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Nephroptosis

Nephroptosis, floating kidneys or renal ptosis, is defined as a significant descent of the kidney, of more than 5 cm or two vertebral bodies, when the patient moves from supine to upright. This is different to an ectopic kidney where it remains in a constant abnormal position. The downward displacement of the kidney give rise to symptoms either due to effects on the ureter or the renal vessels. Nephroptosis is asymptomatic in most patients (80-90%) and occurs more commonly in thin women. The condition is rare in the pediatric age, while it manifest during the second to fourth decade with most being women. The right side is affected in 70% of cases, the left in 10%, and 20% are bilateral. It is believed that nephroptosis is caused by excessive mobility due to deficient support from the perinephric structure. This can cause stretching, torsion or kinking of the hilar vessels and proximal ureter. The diagnosis of nephroptosis requires a high index of suspicion and imaging confirmation. Major symptoms are pain, nausea/vomiting, transient hematuria, and orthostatic hypertension. Pain in the flank or abdomen is the most common symptom (90%), and typically occurs when upright, and relieved by recumbency. Nephroptotic pain can be associated with intermittent ureteric obstruction causing hydronephrosis, ischemia, narrowing or kinking of the renal artery or vein causing stasis, traction and stimulation of the visceral nerves, and symptoms due to secondary pathology. The hematuria originates from the calyceal and renal pelvis veins due to compression. Hypertension is caused by activation of the renin-angiotensin-aldosterone system. Nephroptosis is a diagnosis of exclusion after ruling out renal calculi, PUJ obstruction and pyelonephritis. All suspected cases should undergo both supine and upright studies such as US with Doppler, intravenous urography, contrast CT and radionuclide scans (dynamic or static). The Whitaker test, though invasive can also be used as a diagnostic tool. The affected ptotic kidney will return to its normal position when the patient is supine. Radionuclear scans (DTPA renogram) can demonstrate vascular flow impairment, abnormal tubular secretion, irregular distribution of the tracer, reduced glomerular filtration rate and outlet obstruction. Management should be considered in symptomatic patients with more than three months of symptoms duration and evidence of no other pathology associated, with nuclear medicine and Doppler imaging showing descent of the symptomatic kidney with obstruction or diminished flow to the symptomatic side. Treatment is surgical, namely nephropexy. Nephropexy can be performed open, laparoscopic, or percutaneously. Optimal nephropexy should include complete nephrolysis and release of the attachments to the peritoneum, mobilization of the kidney to a more cephalad retroperitoneal position, relief of associated urinary obstruction, and fixation of the renal axis without tension. The percutaneous nephropexy relies in the scar formation after access and placing a drain for several days.

The laparoscopic nephropexy has a significant successful outcome in more than 90% of patients, excellent cosmetic results, less postoperative pain, less hospital stay, lower morbidity and faster recovery. Is more time-consuming and expensive than the open procedure.

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Pleuropulmonary Blastoma

Pleuropulmonary blastoma (PPB) is considered the most common primary malignancy of the lung in children. 25-50 new cases are seen per year in the USA. PPB arise initially as a pulmonary cyst. Three pathologic stages of PPB have been described: type 1, purely cystic PPB; type 2 cystic/solid PPB; and type 3 purely solid PPB. The median age at diagnosis and the pathologic type of PPB: type 1 at 8 months; type 2 at 35 months; type 3 at 44 months. A progression from type 1 to 3 can occur, though not all cases progress to a more malignant transformation. Regression of the purely cystic form is called type 1r. PPB type 1 develops at a much younger age than type 2 or 3, with 97% presenting before the age of 3 years. Type 1 PPB appears as multiloculated, air-filled cysts with thin septa. The cysts are lined with benign respiratory epithelium and mesenchyme, with an underlying component of malignant mesenchymal cells that may have rhabdomyoblastic differentiation. Type 1 are most often unilateral, unifocal, peripheral, over 5 cm in size, and occur with a slight male predominance. Lung cysts can be seen prenatally between gestational age 23 to 35 weeks. Type 1, purely cystic PPB can be mistaken for another congenital cystic lung lesion. Type 1r (regression type) was originally recognize in older relatives of PPB, though cysts with these features can be found in very young children. Type 1r PPB have the same multilocular cystic appearance as type 1, but without the interspersed primitive malignant cells. Type 1r have a median age of diagnosis of 47 months compared to 8 months for type 1. Type 1r age range is larger, and a lung cyst in an older individual with DICER1 or a relative with PPB patient is most likely this type. Type 2 PPB account for approximately one-third of cases, with an equal male-to-female ratio, and present later than type 1 at a median age of 35 months, very rarely seen prior to 12 months of age. Type 3 PPB has the worse prognosis, is entirely comprised of tumor cells without intervening cystic space, present at a more advanced age, with a median age-of-diagnosis of 44 months, and do not appear to be seen before 12 months of age. Type 2 and 3 PPB are histologically similar, displaying a mixed sarcomatous pattern, are diagnosed at an older age, and have

