

SPR 2013



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Disclosure

- MPS VI and MPS IVA Advisory Board with financial support from BioMarin
- Indirectly related due to interest in cranio-cervical imaging

Time Resolved Steady State Free Precession Imaging of the Brain and Spine

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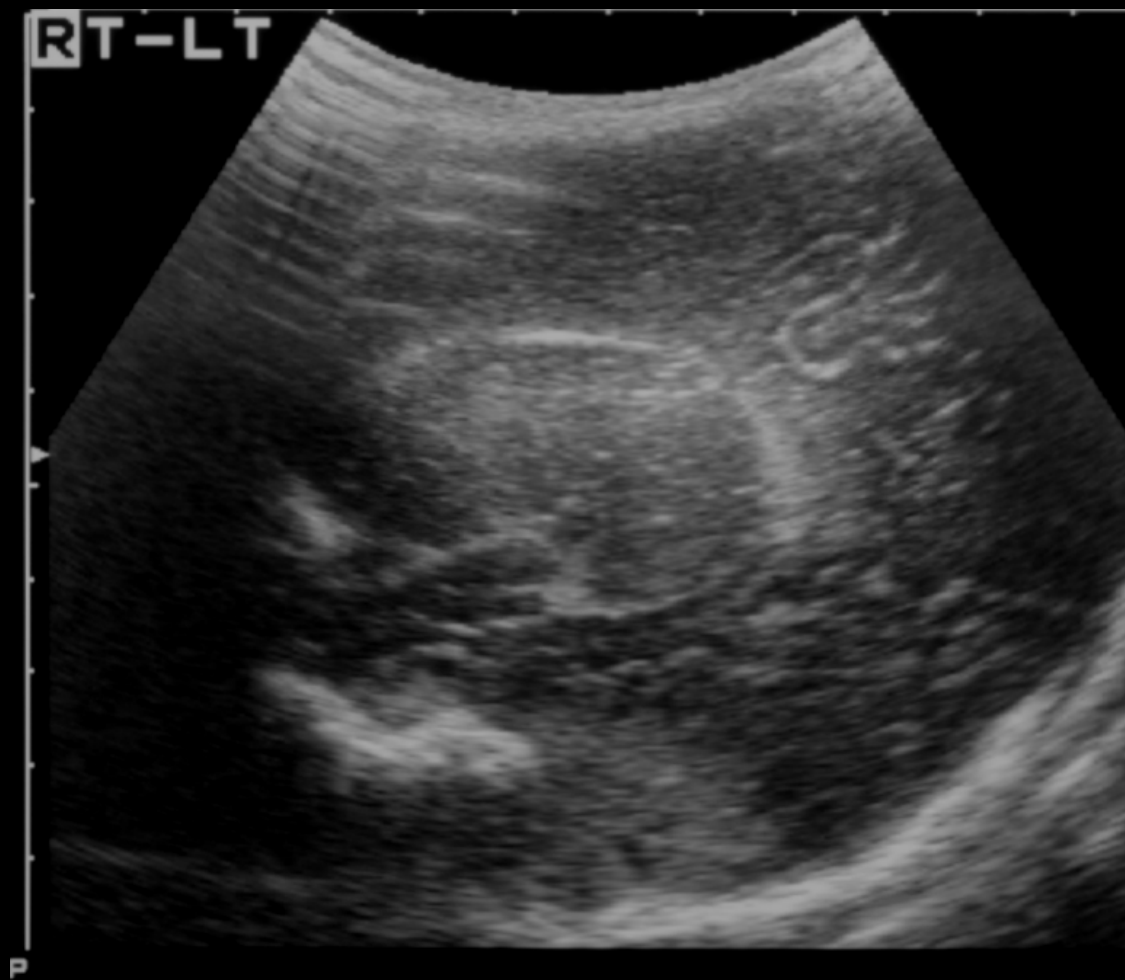
PCPRA 2012

- “Best scientific paper” ... not quite.
- Difficult case presentation

Index Case History

- Presumed post-natal hemorrhage
- Hydrocephalus diagnosed at age two
- Ventriculo-peritoneal shunt placed
- Complicated by chronic subdural hygromas
- Programmable shunt placed
- High valve pressure setting treats hygromas
- But develops back pain and syrinx
- Low valve pressure setting treats syrinx
- But develops intracranial hypotension

Index Case



NUS 2002



T2 2004

Index Case



CT 2004



CT 2005



CT 2007

Index Case



T2 2009



T2 4-2011



T2 11-2011

Index Case

- Neurosurgeon complains, “I turn the valve up, the syrinx enlarges, and the patient gets back pain. I turn the valve down, the back pain goes away, but the patient gets a spinal headache. I want to know why this patients has a syrinx. We’ve done multiple scans and no cause has been found. Do whatever it takes to figure it out.”
- Radiologist thinks, “How cool is that!”

