PEDIATRIC SURGERY *Update* ©
Vol. 49 No. 05 NOVEMBER 2017

Magnamosis

Magnamosis refers to the concept of performing magnetic compressive anastomosis using two magnets that approach each other due to its attracting forces sloughing the tissue in between them and creating a union. Anastomosis between different parts of our body is a fundamental procedure performed in surgery. Most anastomosis are either hand-sewn or made using mechanical staplers device. Recently a magnamosis device was utilized to perform bowel anastomosis in humans. The magnamosis device is a pair of self-centering rare earth neodymium-iron-boron ring magnets encased in a specially-engineered polycarbonate shell. To create an anastomosis a single magnetic (Harrison ring) is placed within the lumen of each segment of intestine where the union is desired. When the two rings are joined the interposed tissue in between is compressed causing necrosis and anastomosis formation. The device then passes through the newly formed anastomosis and leaves no foreign bodies. The patient then passes the device through the rectum with bowel movement. The magnamosis device has been found to create histologically well-formed anastomosis with burst strength comparable or even better that hand-sew or stapled anastomosis. One side of the device has a slightly convex surface whereas the other side is slightly concave. The compressive forces on the bowel wall causes transmural ischemia and necrosis centrally allowing for remodeling of the bowel in the periphery gradually forming a full-thickness anastomosis. The device is passed in the stools seven to 14 days later depending on the motility of the bowel. Patients can be safely discharge home prior to passing the magnets. The concept of magnamosis has also been utilized for the management of rectal atresia, bilioenteric, esophageal, gastroenteric and vascular anastomosis. It has also been used to manage bile ducts strictures. Magnamosis device is a safe and effective means of sutureless full-thickness bowel anastomosis with serosal apposition.

References:

1- Jamshidi R, Stephenson JT, Clay JG, Pichakron KO, Harrison MR: Magnamosis: magnetic compression anastomosis with comparison to suture and staple techniques. J Pediatr Surg. 44(1):222-8, 2009

2- Pichakron KO, Jelin EB, Hirose S, Curran PF, Jamshidi R, Stephenson JT, Fechter R, Strange M, Harrison MR: Magnamosis II: Magnetic compression anastomosis for minimally invasive gastrojejunostomy and jejunojejunostomy. J Am Coll Surg. 212(1):42-9, 2011

3- Wall J, Diana M, Leroy J, Deruijter V, Gonzales KD, Lindner V, Harrison M, Marescaux J: MAGNAMOSIS IV: magnetic compression anastomosis for minimally invasive colorectal surgery. Endoscopy. 45(8):643-8, 2013

4- Russell KW, Rollins MD, Feola GP, Scaife ER: Magnamosis: a novel technique for the management of rectal atresia. BMJ Case Rep. 2014 Aug 5;2014.

5- Xue F, Guo HC, Li JP, Lu JW, Wang HH, Ma F, Liu YX, Lv Y: Choledochojejunostomy with an

innovative magnetic compressive anastomosis: How to determine optimal pressure? World J Gastroenterol. 22(7):2326-35, 2016
6- Dorman RM, Vali K, Harmon CM, Zaritzky M, Bass KD: Repair of esophageal atresia with proximal fistula using endoscopic magnetic compression anastomosis (magnamosis) after staged lengthening. Pediatr Surg Int. 32(5):525-8, 2016
7- Graves CE, Co C, Hsi RS, Kwiat D, Imamura-Ching J, Harrison MR, Stoller ML: Magnetic Compression Anastomosis (Magnamosis): First-In-Human Trial. J Am Coll Surg. 2017 Aug 23. pii: S1072-7515(17)31701-5. doi: 10.1016/j.jamcollsurg.2017.07.1062

Granulomatous Lymphadenitis

Granulomatous inflammation of lymph nodes is the second most common finding in histological examination of peripheral lymph nodes. Reactive hyperplasia accounts for the most common finding. Granulomatous disease accounts for almost one-third of biopsies of cervical masses or lymph nodes in children. They are most commonly identified in the head and neck region. The granulomatous response is a generic reaction to the presence of a persistent endogenous or exogenous insoluble irritant characterized by accumulation of macrophages and dependent of the immune system of the host. Non-tuberculous mycobacteria (NTM) is the etiology of most cases of granulomatous lymphadenitis in children. In developed countries Mycobacterium Avium and Intracellulare accounts for most cases of NTM causing granulomatous lymphadenitis. NTM lymphadenitis in immunocompetent children is best managed with complete excision. Other causes of granulomatous lymphadenitis include tuberculosis, sarcoidosis, fungal infections, rheumatoid disease, Cat's scratch disease and foreign body inclusions. NTM are ubiquitous in the environment existing in soil and water (including tap water) and ingestion of contaminated material has been thought to be the principal route of cervicofacial infection in children. Children with NTM granulomatous lymphadenitis are commonly less than five years in age and more likely have multiple lymph nodes involvement in the preauricular/parotid or submandibular/submental area. Granulomatous inflammation in other sites (axilla and upper extremity, inguinal), or older than age 10 years rarely yielded a cause. Surgical excision of granulomatous lymphadenitis has a high cure rate. Surgical excision is also more effective therapy than prolonged antibiotic oral therapy. The complication rate of children who underwent surgical excision is higher including secondary staphylococcal infection and transient or permanent facial nerve damage reason why some physicians prefer to manage deep cervical lymph nodes with antibiotics and watchful waiting.