metastatic potential to the brain, bone, and rarely liver. Chest/abdominal CT and brain MRI with bone scan are required. Both type 2 and 3 are aggressive malignancies that require chemotherapy soon after the first diagnostic surgery. PPB is associated with an unique set of disorders, and the genetic basis of the PPB familial syndrome is the heterozygous loss-of-function mutation of DICER1 found in 70-80% of children who develop PPB. The presence of such a germline mutation defines DICER1 PPB familial tumor predisposition syndrome. Germline DICER1 mutations are inherited as an autosomal dominant fashion in 80% of cases and arising the novo in the rest. In addition to PPB, DICER1 mutation includes cystic nephroma, ovarian Sertoli-Leydig cell tumors, ciliary body medulloepithelioma, nodular hyperplasia and differentiated carcinoma of the thyroid gland, pituitary blastoma, pineoblastoma, nasal chondromesenchymal hamartoma, and ERMS. Due to the rarity of PPB, screening for the general population is not needed. In children with DICER1 mutation only 4% of infants would develop a PPB. DICER1 germline testing should be performed in all pediatric patients with lung cysts early in life. P53 mutations in the cystic epithelial cells also have an important role in PPB type progression. Clinical presentation is usually with nonspecific respiratory complaints such as difficulty in breathing, dyspnea, chest pain, hemoptysis. Fever, malaise, and anorexia are associated with type 2 and 3 PPB. On imaging, chest simple films are the first modality used for evaluation. PPB is most commonly seen on the right side. It appears as hemi-opaque thorax with contralateral tracheal and mediastinal deviation. Diagnosis needs CT of chest and metastatic workup for type 2 and 3, since metastasis is unknown in type 1. Pleural effusion and pneumothorax con be commonly seen. Calcification is not a common finding. Management of PPB is surgical resection. Type 1 and 1r should be managed via complete resection with widely negative margins. An open approach is advocated to minimize chance of tumor spillage. Adjuvant chemotherapy is not typically given for type 1 PPB unless there is intraoperative tumor spill, incomplete resection, or local invasion of adjacent structures. In older asymptomatic patients with type 1r removal is not explicitly indicated and observation might be appropriate. For type 2 and 3 PPB, both systemic chemotherapy and surgical resection are critical component of management. Chemotherapy is typically based on sarcoma regimens. Surgical resection of type 2 and 3 PPB may require from a wedge resection to lobectomy or pneumonectomy to achieve negative margins. Involved pleural space should also be resected en-bloc with the primary tumor and involved pulmonary lobe. Radiation therapy is ineffective in general. For brain metastasis all three treatment modalities, surgery, chemotherapy, and radiation therapy is recommended. The type of PPB is the strongest prognostic factor, with outcomes better for type 2 over type 3. Correlation between the PPB type and survival is type 1 -94%; type 2, 71%; type 3, 53%. Distant metastasis at diagnosis had a statistically significant detrimental effect on survival. Anaplasia is common in both type 2 and 3 without significant prognostic effect. Gross total resection for adequate local control has important favorable prognostic implication. The PPB type and presence of distant metastasis at diagnosis are the most important prognostic factors related to treatment outcome.

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