Direct Sagittal Body CT in Neonates

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Sagittal plane scanning is particularly suitable for anatomical display of structures located in the midline or lying along the longitudinal axis of the body. This is exemplified by the application of cranial ultrasonography in studying the ventricular system and related structures in the neonate, or magnetic resonance imaging (MRI) in studying the pineal gland and the spine. It is envisaged that MRI will eventually take care of most, if not all, sagittal imaging in view of its non-ionizing irradiation nature, high contrast resolution and flexibility of multiplanar imaging.

However, computed tomography (CT) has its merits of ready accessibility and very fast scanning capability. This is especially applicable to structures that may shift in position with respiration in the neonates who breathe fast and will not cooperate with breath-holding. The modern CT scanner with a large gantry can accommodate the small body of the neonate positioned with his long axis lying along the plane of the equipment gantry for direct sagittal imaging. In this aspect, the ultrafast scanner obviously has its pros of a larger gantry and much faster scanning, but the conventional CT scanners normally suffice. Thin direct sagittal CT sections are obtained with appropriate field of view focussed over the region of interest. The required number of slices and the thickness of section depend on the structures under investigation. For studies on structures outside the pelvis, the baby's body can often be slightly bent to exclude the genital organs from the scanning planes. The resolution of direct sagittal scanning is much better than sagittal reformation from a set of axial scans. The lecture reviews our experience with imaging-surgical correlation over a period of ten years, for direct sagittal CT using a General Electric 9800 Quick system.

Direct sagittal CT is useful in studying the major airways and the air-filled esophagus. In esophageal atresia, the technique consistently demonstrates the extent of the patent esophageal segments by its air contrast, the location and length of the atretic portion, and for the detection of tracheo-esophageal fistula. It visualizes the H-type tracheo-esophageal fistula without the need to administer positive contrast. It is a good preoperative evaluation of cases of esophageal atresia, with morphologic depiction of the abnormality, and assessment of the length of the atretic segment for decision on the feasibility and timing of primary anastomosis. The technique has also been used to demonstrate other pathologies like lingual thyroid, laryngeal cyst, subglottic hemangioma and tracheal stenosis.

Anorectal anomalies have been studied by direct sagittal CT. The presence of air in the anorectum permits ready identification of the level of imperforate anus. It has reasonably high sensitivity in dividing the cases into high, intermediate or low types of atresia. Detection of fistula is less sensitive, but there is high specificity.

The method is also useful in the assessment of the longitudinal extent of midline masses. Examples include the imaging of dermoid cyst, encephalocele or meningocele. Demonstration of the degree of intrapelvic encroachment and its relation to intrapelvic organs in sacrococcygeal teratoma is a finding with profound prognostic significance, and is readily assessed by a few direct sagittal scans.

In conclusion, direct sagittal CT is a very useful investigation for the evaluation of specific disorders in the neonate.

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