



European
Reference
Network

for rare or low prevalence
complex diseases

 Network
Paediatric Cancer
(ERN PaedCan)



June 16th 2021

Shermaine Pan & Emanuela Palmerini

“Treatment conundrum in a rare
diagnosis: resect and irradiate, is that
enough?”

Chair: Roelof van Ewijk

See and register for all webinars in this series at
<https://www.gotostage.com/channel/epyswebinars>



Co-funded by
the Health Programme
of the European Union





Co-funded by
the Health Programme
of the European Union

COI Declaration



**European
Reference
Network**
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Nothing to declare.



Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

History

4 year old with reduced power and movement in the right arm and fixed posture of the neck.

Normal vaginal delivery and normal developmental milestones.

Sibling died at 4 weeks with congenital hydrocephalus.





Co-funded by
the Health Programme
of the European Union



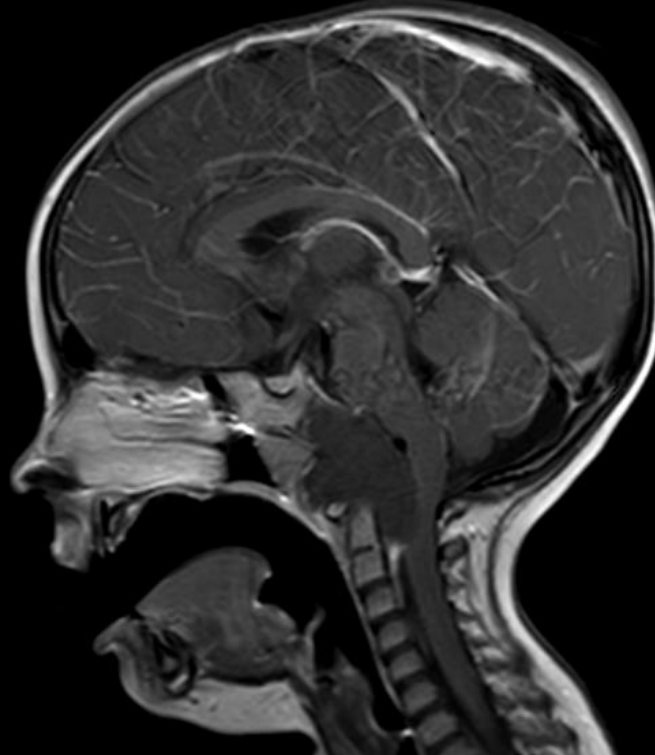
European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

