PEDIATRIC SURGERY *Update**
Vol. 55 No. 06 DECEMBER 2020

Leydig Cell Tumor

Testicular sex-cord-stromal tumors are very rare in children developing from non-germinative tissue with different clinical and biologic behavior. They account for 8% of all testicular neoplasm in children occurring within months of birth or during puberty. The main histological types include Leydig cell tumor, Sertoli cell tumors, juvenile granulosa cell tumor and undifferentiated cell tumor. Leydig cell tumor (LCT) is the most common testicular sex cord-stromal tumor, appears between five and 10 years of age (prepubertal), is benign in most children (90%), and bilateral in 10% of cases. Leydig cells are normally present as single cells or small clusters in the interstitium between the seminiferous tubules. They are involved in development of secondary male characteristics and maintenance of spermatogenesis as they produce testosterone when stimulated by LH. Hormonal activity is observed in 20% of LCT cases characterized by symptoms of precocious pseudopuberty due to androgenic hormone production along with gynecomastia in a few cases. LCT is a steroid secreting tumor mainly producing androgens (testosterone, androstenedione, dehydroepiandrosterone, 17 alpha-hydroxyprogesterone), but they can produce estrogens. Precocious puberty is the primary presenting feature of LCT including pubic hair, penile growth, scrotal hyper pigmentation, changes in body odor and advanced bone age. Children may have unilateral or bilateral testicular enlargement or a painless palpable mass in the testis. Scrotal ultrasound may reveal an avascular, hyperechoic discrete lesion. This can be followed with an MRI to avoid irradiating the scrotum. Children with suspected LCT should undergo measurement of alpha-fetoprotein, HCG, testosterone, FSH, LH and prolactin. The definite diagnosis is established by excisional biopsy. This is approach through an inguinal incision delivering the testis and cord into the wound area. The spermatic cord should be atraumatically occluded during dissection and removal of the tumor from the testis parenchyma (enucleation). Frozen-section can clarify the benign nature of the tumor, intraoperative ultrasound that surgical borders are tumor-free, hence vascular occlusion is terminated and orchiopexy is performed. Positive surgical margins after enucleation can be managed with observation and hormone determination obviating completion orchiectomy. Large size tumors (> 5 cm), infiltrative margins, areas of hemorrhage and necrosis extending beyond the testicular parenchyma, nuclear atypia, high mitotic count and angiolymphatic invasion suggest the very rare malignant variant of LCT. For malignant LCT inguinal orchiectomy with retroperitoneal lymphadenectomy is required as metastasis commonly involve retroperitoneal nodes and survival is reduced to three years after surgery. Chemotherapy has limited efficacy in malignant LCT, while there is no role for radiotherapy. Signs of precocious pseudopuberty or gynecomastia regress following tumor removal. Leydig cell hyperplasia, though very rare, presents identical to LCT and is

managed with the same protocol. Central precocious puberty arises from the rebound secretion of LH after surgical removal of LCT and long-term endocrinology evaluation is warranted.

References:
1- Cechetto G, Alaggio R, Bisogno G, et al: Sex cord-stromal tumors of the testis in children. A clinicopathologic report from the Italian TREP project. J Pediatr Surg 45: 1868-1873, 2010
2- Mennie N, King SK, Marulaiah M, Ferguson P, Heloury Y, Kimber C: Leydig cell hyperplasia in children: Case series and review. J Pediatr Urol. 13(2):158-163, 2017
3- Emre S, Ozcan R, Elicevik M, et al: Testis sparing surgery for Leydig cell pathologies in children. J Pediatr Urology 13: 51.e1-51.e4, 2017
4- Mukhopadhyay M, Das C, Sarkar S, Mukhopadhyay B, Mukhopadhyay B, Patra R: Leydig Cell Tumor of Testis in a Child: An Uncommon Presentation. J Indian Assoc Pediatr Surg. 22(3):181-183, 2017
5- Zu'bi F, Koyle MA, Rickard M, et al: Testis-sparing Surgery for Pediatric Leydig Cell Tumors: Evidence of Favorable Outcomes Irrespective of Surgical Margins. Urology. 134:203-208, 2019
6- Luckie TM, Danzig M, Zhou S, et al: A Multicenter Retrospective Review of Pediatric Leydig Cell Tumor of the Testis. J Pediatr Hematol Oncol. 41(1):74-76, 2019
7- Alagha E, Kafi SE, Shazly MA, Al-Agha A: Precocious Puberty Associated with Testicular Hormone-secreting Leydig Cell Tumor. Cureus. 11(12):e6441, 2019

