



Draft PMB definition guideline for uncomplicated hernias in patients below 18 years & hernias with obstruction and/or gangrene.

Disclaimer:

The uncomplicated hernias in patients below 18 years and hernias with obstruction and/or gangrene benefit definition has been developed for the majority of standard patients. These benefits may not be sufficient for outlier patients. Therefore regulation 15h and 15l may be applied for patients who are inadequately managed by the stated benefits. The procedure codes only serve as an indication of applicable procedure codes, and some significant procedure codes may not have been included. The benefit definition does not describe specific in-hospital management such as theatre, anaesthetists, anaesthetist drugs, supportive medication and nursing care. However, these interventions form part of care and are prescribed minimum benefits.

Table of Contents

1. Introduction	5
2. Scope and Purpose	5
3. Epidemiology and burden of the disease.....	7
4. Diagnostic Investigation.....	7
4.1 Diagnostic investigations in complicated hernias	7
4.2 Diagnostic investigations for uncomplicated hernias for patients below 18 years	9
4.3 Indication for surgical referrals.....	10
5. Surgical management of complicated hernias.....	10
6. Consideration of antibiotic prophylaxis for any surgical patient	12
7. Best Supportive care	13
8. References	14

Abbreviations

CT	Computed tomography
FBC	Full blood count
RCTs	Randomized control trials
SSI	Site of infection
TAPP	Transabdominal preperitoneal
TEP	Totally extraperitoneal
U&E	Urea and electrolytes
USS	Ultrasound scan

1. Introduction

1.1. The legislation governing the provision of the Prescribed Minimum Benefits (PMBs) is contained in the Regulations enacted under the Medical Schemes Act, No. 131 of 1998 (the Act). In respect of some of the Diagnosis Treatment Pairs (DTPs), medical scheme beneficiaries find it difficult to know their entitlements in advance. In addition, medical schemes interpret these benefits differently, resulting in a lack of uniformity on benefit entitlements.

1.2. The benefit definition project is coordinated by the Council for Medical Schemes (CMS) and aims to define the PMB package, as well as to guide the interpretation of the PMB provisions by relevant stakeholders.

2. Scope and purpose

2.1. This is a recommendation for the diagnosis, treatment and care of individuals in any clinically appropriate setting as outlined in the Act for:

- uncomplicated hernias in children below 18 years and
- hernias with obstruction and/or gangrene

Table 1: Possible ICD10 codes for identifying uncomplicated hernias below 18 years & hernias with obstruction and/or gangrene.

ICD 10 code	WHO description
K40.0	Bilateral inguinal hernia, with obstruction, without gangrene
K40.1	Bilateral inguinal hernia, with gangrene
K40.2	Bilateral inguinal hernia, without obstruction or gangrene
K40.3	Unilateral or unspecified inguinal hernia, with obstruction, without gangrene
K40.4	Unilateral or unspecified inguinal hernia, with gangrene
K40.9	Unilateral or unspecified inguinal hernia, without obstruction or gangrene
K41.0	Bilateral femoral hernia, with obstruction, without gangrene
K41.1	Bilateral femoral hernia, with gangrene
K41.2	Bilateral femoral hernia, without obstruction or gangrene

K41.3	Unilateral or unspecified femoral hernia, with obstruction, without gangrene
K41.4	Unilateral or unspecified femoral hernia, with gangrene
K41.9	Unilateral or unspecified femoral hernia, without obstruction or gangrene
K42.0	Umbilical hernia with obstruction, without gangrene
K42.1	Umbilical hernia with gangrene
K42.9	Umbilical hernia without obstruction or gangrene
K43.0	Ventral hernia with obstruction, without gangrene
K43.1	Ventral hernia with gangrene
K43.2	Incisional hernia without obstruction or gangrene
K43.3	Parastomal hernia with obstruction, without gangrene
K43.4	Parastomal hernia with gangrene
K43.5	Parastomal hernia without obstruction or gangrene
K43.6	Other and unspecified ventral hernia with obstruction, without gangrene
K43.7	Other and unspecified ventral hernia with gangrene
K43.9	Ventral hernia without obstruction or gangrene
K44.0	Diaphragmatic hernia with obstruction, without gangrene
K44.1	Diaphragmatic hernia with gangrene
K44.9	Diaphragmatic hernia without obstruction or gangrene
K45.0	Other specified abdominal hernia with obstruction, without gangrene
K45.1	Other specified abdominal hernia with gangrene
K45.8	Other specified abdominal hernia without obstruction or gangrene
K46.0	Unspecified abdominal hernia with obstruction, without gangrene
K46.1	Unspecified abdominal hernia with gangrene
K46.9	Unspecified abdominal hernia without obstruction or gangrene
Q79.0	Congenital diaphragmatic hernia
Q79.1	Other congenital malformations of diaphragm

3. Epidemiology and burden of the disease

3.1. A hernia is a protrusion of tissue, structure, or part of an organ through the muscular tissue, or the membrane by which it is normally contained. Abdominal hernias may be classified as groin hernias (femoral and inguinal) and ventral hernias (umbilical, epigastric, spigelian and incisional).