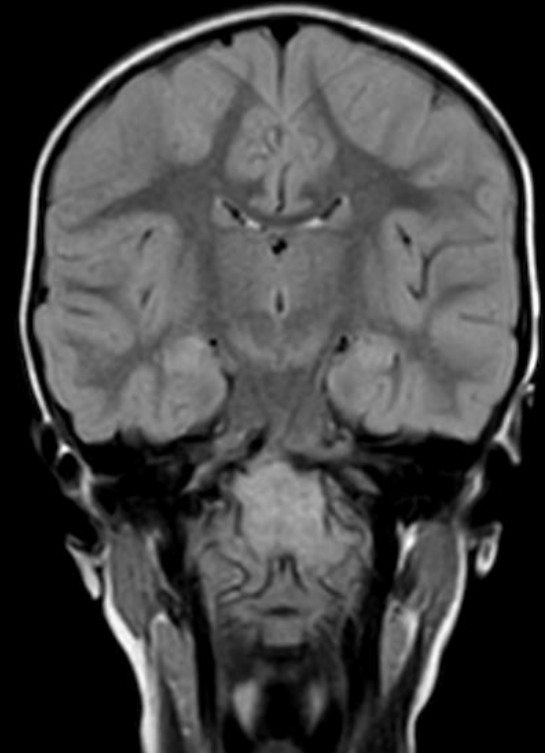
MR Imaging



T2 axial



T1 post-gad sag



FLAIR cor





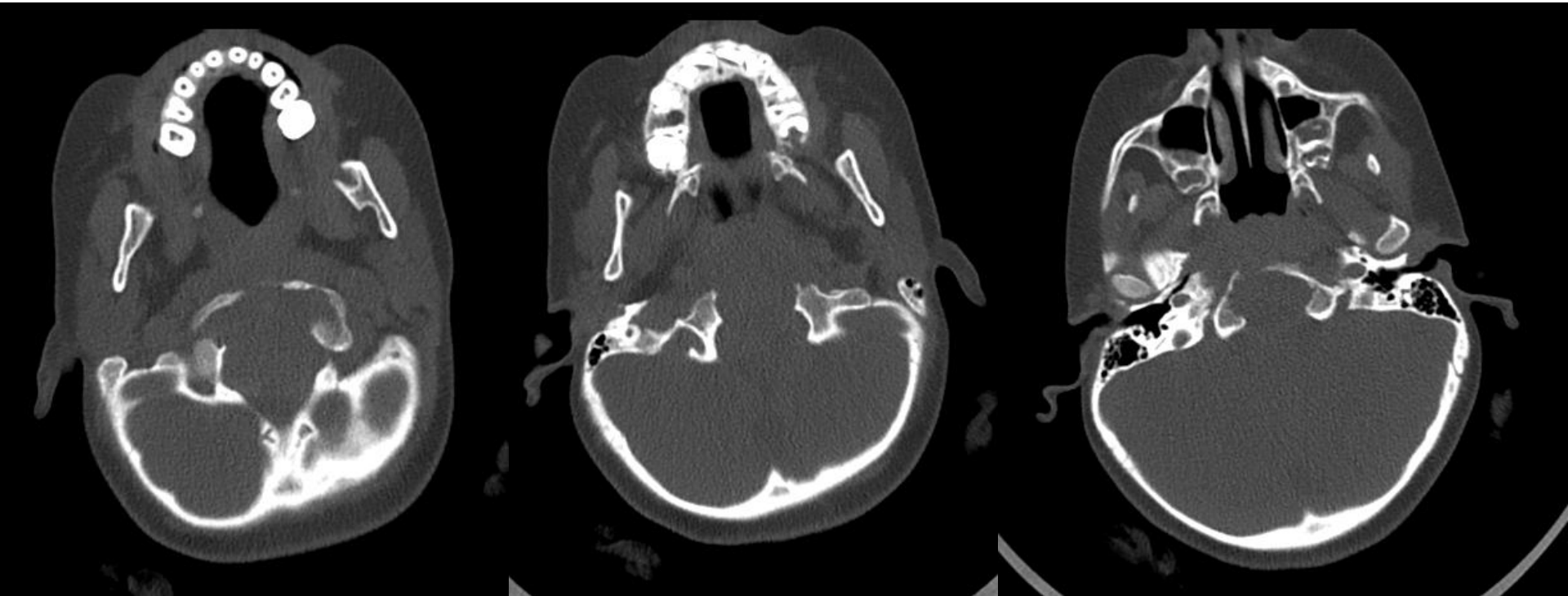
Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

CT Imaging





Co-funded by
the Health Programme
of the European Union

Question 1

What is the likely radiological diagnosis?

- A. Extraskelletal Ewing's sarcoma
- B. Chordoma
- C. Chondrosarcoma
- D. Meningioma



Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Histology

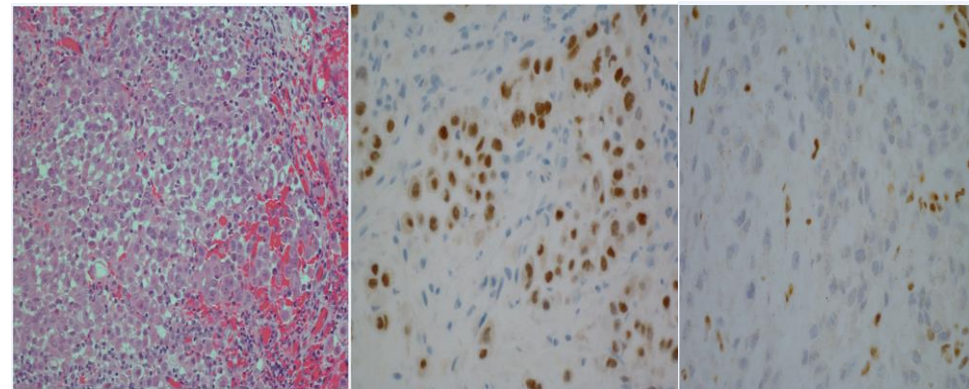
Poorly differentiated
chordoma

Atypical large epitheloid
cells

Brachyury
immunopositivity

Ki-67 5-10% (focally 10-
20%)

Loss of INI1/SMARCB1
expression



H&E staining
shows poorly
differentiated
tumour

Brachyury
positive

Loss of nuclear
staining for
SMARCB1



Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Treatment

Posterior cranio-cervical junction and debulking of tumour followed by application of cervical spine halo.

Immediate post-operative MR scan showed subtotal resection, with residual disease superior to the anterior arch of atlas and lateral mass of C1.





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Question 2

What next steps would you recommend at MDT?

- A. Further surgery
- B. Chemotherapy followed by radiotherapy
- C. Concurrent chemo-radiotherapy
- D. Post-operative radiotherapy





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Treatment conundrum

Discussion at the Massachusetts General Hospital Skull Base MDT – agreed with local team approach of chemotherapy prior to proceeding with radiotherapy.