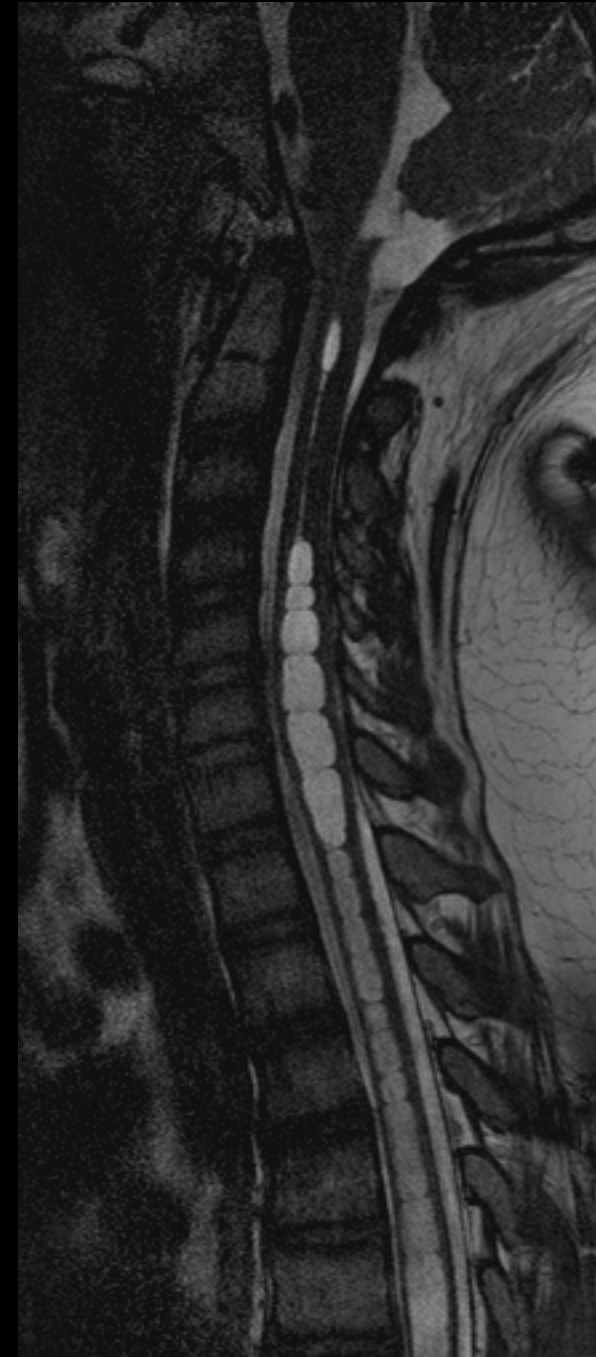
Index Case Pre-Op



T1



T2

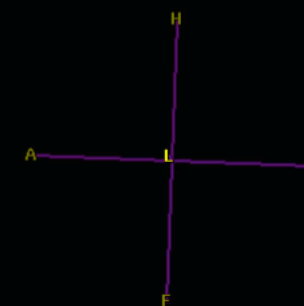
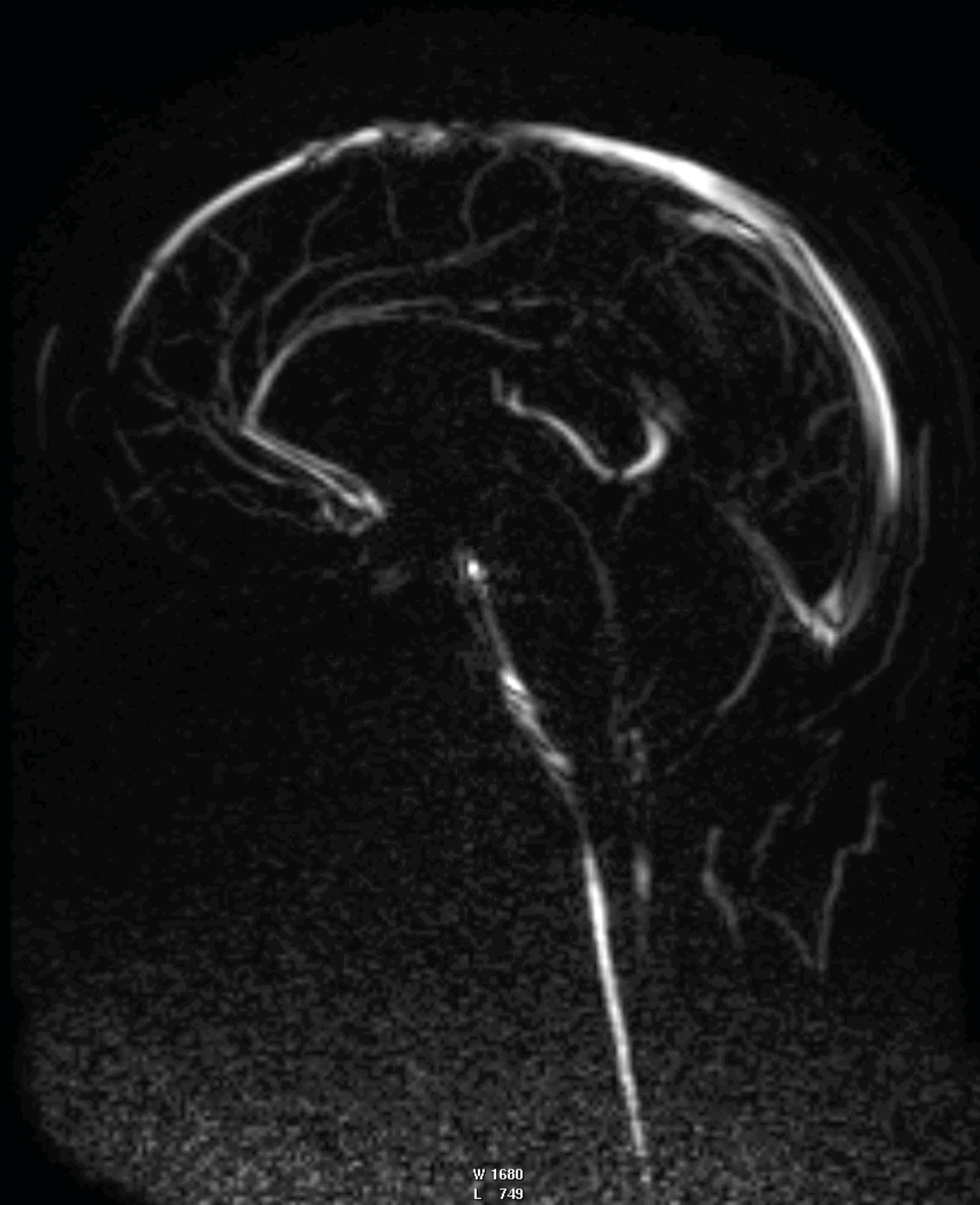


BFFE

Index Case

Sc 4.1/1
FFE / PCA/M
Td 000 ms [24]

