocephalus

DIPG : Biology and histology

- TP53 mutations
- Amplification of EGFR
- Gain in PDGRFA
- Gain in PARP 1

- Histone mutations

DIPG : Treatment

- Steroids
- Focal radiotherapy
- 54Gy in 30 fractions

- 39Gy in 13 fractions + potential to repeat

- ~85% will respond
- Radiosensitising chemo shows no benefit

DIPG : Clinical trials

- 21 trials listed
- Early phase, vaccine therapy, convection enhanced delivery, immunotherapy

- BIOMEDE: Biological Medicine for Diffuse Intrinsic Pontine Glioma Eradication

DIPG : Prognosis

- Median survival of 9 months
- Median time from progression to death 1-4.5 months
- Favourable predictors include age </ = 3years, longer symptom duration at diagnosis

DIPG : End of life care

- Constipation
- Headache, seizures.
- Visual disturbance
- Sensitivity to noise
- Pain
- Nausea, vomiting
- Anxiety
- Sleep disturbance
- Fatigue
- Dysarthria
- “Locked in syndrome”
- Dysphagia
- Nutrition
- Urinary retention
- Secretions
- Dyspnoea
- Advanced care planning

DIPG:
Other challenges

- Health tourism
- Social media
- Fundraising
- Unrealistic expectations


DIPG
THE BASIC FACTS
DIPG HAS A SURVIVAL RATE OF LESS THAN 1%
9 MONTHS
THE MEDIAN SURVIVAL RATE FROM DIAGNOSIS.
DIPG MOST COMMONLY STRIKES KIDS BETWEEN
4 TO 11
YEARS OF AGE.
90%
OF KIDS WILL DIE WITHIN 2 YEARS OF A DIPG DIAGNOSIS.
BRAIN TUMORS
ARE THE LEADING CAUSE OF CANCER RELATED DEATHS IN CHILDREN UNDER AGE 10.
DIPG
LEAVES KIDS MENTALLY INTACT. BUT STEALS ESSENTIAL BODILY FUNCTIONS OVER TIME AS THE TUMOR GROWS. SUCH AS VISION, CHEWING, SWALLOWING, WALKING, AND BREATHING.
www.DefeatDIPG.org

Brain Tumours are the #1 cancer killer of UK Children.

The most FATAL Childhood Brain Cancer is DIPG

No Treatment. No Cure. 0% Survival Rate.

It is described as a 'Rare' cancer
BUT every 9 Days a UK child like
Rebekah is diagnosed with DIPG

Median Survival is 9 - 12 months
Rebekah was taken in *just* FIVE

Support vital DIPG Research and the work
of Abbie's Army to help Make a Difference
& change the outcomes for other Children

Text: DIPG20 £ to 70070

Learn more about www.abbiesarmy.co.uk


80%
Survival Rate
for childhood cancer
?
For every 8 children diagnosed with cancer
1 will not survive
will suffer late effects such as secondary cancers, muscular difficulties and infertility.
Although survival rates have increased, there are still childhood cancers, like DIPG, that are
TERMINAL AT DIAGNOSIS
TEAM Jacob FOUNDATION

Looking forward……..

- Increased international collaboration
- Working together
- - with palliative care
- - with parent groups

- **STRONGER TOGETHER**

- Things can only get better…….

- Any questions?
- Any comments?

Thank you, enjoy your lunch!