



Learning From Mistakes-Ultrasound

Case presented by
Ajay Taranath
Women's and Children's Hospital
Adelaide, Australia

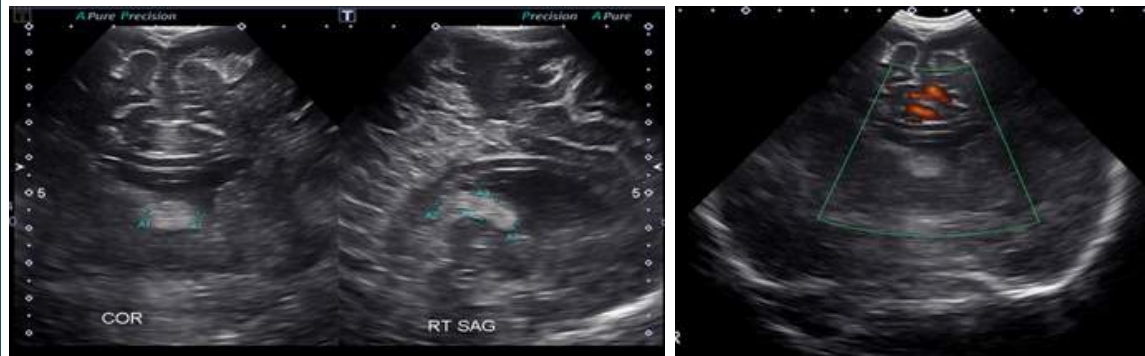
6-MONTH-OLD MALE

Ultrasound at an external imaging centre showed a third ventricular mass.



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WHAT ARE THE DIFFERENTIAL DIAGNOSIS?

- a. Intraventricular hemorrhage
- b. Choroid plexus mass lesion
- c. Artifact of image acquisition.

DIAGNOSIS

ARTIFACT OF IMAGE ACQUISITION - REFRACTION ARTIFACT



Government of South Australia
Children, Youth and Women's Health Service



Women's & Children's Hospital



SOUTH AUSTRALIA
MEDICAL
IMAGING



THE UNIVERSITY
of ADELAIDE

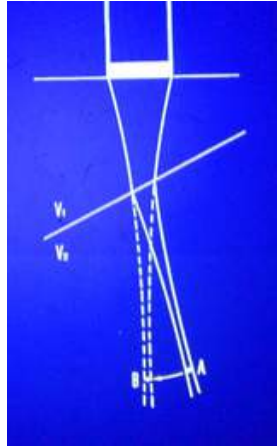


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REFRACTION ARTIFACT

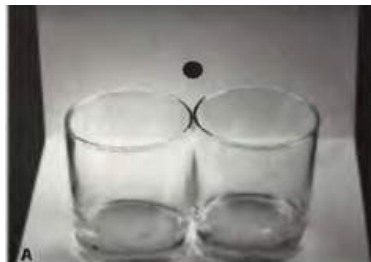
Image courtesy Mr Roger
Gent Chief Sonographer
WCH
Clinical sonography A
Practical guide 4th Ed
Sanders R, Winter T



- Bending of ultrasound beam when it passes through an interface between tissues with different speeds of sound , when the angle of approach to the interface is not perpendicular.
- Degree and direction of refraction depends on speed of sound in tissues (V_1 and V_2 in figure).
- Echoes arising from the refracted part of the beam pass back to the transducer along the refracted path but are assumed to have arisen from the original beam path (dotted lines in figure).
- In the body it is seen where there is non uniformity of tissues i.e. Muscle-fat, muscle-cartilage interface. There is defocusing (distortion) of ultrasound beam resulting in loss.

OPTICAL EQUIVALENT OF REFRACTION ARTIFACT AND AVOIDANCE / MINIMIZATION

Clinical sonography A
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Single dot on cardboard behind drinking glasses



Two dots seen when looking through the glasses



Moving to one side avoids the effect

REFRACTION ARTIFACT - AVOIDANCE / MINIMIZATION



- Coronal views of the neonatal brain through the anterior fontanelle reveals refraction in the interhemispheric fissure resulting in distortion of midline structures.
- Refraction in the interhemispheric fissure may be avoided by shifting the transducer to one side i.e into the coronal suture and angling medially.
- This way the non uniformity of the tissues is avoided.

6-MONTH-OLD MALE

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NORMAL MRI