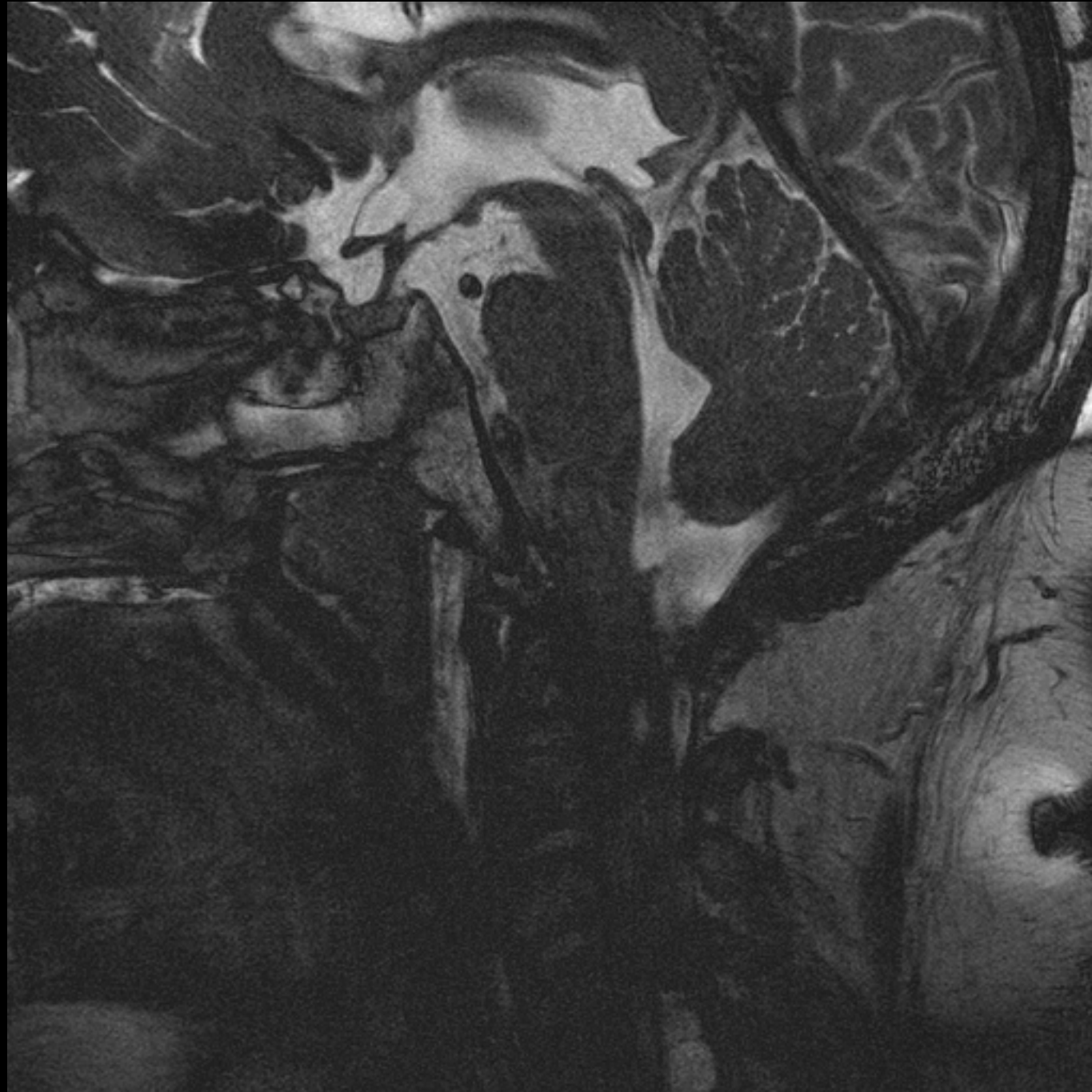
RFOV 80 %



16-Sep-2011

Phase Contrast CSF Flow

Index Case

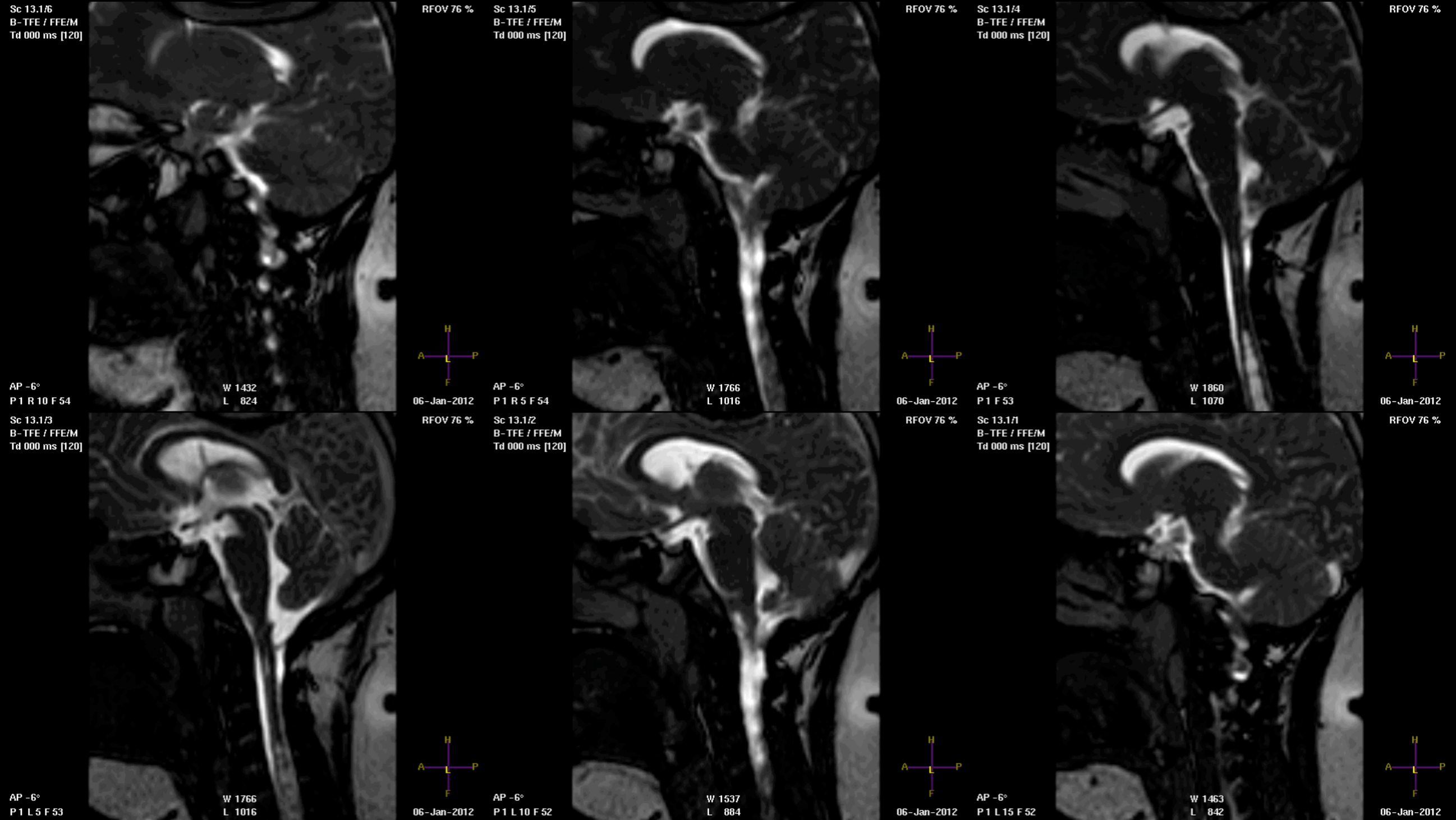


BFFE

BTFE Sequence

- Balanced Turbo Field Echo (Philips)
- Steady state free precession
- Cardiac gated with 12 partitions
- Single or multiple slice location
- T1 and T2 weighting
- High tissue fluid contrast
- Cardiac imaging
- Null artifacts

Index Case

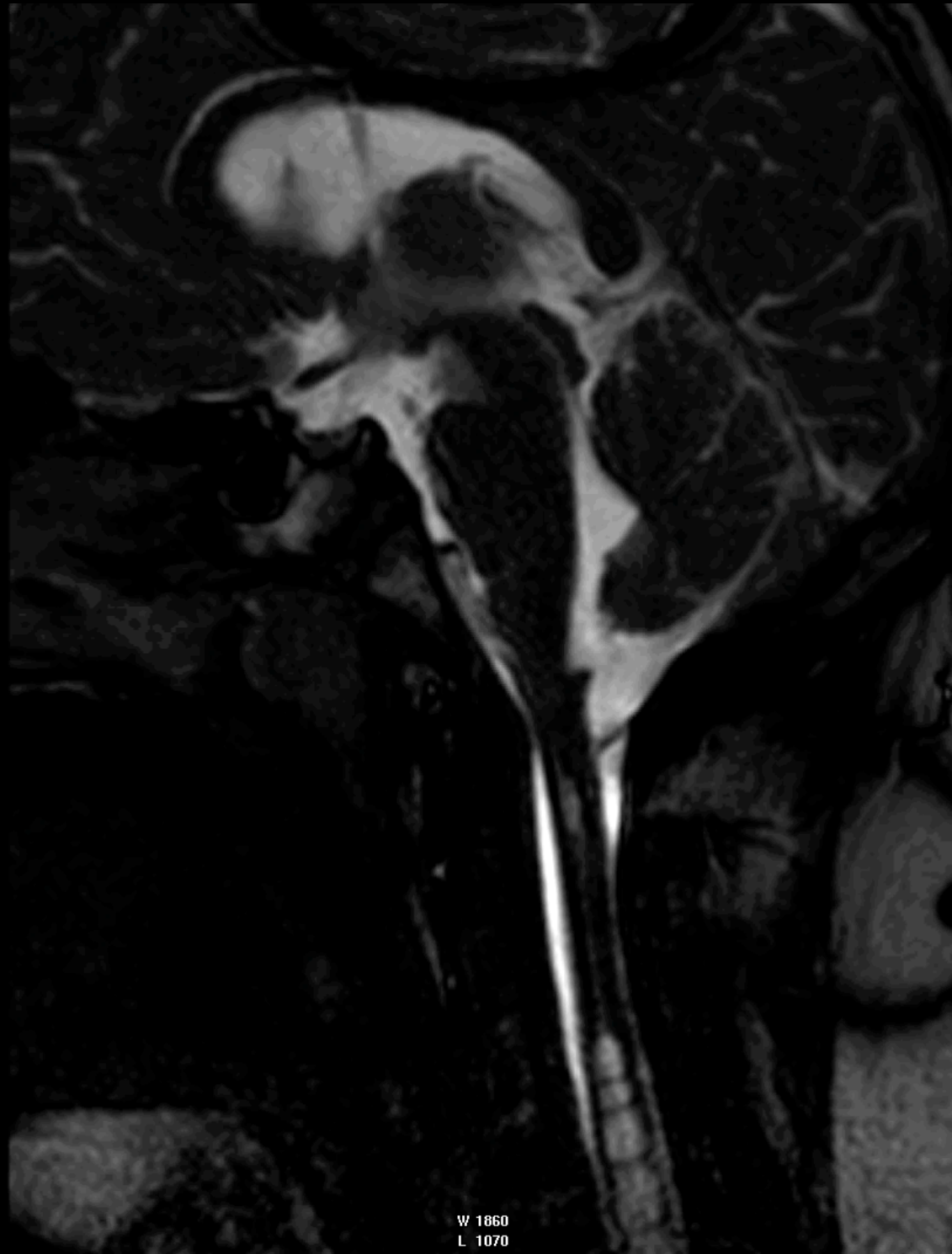


BTFE Cine 5mm, 6 slices, first attempt

Index Case

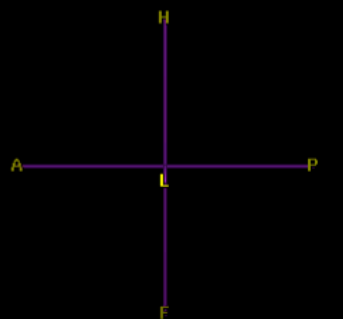
Sc 16.1/1
B-TFE / FFE/M
Td 000 ms [12]

