



PEDIATRIC SURGERY Update 8

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Subdural Hematoma

Subdural hematoma (SDH) is a type of traumatic brain injury where blood collect within the dura layer of the brain. Subdural bleeding usually results from tears in veins that cross the subdural space. Subdural hematoma requiring surgery in children is unusual. The incidence of SDH in infants is between 12-25 cases per 100,000 children and most detected SDH are due to physical abuse. Radiographically, these are easily distinguishable from a lens shaped[®] epidural hematoma. Epidural hematoma is more likely to be accidental. The small unilateral SDH seen with diffuse head injury can be observed. Isolated SDH associated with neurologic deficit or progressive loss of consciousness will need surgical evacuation. Almost 60% of these are associated with a skull fracture. Chronic SDH are encountered in children that have been abused. SDH in the infant has a different pattern from that seen in the older child and adult. It is usually a widespread, bilateral, thin film, unlike the thick, space-occupying and often unilateral clot seen in older children and adults after trauma. Healing of SDH is by formation of a granulating membrane which may confer vulnerability to rebleeding, either spontaneously or after an otherwise innocuous event. SDH has a particular significance as one of the features of the triad (together with retinal hemorrhage and encephalopathy) associated with non-accidental injury (physical child abuse).

References:

- 1- Swift DM, McBride L: Chronic subdural hematoma in children. *Neurosurg Clin N Am.* 11(3):439-46, 2000
- 2- Jayawant S, Parr J: Outcome following subdural haemorrhages in infancy. *Arch Dis Child.* 92(4):343-7, 2007
- 3- Case ME: Inflicted traumatic brain injury in infants and young children. *Brain Pathol.* 18(4):571-82, 2008
- 4- Case ME: Accidental traumatic head injury in infants and young children. *Brain Pathol.* 18(4):583-9, 2008
- 5- Squier W, Mack J: The neuropathology of infant subdural haemorrhage. *Forensic Sci Int.* 187(1-3):6-13, 2009

Subglottic Stenosis

Subglottic stenosis refers to stenosis of the airway inside the cricoid ring. Subglottic stenosis (SGS) can be congenital or acquired. In either case the child will develop an inspiratory and expiratory (biphasic) stridor. Subglottic stenosis will also have a barking cough and can manifest during a viral illness. The congenital variety of subglottic stenosis is very rare and consists of a soft tissue thickening of the subglottic area, occasionally involving the true vocal cords. Minimal laryngeal inflammation precipitates airway obstruction because the cricoid cartilage is nondistensible. With time as

laryngeal growth occurs, the congenital stenosis improves needing surgery less common. The acquired variety of SGS in infants is usually the result of prolonged endotracheal intubation during the neonatal period due to hyaline membranes disease or after surgical procedures. More than the duration of intubation is the continuous movement of the tube from inadequate fixation that produces the chronic inflammation needed for the stenosis to develop. With better neonatal airway care the incidence of acquired subglottic stenosis has significantly decreased. Severe airway obstruction will need tracheostomy followed by laryngotracheal reconstruction. Anterior or multiple cricoid splitting with cartilage graft interpositioning is usually performed. The success rates for these procedures have been shown to be approximately 90%.

References:

- 1- Schroeder JW Jr, Holinger LD: Congenital laryngeal stenosis. *Otolaryngol Clin North Am.* 41(5):865-75, 2008
- 2- Walner DL, Loewen MS, Kimura RE: Neonatal subglottic stenosis--incidence and trends. *Laryngoscope.* 111(1):48-51, 2001
- 3- Sichel JY, Dangoor E, Eliashar R, Halperin D: Management of congenital laryngeal malformations. *Am J Otolaryngol.* 21(1):22-30, 2000
- 4- Cotton RT: Management of subglottic stenosis. *Otolaryngol Clin North Am.* 33(1):111-30, 2000
- 5- Fraga JC, Schopf L, Forte V: Thyroid alar cartilage laryngotracheal reconstruction for severe pediatric subglottic stenosis. *J Pediatr Surg.* 36(8):1258-61, 2001
- 6- Hartnick CJ, Hartley BE, Lacy PD, Liu J, Willging JP, Myer CM 3rd, Cotton RT: Surgery for pediatric subglottic stenosis: disease-specific outcomes. *Ann Otol Rhinol Laryngol.* 110(12):1109-13, 2001

CHARGE Syndrome

CHARGE syndrome is a specific collection of non-randomly occurring congenital anomalies named for its six major clinical features. Patients of CHARGE syndrome may be presented to ophthalmologists due to ocular coloboma. The acronym CHARGE stands for the major features of this syndrome: Coloboma of the eye, Heart defects, Atresia of the choanae, Retarded growth and development, Genital hypoplasia, and Ear anomalies and/or deafness. CHARGE syndrome occurs in an estimated of one in 8,500 live births. Individuals with CHARGE syndrome who demonstrated a less extensive phenotype (less than three major criteria) were more likely to present with minor cardiovascular malformations, including small atrial or ventricular septal defects (VSD) or patent ductus arteriosus (PDA). Mutations in the CHD7 gene (member of the chromodomain helicase DNA protein family) are detected in more than 75% of patients with CHARGE syndrome. A significant cause of morbidity is severe feeding difficulty, including problems with chewing, swallowing, and gastroesophageal reflux, which are prevalent throughout childhood. Evaluation of associated defects and proper referral for timely management may be critical for patients with CHARGE syndrome.

References:

- 1- Hsueh KF, Yang CS, Lu JH, Hsu WM: Clinical characteristics of CHARGE syndrome. *J Chin Med Assoc.* 67(10):542-6, 2004
- 2- Issekutz KA, Graham JM Jr, Prasad C, Smith IM, Blake KD: An epidemiological analysis of CHARGE syndrome: preliminary results from a Canadian study. *Am J Med Genet A.* 133A(3):309-17, 2005

- 3- Blake KD, Prasad C: CHARGE syndrome. Orphanet J Rare Dis. 7;1:34, 2006
4- Pagon RA, Graham JM Jr, Zonana J, Yong SL: Coloboma, congenital heart disease, and choanal atresia with multiple anomalies: CHARGE association. J Pediatr. 99(2):223-7, 1981
5- Davenport SL, Hefner MA, Mitchell JA: The spectrum of clinical features in CHARGE syndrome. Clin Genet. 29(4):298-310, 1986
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