3.2. The incidence of abdominal wall hernia in different countries varies from 100 - 300/100000 per year. (Kingsnorth, 2003). Of the many of types of hernias, inguinal hernias are by far the most common. Estimates of groin hernia prevalence in sub-Saharan Africa range from 3.15% to 25% (Beard, 2013).

4. Diagnostic Investigations

4.1. Diagnostic investigations in complicated hernias

4.1.1. Generally, a patient who presents with typical symptoms and signs of groin hernias should not require further imaging for confirmation. History and physical examination remain the best means of diagnosing hernias. Clinical diagnosis can however be difficult, especially in patients with obesity, pain or abdominal wall scarring. In these cases, abdominal imaging may be the first clue to the correct diagnosis and to confirm suspected complications of hernias.

4.1.2. Medical imaging should be considered in patients in whom there is diagnostic uncertainty or to exclude other pathology (Simons, 2009).

4.1.3. Ultrasound scan (USS) is recommended as the first line investigation and largely detects a mass in the abdominal wall corresponding to the contents of the hernia sac and distinguishes it from other masses such as cysts, hematomas, neoplasms or varicoceles (Rettenbacher,2001).

- 4.1.4. USS may also reveal signs of the presence of the hernia, and is particularly useful in small midline hernias containing mesenteric fat or to study the paediatric population. A retrospective review of 297 patients who had had an USS for groin pain and a suspected inguinal hernia resulted in 167 positive scans and 85 patients were found to have hernia at operation, with a positive predictive value of 50%. From this it was concluded that USS is only useful in conjunction with clinical judgment (Light, 2011). The majority of reports have concluded that an ultrasound scan can only act as a guide, and the decision whether or not to operate should be based on clinical judgment.
- 4.1.5. A CT scan has a limited place in the diagnosis of an inguinal hernia. It may however be useful in cases of diagnostic dilemma or suspected complications, and with motivation. It can be performed if additional information is needed to aid in further clinical decision making.
- 4.1.6. Upper endoscopy and barium swallow have been the mainstay of evaluation for patients with a hiatal hernia. As barium swallow examinations are rarely performed, contrast studies are reported to be more sensitive than endoscopy in detecting sliding hiatal hernia, at least in the bariatric population (Fornari, 2010).

Table 2: Diagnosis basket for complicated hernias.

	Description	Frequency	Comments
Consultations	Primary care practitioner	2	
	Specialists	2	
	Anaesthesiologist	2	Pre-anesthetic consultation to evaluate fitness of surgery and follow up if necessary
Laboratory investigations	Blood gas		
	FBC		Should include white cell count. Results are nonspecific, but leukocytosis with left shift may occur with strangulation.
	U&E		

Radiological investigations	Contrast CT scan of abdomen – for diaphragmatic hernia		Motivation required for femoral hernia, inguinal hernia and incisional hernia as CT is only on clinical indication.
	Ultrasound		For differentiating masses in the groin or abdominal wall or in differentiating testicular swelling.
	X-ray abdomen (Upright Chest x-ray)		To exclude free air if strangulated hernia is suspected.
	Gastroscopy		Only for diaphragmatic hernia; if suspected gastric herniation

4.2. Diagnostic investigations for uncomplicated hernias in patients below 18 years

- 4.2.1. As in adult patients, imaging studies are generally not indicated to assess for inguinal hernia. However, ultrasonography can be helpful in the assessment of selected patients.
- 4.2.2. The role of ultrasound in the pediatric population is debatable. Whilst it may have a role in differentiating between a hydrocele and an inguinal hernia, in a patient with an incarcerated inguinal hernia, ultrasound may not be sensitive enough to differentiate between the two conditions.

Table 3: Diagnosis basket for uncomplicated hernias in patients below 18 years

	Description	Frequency	Comments
Consultations	Primary care practitioner	2	
	Specialists	2	
	Anaesthesiologist	2	Pre-anesthetic and follow up if necessary
Laboratory investigations	Blood gas		Part of a preoperative workup

	FBC		Should include white cell count
	U&E		Part of a preoperative workup
Radiological investigations	Ultrasound		
	x-ray abdomen		

4.3 Indication for surgical referrals:

- a) Patients with strangulated, obstructed or gangrenous hernia should be 'emergency referrals' (Bay-Nielsen, 2001 & Nilsson, 2007).
- b) All children, as defined by the institutional paediatric age cut off, with inguinal hernia should be referred to a pediatric surgical provider.