References:

1- Robson CD: Imaging of granulomatous lesions of the neck in children. Radiol Clin North Am. 38(5):969-77, 2000
2- Ahmed NY, Mohammed-Ali WO: A histopathological study of chronic granulomatous lymphadenitis. Saudi Med J. 28(10):1609-11, 2007
3- Harris RL, Modayil P, Adam J, Sharland M, Heath P, Planche T, Daya H: Cervicofacial nontuberculous mycobacterium lymphadenitis in children: is surgery always necessary? Int J Pediatr Otorhinolaryngol. 73(9):1297-301, 2009
4- De Corti F, Cecchetto G, Vendraminelli R, Mognato G: Fine-needle aspiration cytology in children with superficial lymphadenopathy. Pediatr Med Chir. 36(2):80-2, 2014
5- Thoon KC, Subramania K, Chong CY, Chang KT, Tee NW: Granulomatous cervicofacial lymphadenitis in children: a nine-year study in Singapore. Singapore Med J. 2014 Aug;55(8):427-31.

6- Penn EB, Goudy SL: Pediatric Inflammatory Adenopathy. Otolaryngol Clin N Am 48: 137-151, 2015

Pediatric Arterial Catheters

Indwelling arterial catheters are widely used for hemodynamic monitoring and blood sampling purposes in neonatal and pediatric patients. Arterial catheters are inserted through the umbilical artery in premature and term infants, while the radial artery route is utilized in larger children. Other alternative sites for insertion include the ulnar, brachial, axillary, dorsalis pedis and tibialis posterior arteries. Most arterial catheters in children benefit from placing them using ultrasound guidance. Almost one-third of all children with an indwelling arterial catheter will have a complication. The most common complications while using arterial catheters include catheter-related infection or inflammation, mechanical complications, embolic or thrombotic complications and bleeding. Arterial thrombosis may cause serious short-term and/or long-term complications in children, including skin necrosis, threatened limb or organ viability, leg length differences, claudication, and loss of arterial access. Another important complication of arterial catheters is bleeding when antithrombotic therapy is utilized. Possible explanations for the thrombogenicity of intraarterial catheters include damage to the vessel wall, the foreign surface, and disruption of the blood flow. This complication increases when the femoral route is utilized when compared with the radial artery. In cases where the umbilical artery is catheterized, renal flow and changes should be closely monitored. Insertion attempts of the arterial catheter at multiple sites during the admission and the presence of more than one provider participating in line placement are significant risk factors for subsequent complications. Mechanical complications or line malfunction includes leaking, removed by patient, nonfunctional, no blood return, blanching, occluded or swelling at the line site. Pronovost's prospective checklist for arterial line safety has had success in reducing the frequency of at least the most serious complications in children.

References:

1- Brotschi B, Hug MI, Latal B, Neuhaus D, Buerki C, Kroiss S, Spoerri C, Albisetti M: Incidence and predictors of indwelling arterial catheter-related thrombosis in children. J Thromb Haemost. 9(6):1157-62, 2011

2- Imamura T, Momoi N, Go H, Ogasawara K, Kanai Y, Sato M, Goto A, Hosoya M: Evaluation of arterial catheter management in very preterm neonates: peripheral artery versus umbilical artery.Fukushima J Med Sci. 58(1):1-8, 2012

3- Schindler E, Schears GJ, Hall SR, Yamamoto T: Ultrasound for vascular access in pediatric patients. Paediatr Anaesth. 22(10):1002-7, 2012

4- Molina Caballero AY, Martinez Merino, Parez Martinez et al: [Peripherally inserted central catheters: Savings, comfort, many advantages]. Cir Pediatr. 29(3):96-100, 2016

5- Hebal F, Sparks HT, Richlik KI, et al: Pediatric arterial catheters: Complications and associated risk factors. J Pediatr Surg (2017), http://dx.doi.org/10.1016/j.jpedsurg.2017.08.057

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

Professor of Pediatric Surgery, University of Puerto Rico - School of Medicine,

Rio Piedras, Puerto Rico. Director - Pediatric Surgery, San Jorge Childrens Hospital.
Address: P.O. Box 10426, Caparra Heights Station, San Juan, Puerto Rico USA 00922-0426.
Tel (787)-999-9450 Fax (787)-720-6103 E-mail: *titolugo@coqui.net*
Internet: http://home.coqui.net/titolugo

ISSN 1089-7739