Persistent Cloaca: Newborn Management

When a female child is born with a single perineal orifice usually located where the urethra is normally seen the diagnosis is persistent cloaca. The bladder, vagina and rectum are connected to this single perineal channel. Cloaca represents a spectrum of defects. Two-third has a common channel less than 3 cm with a low incidence of associated malformations, while one-third have common channels larger than 3 cm with a higher incidence of defects. During the first 24 hours of life the neonate would receive intravenous fluids, antibiotics and nasogastric decompression and be evaluated for associated defects including cardiac malformations, esophageal atresia and renal anomalies. A totally diverting descending colostomy should be constructed early in life to avoid urogenital infections. Before the colostomy construction a child with cloaca must undergo the following studies: Simple abdominal films looking for duodenal atresia or vertebral anomalies, Abdominal and pelvic US in search of kidney anomalies (hydronephrosis) or hydrocolpus, echocardiogram for cardiac anomalies, spinal ultrasound and x-rays for tethered cord syndrome and sacral anomalies. Missed tethered cord have a negative implication for bowel, bladder and ambulatory function. Hydrocolpus occur in over one-third of children with cloaca. Hydrocolpus compress the bladder trigone causing uretero-pelvic obstruction, bilateral megaureters and hydronephrosis. It can also cause pyocolpos. In either case the hydrocolpus should be drained concomitantly when performing the colostomy. This includes draining two hemi-vaginas if present through a window created in the septal wall. A pigtail catheter or Foley can be use. Before performing the main repair of the cloaca, the child should undergo radiological studies such as distal colostogram, common channel sinogram, MRI of the pelvis, along with endoscopic evaluation of the common channel to determine the distance from the skin to the first structure entrance (channel length). This will help determine if the rectum is reachable through a posterior sacral approach or a laparotomy/laparoscopy will be needed and if the distal bowel length will reach the

perineum after pull-through surgery. It will also determine the length of the common channel whether is 3 cm or less in length, to classify the cloaca as classic or complex (channel length of > 3 cm). The presence, size and location of the vagina should also be determined. Once the surgeon has a good idea of the anatomy of the type of cloaca, surgery is undertaken. It is advisable to do the main repair when the child is stable, growing well and developing normally usually between three and six months of age. Performing the definitive repair early in life allows for less time with a stoma, easier anal dilatation and the possibility that placing the rectum in the right location early can lead to improved acquired sensation.

References:

1- Pena A, Levitt MA, Hong A, Midulla P: Surgical Management of Cloacal Malformations: A Review of 339 Patients. J Pediatr Surg. 39(3): 470-479, 2004
2- Bischoff A: The surgical treatment of cloaca. Semin Pediatr Surg. 25: 102-107, 2016
3- Wood RJ, Levitt MA: Anorectal Malformations. Clin Colon Rectal Surg 31: 61-70, 2018
4- Specks KE, Arnold MA, Ivancic V, Teitelbaum DH: Operative Technique - Cloaca and hydrocolpos: laparoscopic-, cystoscopic- and colposcopic-assisted vaginostomy tube placement. J Pediatr Surg. 49: 1867-1869, 2014
5- Levitt MA, Bischoff A, Pena A: Pitfalls and challenges of cloaca repair: how to reduce the need for reoperations. J Pediatr Surg 46: 1250-1255, 2011
6- Kraus SJ: Radiologic diagnosis of a newborn with cloaca. Semin Pediatr Surg. 25: 76-81, 2016
7- Bischoff A, Levitt MA, Breech L, Louden E, Pena A: Hydrocolpos in cloacal malformations. J Pediatr Surg. 45: 1241-1245, 2010