Discussion at national PBT Skull Base MDT – unable to deliver radiation with halo in situ.





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Chemotherapy Journey

She was commenced on VDC/IE.

After cycle 3, she was admitted with febrile neutropenia.

CT chest was suggestive of fungal infection.

Clinical deterioration and had abdominal distension.

CT abdomen showed hepatomegaly and severe ascites, in keeping with veno-occlusive disease of the liver.

Acutely managed in Paediatric Intensive Care Unit.





Co-funded by
the Health Programme
of the European Union

Veno-occlusive disease (VOD)



European
Reference
Network

for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Diagnosis was based on confirmed abdominal ascites and hepatomegaly on CT abdomen, which was managed with ascitic drain.

She required invasive ventilation, but also had fungal chest infection. Intubated for 7 days.

There was no new cognitive impairment.





Co-funded by
the Health Programme
of the European Union

Recovery from acute episode



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

She recovered from episode of VOD.

Discussion with parents re: next steps in her management:

- Radiotherapy
- Chemotherapy with Temozolomide as holding measure until radiotherapy begins





Co-funded by
the Health Programme
of the European Union

MR imaging

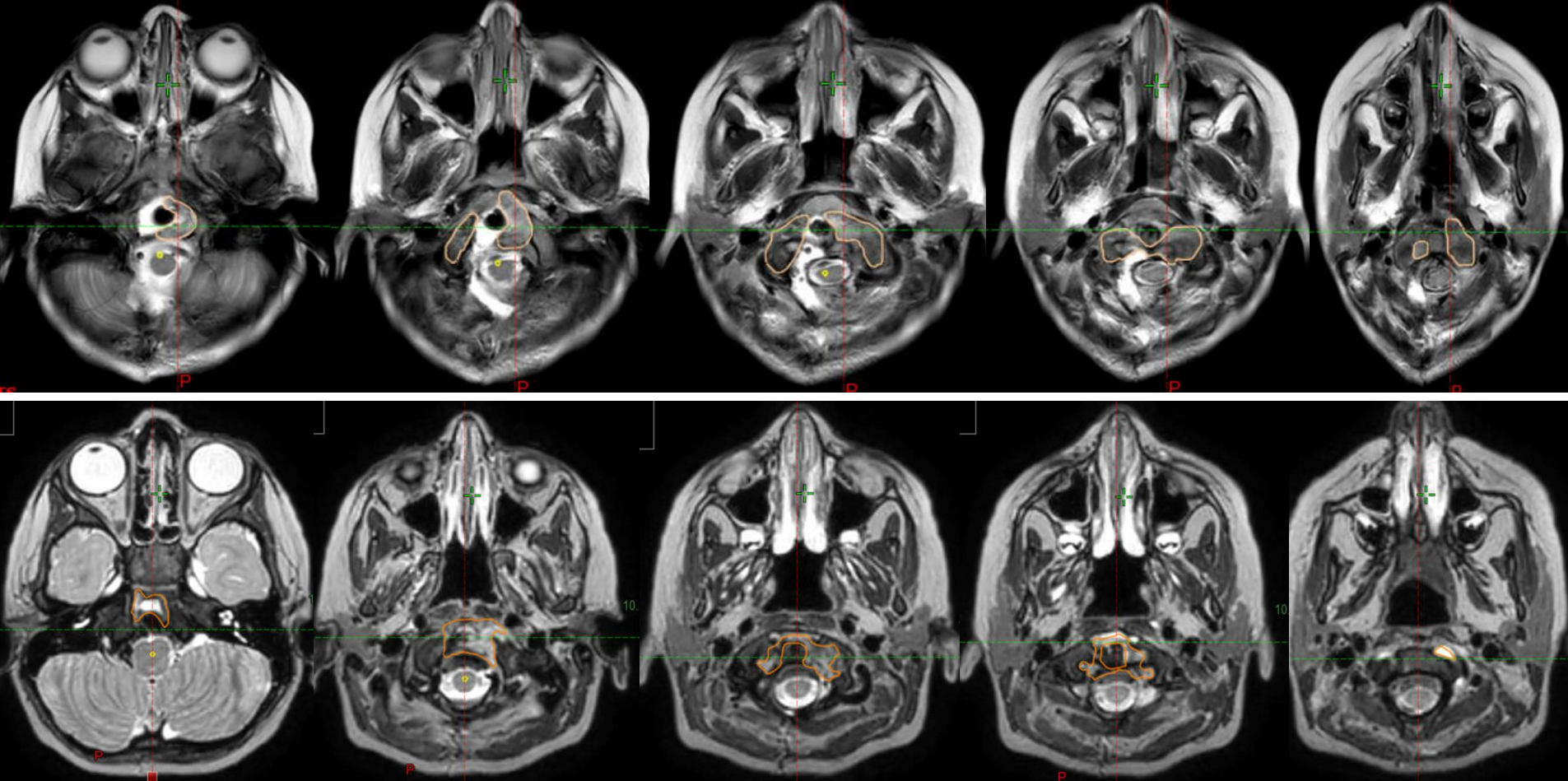
Post-operation (top row), Post-cycle 3 (bottom row)



European
Reference
Network

for rare or low prevalence
complex diseases

Network
Paediatric Cancer





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Question 3

Which radiation modality would you recommend?