RFOV 76 %



AP -6°
P1 L2 F53

W 1860
L 1070



06-Jan-2012

BTfE Cine 5mm, one slice, second attempt

Index Case Post-Op



3-2012



7-2012

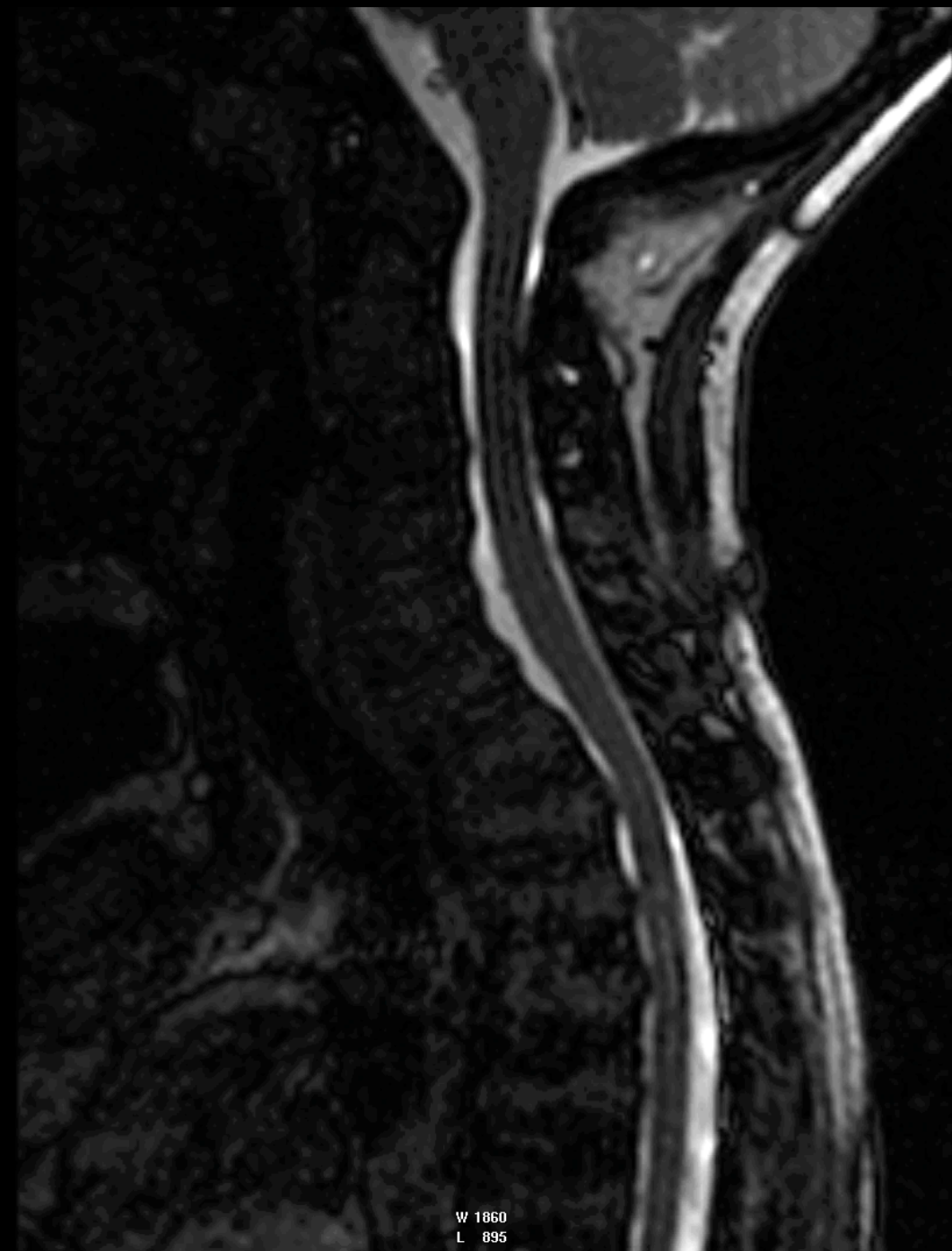


2013

MPS with Spinal Stenosis



T2



BTFE Cine 2mm

Chiari I



T1

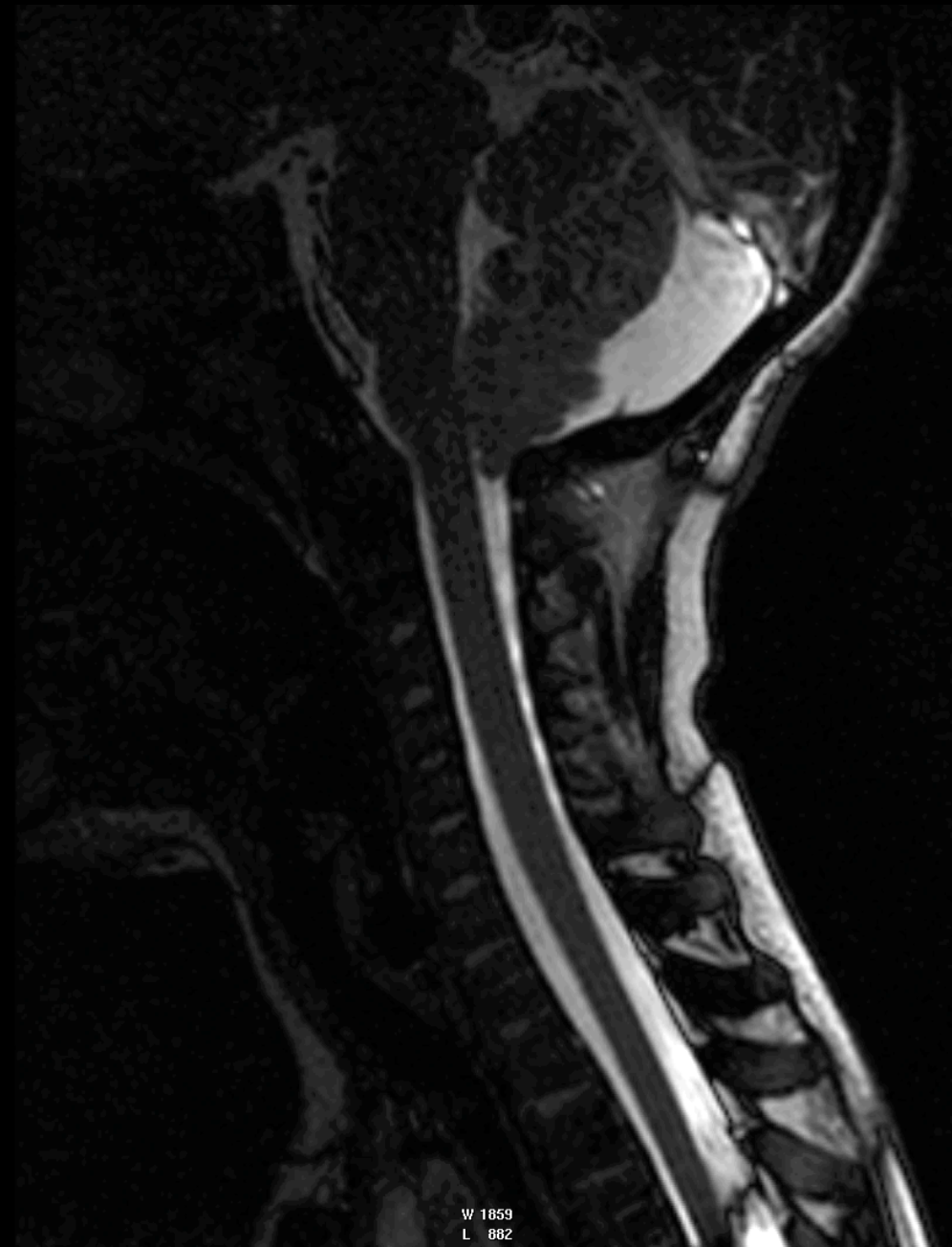


Phase Contrast CSF Flow

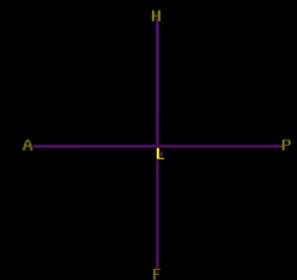
Chiari I

Sc 7.1/1
B-TFE / FFE/M
Td 000 ms [12]