Desmoid Tumors

Desmoid tumors (DT), also known as aggressive fibromatosis, are benign, locally aggressive tumors, arising from musculoaponeurotic elements, associated with a strong propensity for infiltrative growth and local recurrence. DT have no tendency to metastasize. There are two incidental peaks: ages 6 to 15 years and puberty to age 40 years. More than 50% of desmoids tumors develop within the first five years of life as an asymptomatic, firm, solid mass. DT can be found on the head and neck, upper or lower extremities, the abdomen or the trunk. The lower extremities are the most frequent sites of manifestation. DT occurs most commonly sporadically but is often associated with hereditary diseases like familial adenomatous polyposis (Gardner syndrome), familial infiltrative fibromatosis and hereditary dermoid disease. These syndromes are caused by germline mutations of the APC and/or B-catenin gene and mutational analysis of biopsy specimens should be performed. DT may occur at abdominal, intra-abdominal or extra-abdominal location. Abdominal desmoids arise primarily from the rectus and internal oblique muscles and their fascial covering, while intraabdominal tumors arise in the mesentery. Superficial lesions tend to be slow growing, small and rarely involve deep structures. Deep-seated DT tends to be faster growing, larger and involves deeper structures (extra-abdominal). Except fibromatosis colli that tends to regress spontaneously, infantile and extra-abdominal DT is best managed by gross total resection achieving negative margins unless tumor excision is either particularly dangerous or likely to result in significant physical handicap. Surgery provides the best opportunity for long-term event-free survival, though patients undergoing a period of active surveillance do not have an

event free survival significantly different from those undergoing surgery or systemic therapy. Radiation or chemotherapy is most often used with recurrent disease or as an alternative to mutilating surgery. Low dose chemotherapy using methotrexate/vinblastine or doxorubicin/dacarbazine therapy is appropriate for children with rapidly growing or unresectable tumors or symptomatic. Chemotherapy carries adverse effect such as second malignancy, fertility problems, cardiotoxicity and neuropathy. Adjuvant radiation therapy improves local control but is not recommended in skeletal immature children. Younger children have higher recurrence rates when managed with radiotherapy. It is believed they should be treated as low-grade malignancies with documentation of histologic margins and close clinical follow-up. Margin status is not a poor prognostic marker for local recurrence of DT. Other therapies include selective estrogen-receptor modulator, nonsteroidal anti-inflammatory drugs, interferon, tumor necrosis factor alpha and tyrosine kinase inhibitors. Clinical risk factors for poor prognosis in DT include younger age, tumor location (buttock), larger tumor size and proximity to important nerves/vasculature.

References:

1-Honeyman JN, Theilen TM, Knowles MA, et al: Desmoid fibromatosis in children and adolescents: a conservative approach to management. J Pediatr Surg. 48(1):62-6, 2013

2- Woltsche N, Gilg MM, Fraissler L, et al: Is wide resection obsolete for desmoid tumors in children and adolescents? Evaluation of histological margins, immunohistochemical markers, and review of literature. Pediatr Hematol Oncol. 32(1):60-9, 2015

3- Shkalim Zemer V, Toledano H, Kornreich L,et al: Sporadic desmoid tumors in the pediatric population: A single center experience and review of the literature. J Pediatr Surg. 52(10):1637-1641, 2017

4- Ning B, Jian N, Ma R: Clinical prognostic factors for pediatric extra-abdominal desmoid tumor: analyses of 66 patients at a single institution. World J Surg Oncol. 16(1):237, 2018

5- Paul A, Blouin MJ, Minard-Colin V, et al: Desmoid-type fibromatosis of the head and neck in children: A changing situation. Int J Pediatr Otorhinolaryngol. 123:33-37, 2019

6- Desmoid Tumor Working Group. The management of desmoid tumours: A joint global consensus-based guideline approach for adult and paediatric patients. Eur J Cancer. 127:96-107, 2020

***Edited by: Humberto Lugo-Vicente, MD, FACS, FAAP**

Professor of Pediatric Surgery, UPR - School of Medicine, UCC School of Medicine & Ponce School of Medicine.

Director - Pediatric Surgery, San Jorge Children's & Woman Hospital.

Postal Address: P.O. Box 10426, San Juan, Puerto Rico USA 00922-0426.

Tel (787) 340-1868 E-mail: *pediatricsurgerypr@gmail.net*

Internet: pedsurgeryupdate.com

**** PSU 1993-2020***

ISSN 1089-7739