



PEDIATRIC SURGERY Update*

Vol. 53 No. 02 AUGUST 2019

Xanthogranulomas

Xanthogranulomas are rare benign nodules that usually arise in the subcutaneous tissue. When they appear in early infancy or childhood, they are called juvenile xanthogranulomas (JXG). Approximately 20% are present at birth and most arise in the first year of life. The anatomic predilection of appearance of juvenile xanthogranuloma in children occurs in the head and neck region, though appearance on the trunk, extremities and extracutaneous locations has also been reported. Skin lesions are self-limited and can vary in size; they can be solitary or multiple. In the eye, particularly the uveal tract, is the most frequent site of extracutaneous involvement. JXG are composed of collections of histiocytes, foamy cells and Touton giant cells. The diagnosis of JXG requires histologic analysis of a biopsy specimen or the nodule itself. JXG is a benign cutaneous fibrohistiocytic lesion with a type of granulomatous process. Clinically the lesion is papulonodular with a tan to orange color and several millimeters in size. Children with multiple skin lesions or younger than two years of age are at a greater risk for ocular involvement. Systemic JXG which involves the visceral organs is rare occurring in less than 5% of cases. Systemic JXG can appear in the lung, heart, gastrointestinal tract, CNS, adrenal gland, pituitary gland, bones or kidney. There is a sex male predilection for JXG. Spontaneous regression of the cutaneous lesion is frequent. Differential diagnosis includes spitz nevi, mastocytomas, and dermatofibromas. Should the cutaneous nodule keep growing or cause functional impairment it should be removed surgically. Removal must be complete to avoid recurrence of the lesion. JXG generally carries a good prognosis. Congenital giant JXG is a rare subtype most commonly affecting newborn females.

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Cinematic Rendering

Detailed surgical anatomy provided by today imaging technology is essential in planning preoperative surgical decisions, surgical approach and ultimate management of many conditions. Virtual 3-dimensional (3-D) reconstruction techniques have been developed to help surgeons have a more detailed situation of the anatomy of the disease. Two types of 3-D rendering techniques are commonly utilized to visualize volumetric 3-D data: surface shade display and volume rendering. These techniques provide a global overview of volumetric data along with detailed anatomical and pathological information which is usually more difficult to discern in conventional 2-D images. In 2016 a new technique of 3-D visualization of cross-sectional image data called cinematic rendering (CR) was developed. Cinematic rendering is a physically based volume-rendering method that works with random sampling computational algorithms. Multiple light maps and transfer function are used to generate a realistic depiction of medical imaging data. This computer animation program was first used by the entertainment industry. Data is retrieved from either conventional CT or MRI scans to produce the cinematic rendering images. CR helps to transfer complex surgical anatomical information to physicians. CR visualization improves the correctness of image interpretation. Moreover, CR enables the display of CT image data in a colored fashion. Also, a 3-D printed anatomical model can be reconstructed before the surgical procedure enabling the surgeon to study the precise anatomic relationship of the tumor with its vascular supply, an integral part of a surgical resection. Resident surgeons benefit more than attending surgeons when using CR imaging as it enhances anatomic education. CR imaging speeds up and improves the understanding of complex anatomical situations compared with conventional CT Scanning in the chest, abdomen and pelvis.

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ERAS

Enhanced recovery after anesthesia (ERAS) is a recently developed program of standardization of perioperative care driven by clinical pathways impacting both surgical outcomes and efficiency of care in high-volume centers. ERAS pathways have been shown to reduce length of stay, reduce complication rates, reduce providers communication errors

and improve patient satisfaction in some adults' surgical procedures such as colorectal surgery. Few studies have investigated the applicability of this paradigm to pediatric populations. The ERAS society initially developed in Europe organized the protocol into three contexts of care, namely preoperative, intraoperative and postoperative. This include a multidisciplinary team approach encompassing patient education, increased preop volume loading, optimize nutrition, appropriated antibiotic prophylaxis, short-acting anesthetics, maintenance of normothermia, minimally invasive surgical techniques, avoiding drains, using epidural for chest procedures, minimizing opioids analgesics, limiting intra- and postop fluid resuscitation, early removal of drains and catheters, prevention of nausea and vomiting, early oral nutrition, early postop mobility and reporting outcomes. ERAS programs in adults have reduced length of stay by one to two days without increasing readmission rates, decrease postop complications by 30% and shortened return of bowel function by one day. ERAS protocols offer an easy way to improve the cost of care. ERAS protocol applied to the appropriate pediatric surgical populations may be associated with decreased length of stay, decreased narcotic use, and no detectable increase in complications. Pediatric studies using ERAS have demonstrated less intervention than the 20 components suggested for adults. These few pediatric studies have demonstrated that ERAS implementation reduces length of stay by one day with no increase in complications or readmissions, less use of IV fluid in the operating room, less narcotic during hospitalization with early tolerance of feedings. Shorter stay becomes a patient safety benefit as errors and nosocomial infections are reduced upon early discharge. ERAS protocol is well accepted by patients and families. Recent poll demonstrated that pediatric surgeons are already executing several individual ERAS interventions outside of an official protocol.

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*** *PSU 1993-2019***

ISSN 1089-7739