RFOV 76 %



AP -4°
FH -2°
A 8 R 7 H 43



26-Jul-2012

BTfE Cine

Chiari I

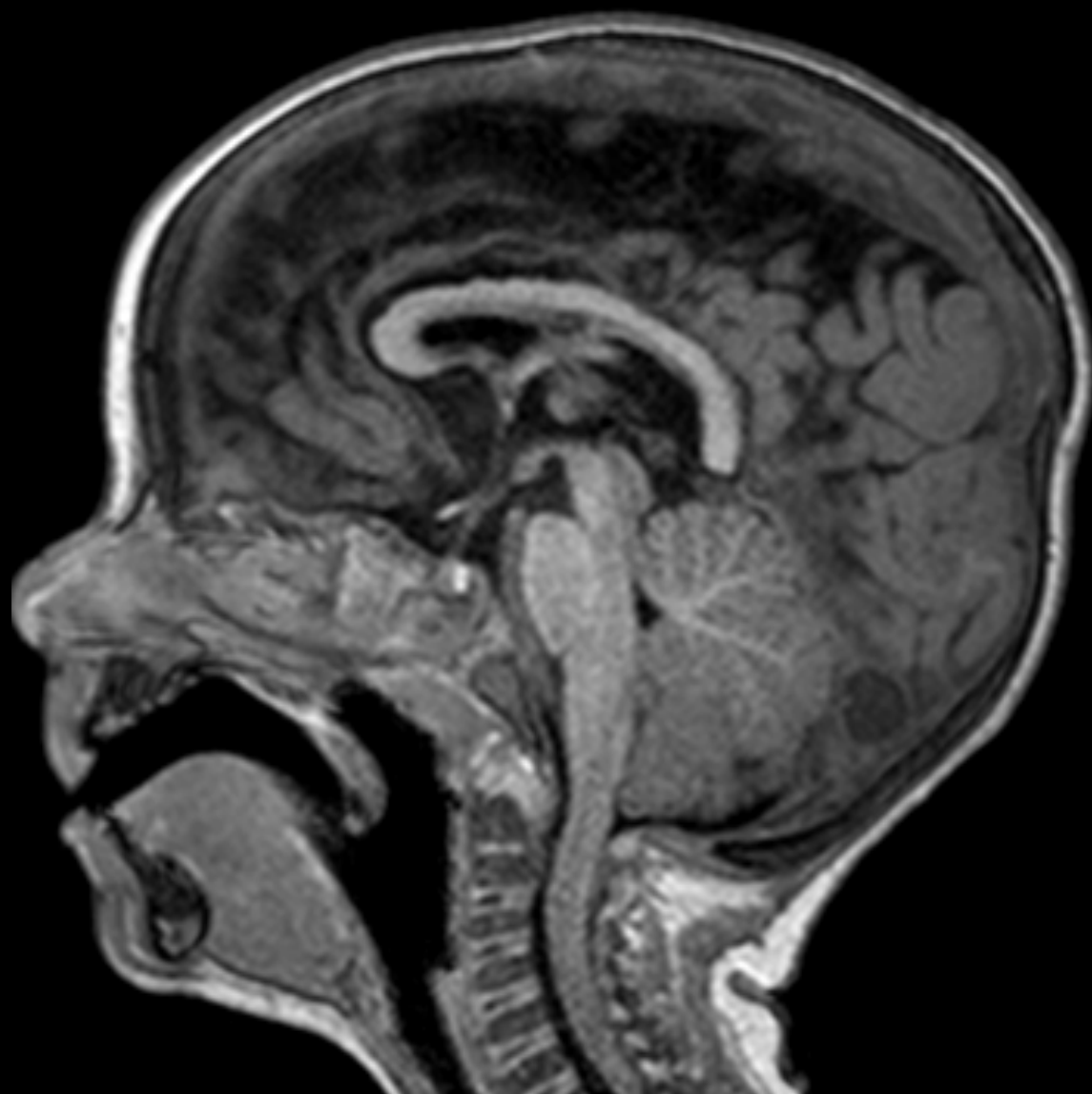


T1

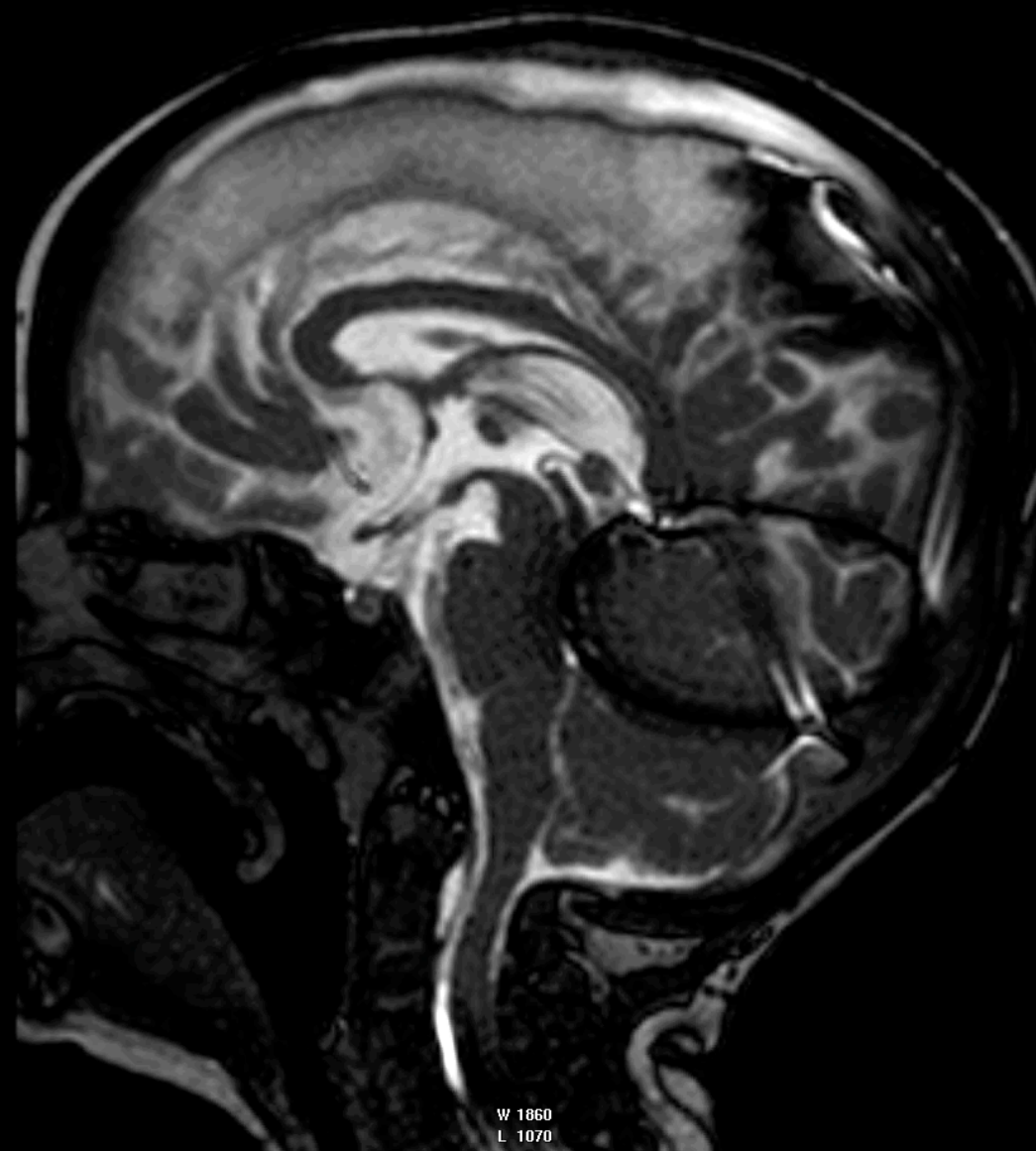


BTFE Cine

Null Point Flow



T1

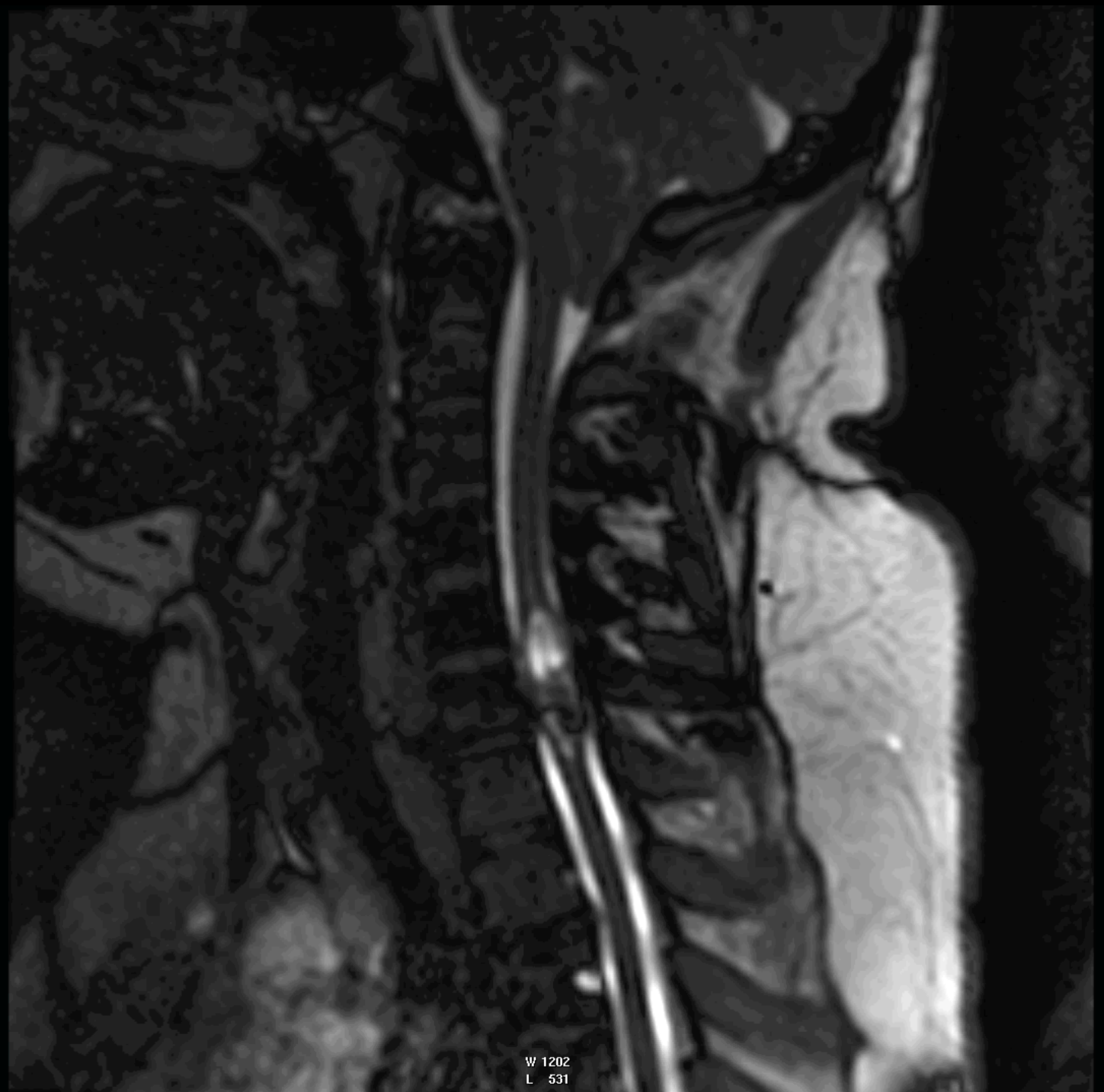


BTFE Cine