- A. Photon therapy
- B. Proton beam therapy (PBT)
- C. Radiotherapy with electrons
- D. Stereotactic radiosurgery (SRS)





Co-funded by
the Health Programme
of the European Union



Proton Beam Therapy

Simultaneous integrated boost (SIB) approach

Total dose of 73.8Gy/CGE in 41#.

Treatment on Monday to Fridays each week.

CTV_Low (59.45Gy/CGE in 41#): GTV + 1cm + whole
clivus

CTV_High (73.8Gy/CGE in 41#): GTV + 5mm





Co-funded by
the Health Programme
of the European Union

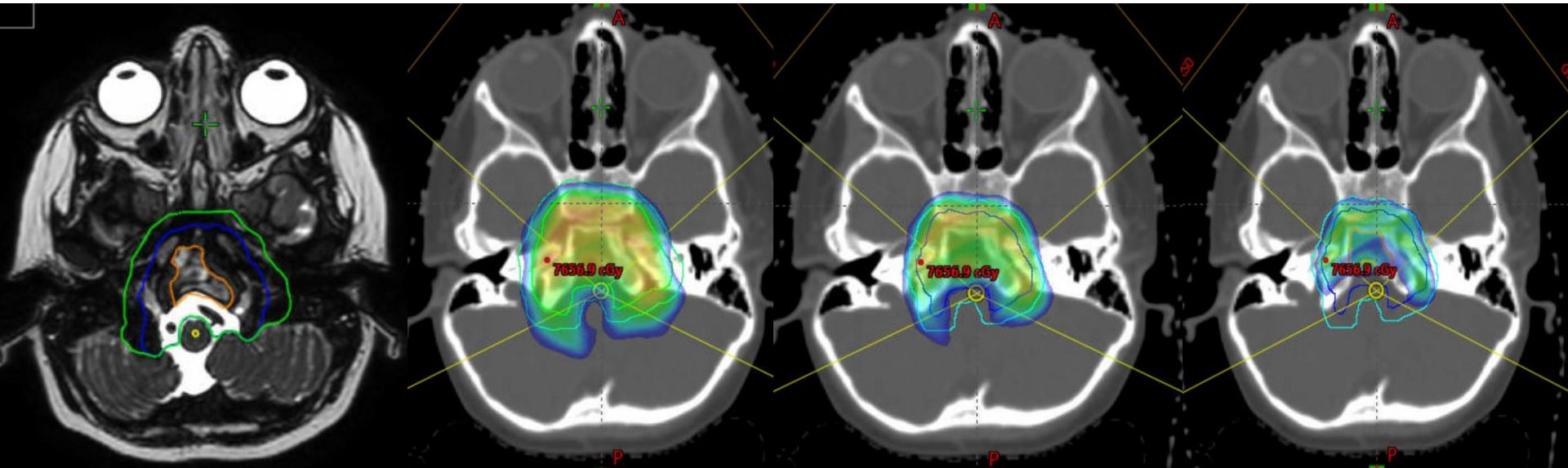


European
Reference
Network

for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Proton Beam Therapy



GTV residual
CTV Low
CTV High

54Gy

63Gy

70Gy





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

PBT acute side effects

She completed PBT end of November 2020.

She tolerated treatment extremely well.

No fatigue or skin reaction or mucositis.





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Question 4

Which radiation-related late effects is relevant?

- A. Second malignancy
- B. Risk of brainstem injury
- C. Hearing impairment
- D. Pituitary dysfunction
- E. All of the above





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

2 months on...

Review in January 2021 - 50% dose reduction of chemotherapy (VDC/IE).

She tolerated chemotherapy well and completed course end of March.

MR scan in January 2021: small residual disease remains stable.





Co-funded by
the Health Programme
of the European Union



European
Reference
Network
for rare or low prevalence
complex diseases

Network
Paediatric Cancer
(ERN PaedCan)

Key Learning Points

Poorly differentiated chordoma, with loss of INI1/SMARCB1 expression are rare.

Trimodality therapy (surgery, chemotherapy and radiotherapy) should be considered.

International collaboration and discussion for rare clinical cases.