Chiari I with Focal Syrinx

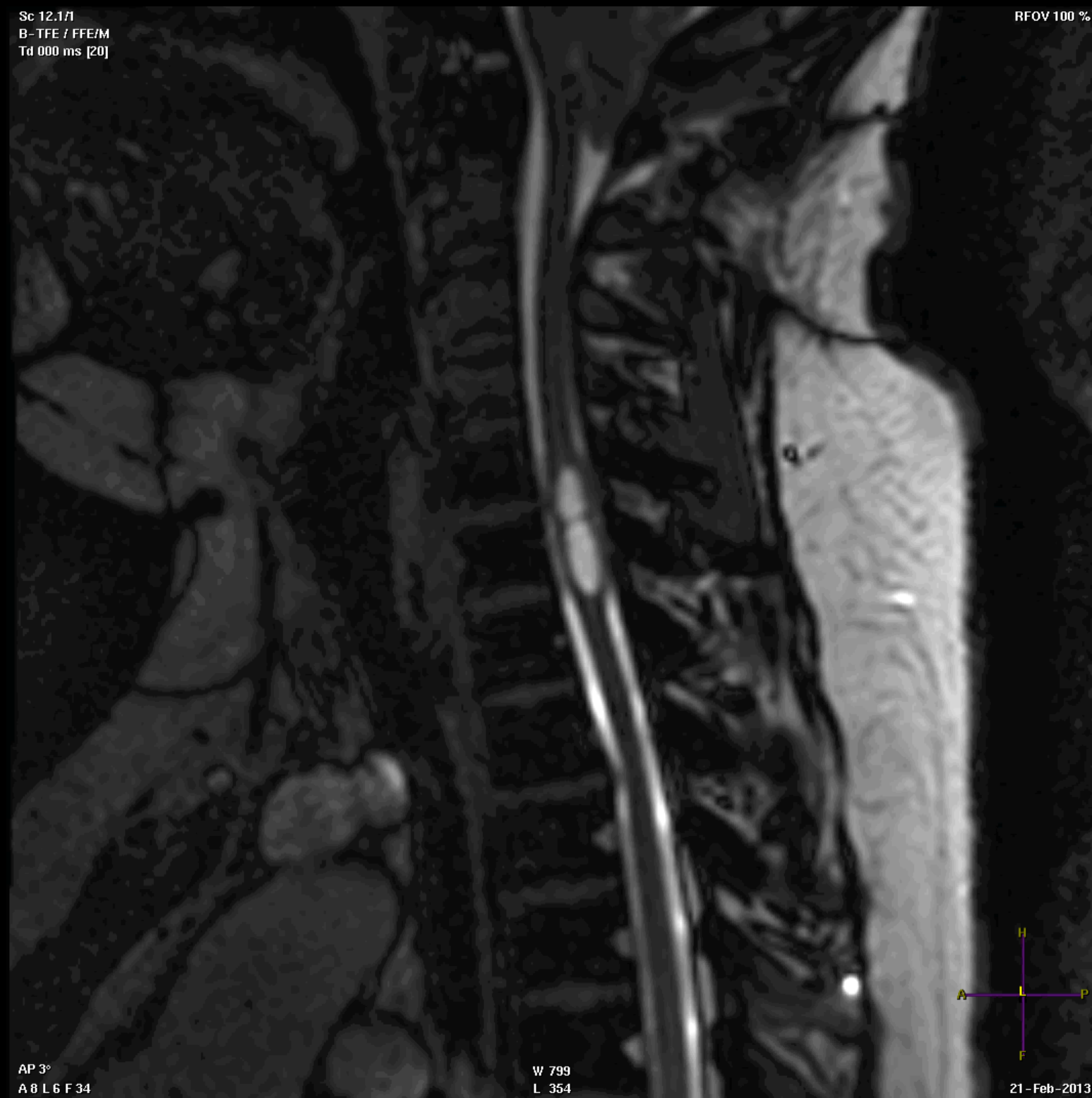


T2



BTFFE Cine

Chiari I with Focal Syrinx



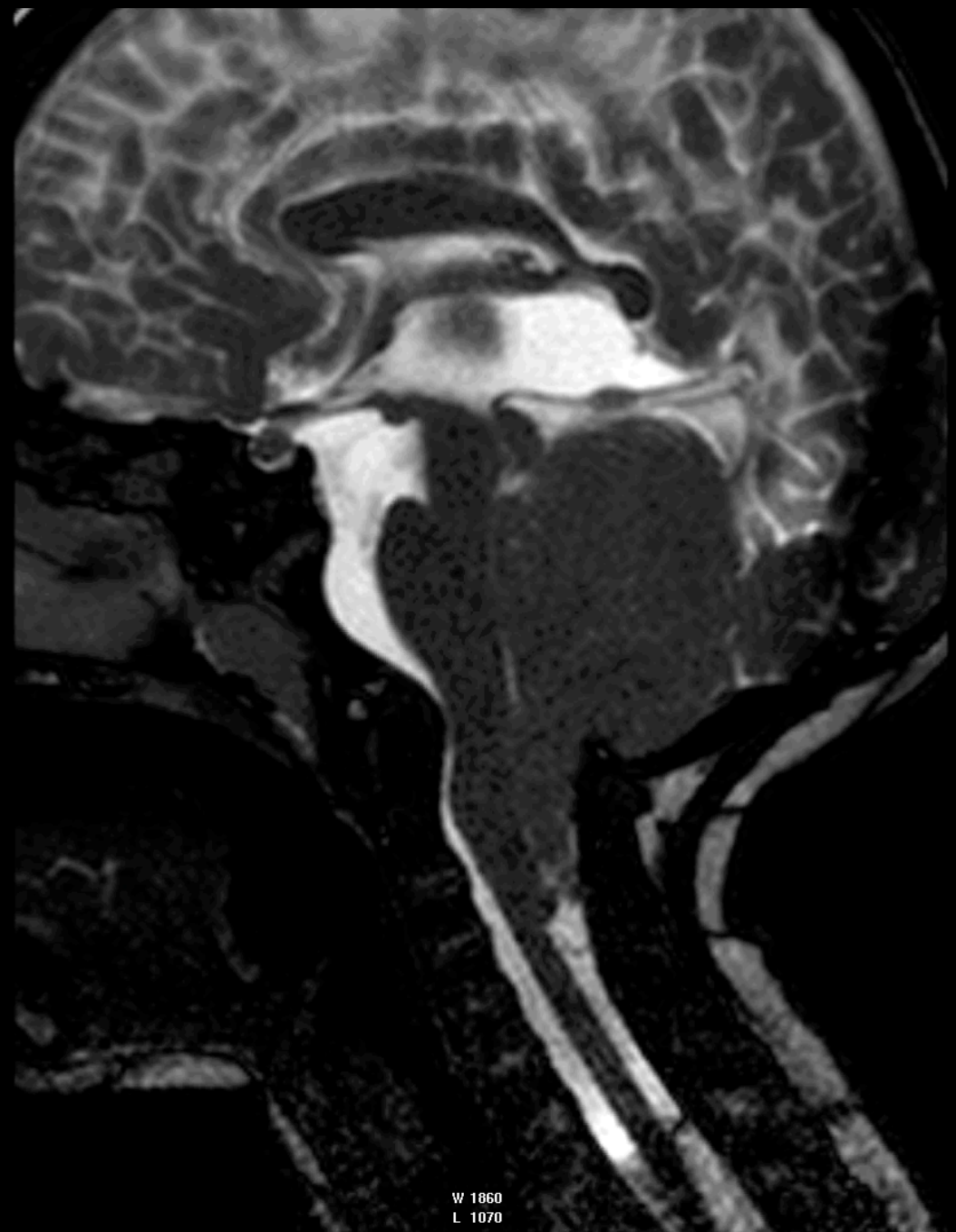
BTfFE Cine

Chiari II



AP -4°
A11 L2 F 41

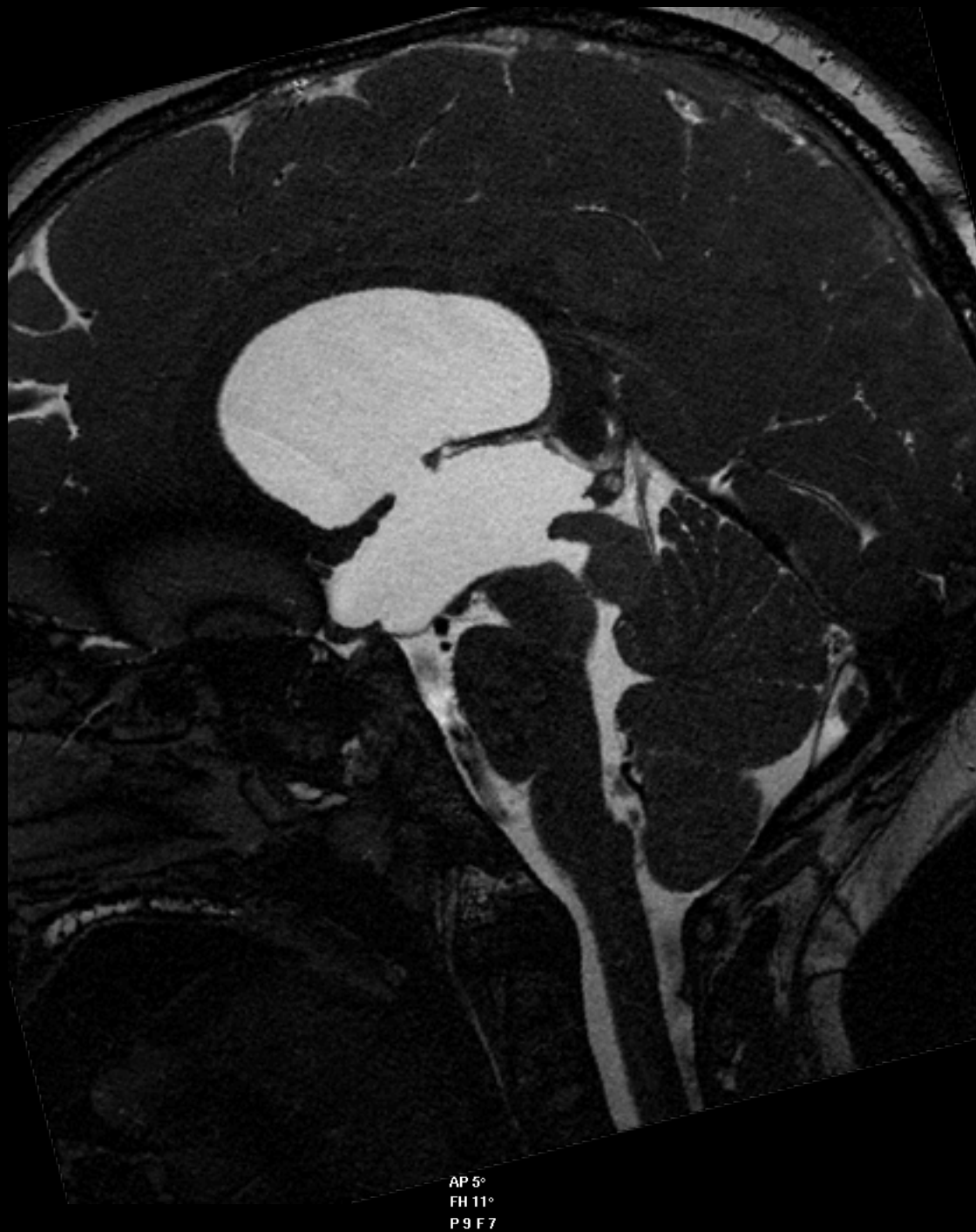
T1



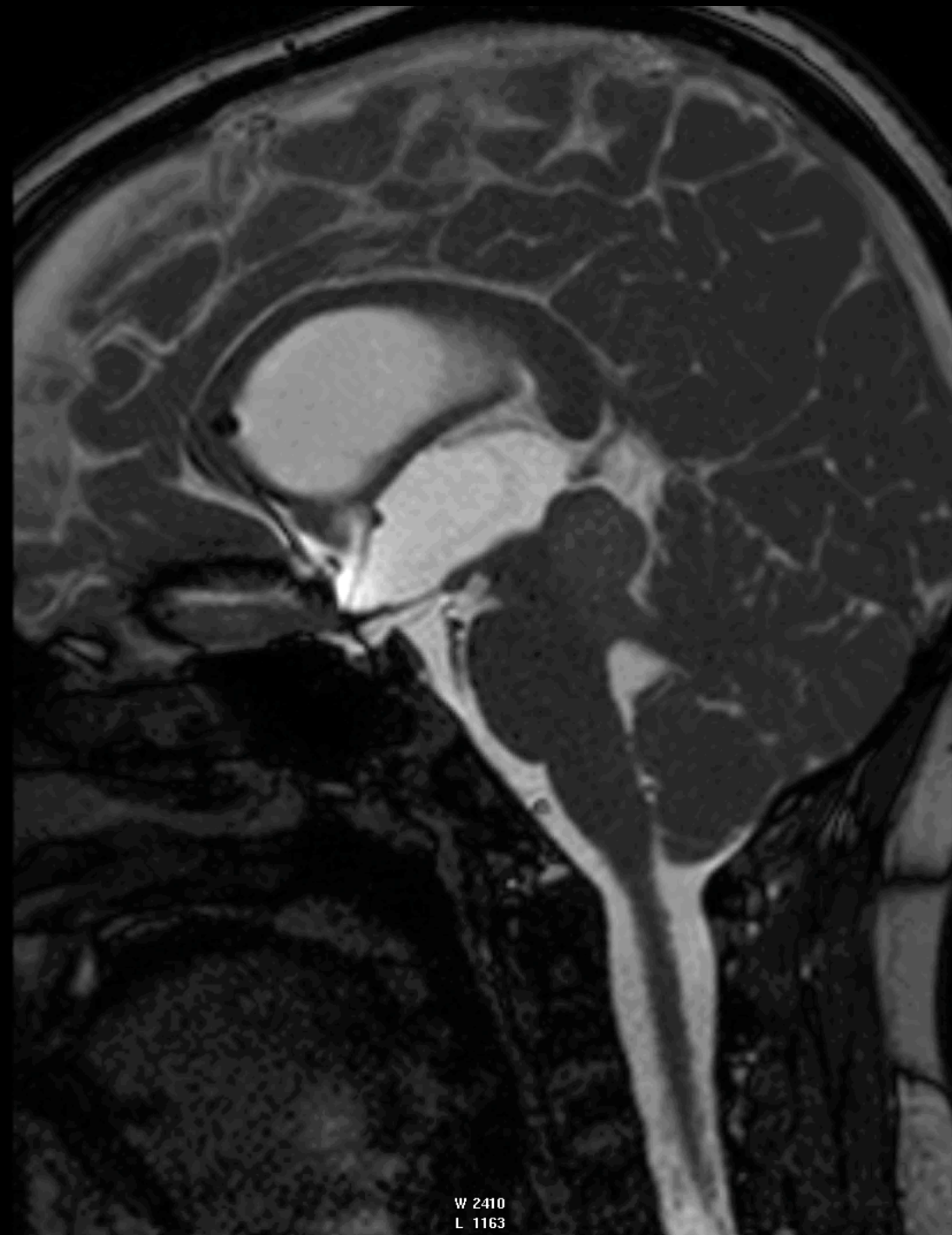
W 1860
L 1070

BTFE Cine

Tectal Glioma with Fenestration

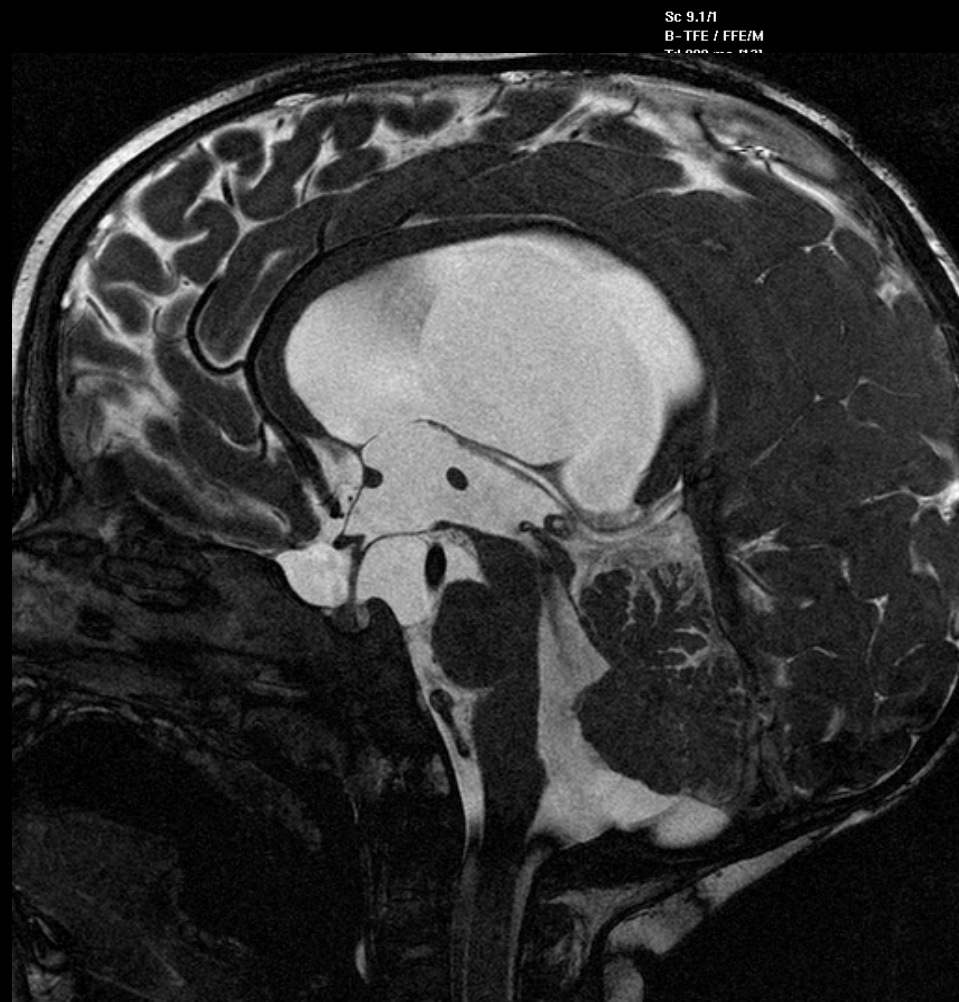


BFFE



BTFE Cine

Aqueductal Jet

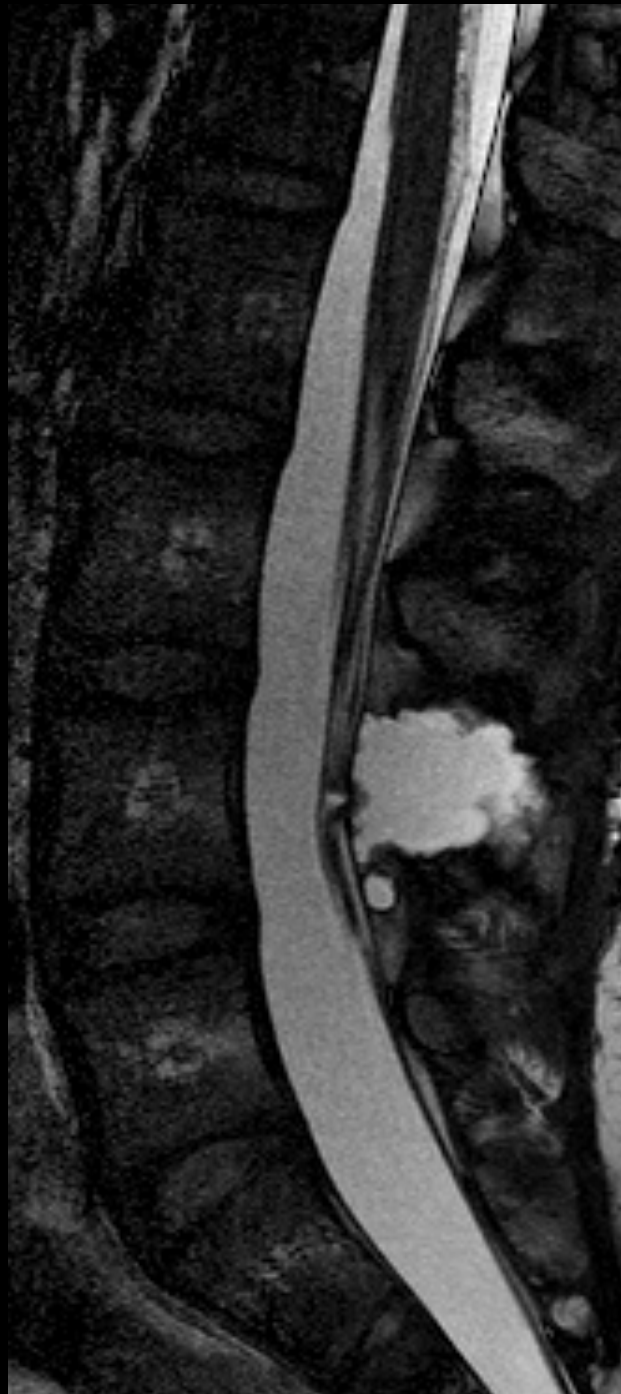


BFFE

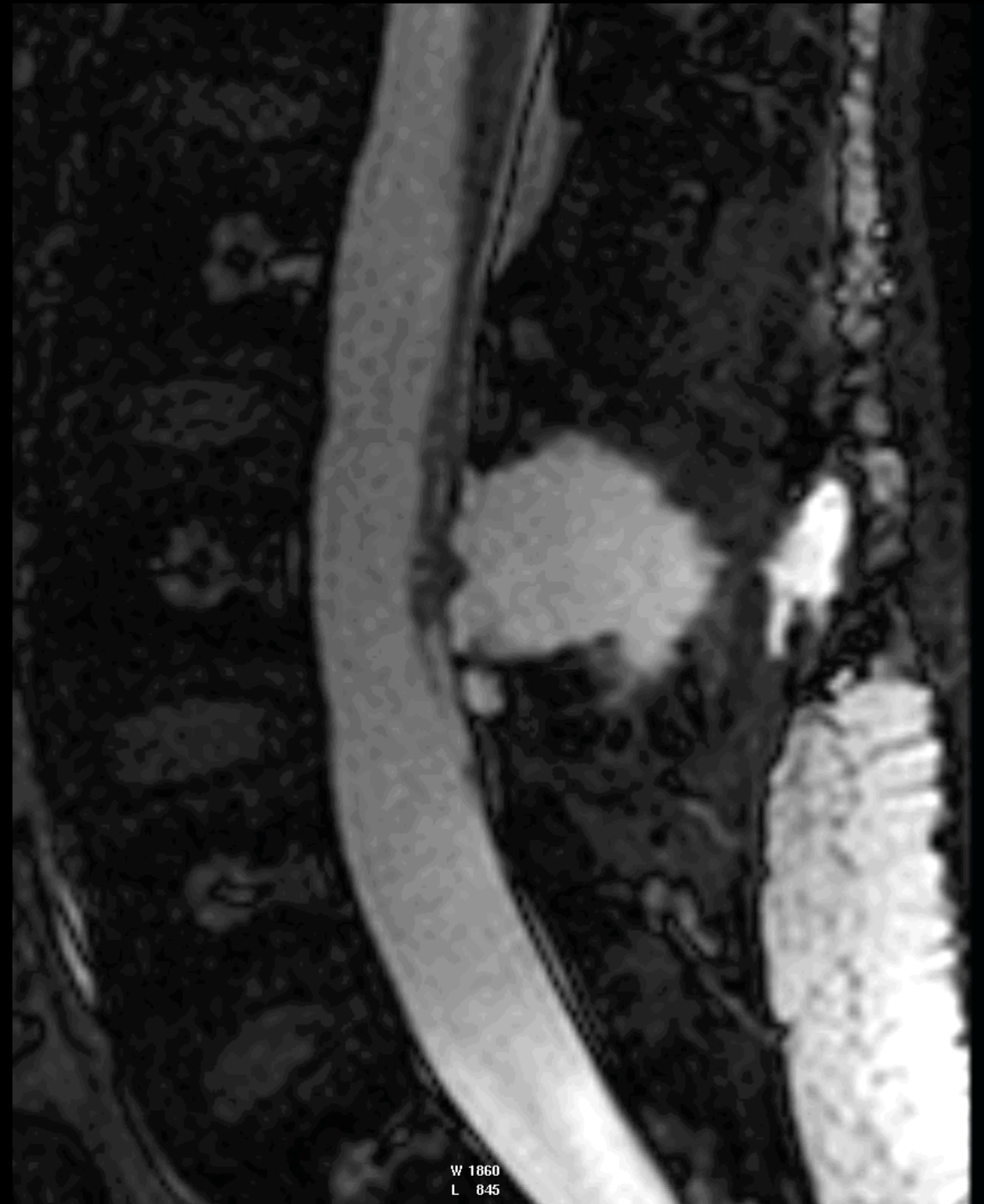


BTFE Cine

Herniated Nerve Root



BFFE



BTFE Cine

Acknowledgement

Taylor Chung, MD

and

Children's Hospital and Research Center at Oakland

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Pacific Coast Pediatric Radiology Association

Society for Pediatric Radiology

End