5. Surgical management of complicated hernias

- 5.1. The goal of treatment is to improve symptoms and the quality of life in general, as well as to prevent adverse events such as incarceration, while keeping the rate of surgical complications minimal.
- 5.2. Surgery can improve the quality of life of patients with symptomatic inguinal hernias, even if they are elderly, and should be considered in patients less than 65 years of age with an asymptomatic inguinal hernia (Magnusson, 2013 & Pierides, 2013).
- 5.3. Asymptomatic hernias can be managed conservatively (watch and wait approach) but there is a likelihood of requiring surgery in the future and outcomes are worse (Bay-Nielsen, 2001; Chung, 2011; Hwang, 2014 & Orchard, 2016). The question of observation versus surgical intervention in the asymptomatic population has however been addressed in two randomized clinical trials where after long-term follow-up, no significant difference in hernia-related symptoms were noted and watchful waiting did not increase the complication rate (Fitzgibbons, 2006 & Sarosi, 2011). Two independent systematic reviews both concluded that watchful waiting is safe, but most patients will develop symptoms (mainly pain) over time and will require an operation (Mizrahi, 2012 & Collaboration 2011).
- 5.4. Despite many years of experience, the optimal surgical approach to inguinal hernia remains controversial. The issue of the most suitable operative technique for hernias as well as the type of mesh continues to be debated. It is, however, generally agreed that there is no single standard technique for all hernias. The best operative technique should have low risks of complications and be

cost effective. The hernia is repaired using either open surgery or minimal access laparoscopy and the most common laparoscopic techniques for inguinal hernia repair are transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) repair. There are two randomized control trials (RCTs) directly comparing TAPP and TEP inguinal hernia repairs however conclusions on outcomes based on these studies could not be reached (Treadwell, 2012).

- 5.5. Although numerous surgical approaches have been developed to treat inguinal hernias, the Lichtenstein tension-free mesh-based repair remains the standard criterion (Awad, 2004). A 2014 meta-analysis of seven studies comparing laparoscopic repair with the Lichtenstein technique for treatment of recurrent inguinal hernia, concluded that despite the advantages to be expected with the former (e.g., reduced pain and earlier return to normal activities), operating time was significantly longer with the minimally invasive technique, and the choice between the two approaches depended largely on the availability of local expertise (Pisanu, 2014).
- 5.6. In the management of unilateral primary inguinal hernias, there is conflicting information on whether laparoscopic repair reduces the incidence of chronic pain and improves other outcomes. Although there were recognised study limitations, the majority of meta-analyses concluded that the laparoscopic group suffered less acute pain, less chronic pain and less severe chronic pain; less post-surgery numbness in the groin; and less infection and a quicker return to work, compared to open repair (McCormack, 2003; Kuhry, 2007 & Wright, 2002). Groin hernias in women should preferentially be repaired laparoscopically because of the risk of undiagnosed femoral or contralateral inguinal hernias (Koch, 2005).

Table 4: Surgical management for complicated hernias

	Description	Comments
Anterior abdominal wall hernias - Ventral - Umbilical - Incisional	Surgical repair with prolene mesh if hernias > 2cm	Open or laparoscopy surgery
- Inguinal hernia - Femoral hernia - Parastomal hernia - Diaphragmatic	Prolene mesh repair	Open surgery

- Hiatic hernias	Surgical repair	Not mesh repair
Exclusions		
Biologic mesh		

Table 5: Surgical management for uncomplicated hernias in patients less than 18 years.

	Description	Comments
Uncomplicated hernias	Herniactomy +/- mesh	Mesh might be required depending on the size of the hernia
Exclusions		
Biologic mesh		

6. Consideration of antibiotic prophylaxis for any surgical patient

- 6.1. For patients undergoing uncomplicated inguinal or femoral hernia repair with planned mesh placement, prophylactic antibiotics are recommended. Patients with complicated hernias require broader antimicrobial coverage than prophylactic antibiotics (Brooks, 2017).
- 6.2. For patients undergoing uncomplicated inguinal or femoral hernia repair without planned mesh placement, prophylactic antibiotics may be omitted based upon surgeon preference.
- 6.3. The role of prophylactic antibiotics given prior to inguinal or femoral hernia repair remains controversial. Uncomplicated hernia surgery is considered clean surgery, for which prophylactic antibiotics are not indicated. Some surgeons, however, prefer to administer antibiotics to patients undergoing hernia repair with mesh to prevent potential mesh infection. Others omit routine prophylactic antibiotics because the risk of surgical site infection (SSI) after groin hernia surgery is low, and most infections to the surgical site are superficial and can be easily treated with oral antibiotics (Brooks, 2017).
- 6.4. A 2012 Cochrane review of 17 randomized trials demonstrated a lower rate of SSI in patients who received, compared with those who did not receive, prophylactic antibiotics (3.1 versus 4.5 percent, odds ratio 0.64, 95% CI 0.50-0.82). In subgroup analyses, however, the difference was smaller in patients without mesh placement than in those with mesh placement (Brooks, 2017).
- 6.5. Antibiotic prophylaxis is therefore recommended as PMB level of care if a prosthetic mesh is used.

7. Best Supportive care

Routine outpatient follow-up is not required after hernia repair. The following supportive therapy are PMB level of care.

Table 6: Post-operative care following hernia repair.

	Comments
Regular follow up within one month postoperatively is included within the surgical fee	
Primary practitioner visits	3 consultations per year
Specialist	1
Analgesia and antibiotics	As per formulary

This guideline will be due for update on 31 March 2020

References:

- Alnassar, S., Bawahab, M., Abdoh, A., Guzman R., Al Tuwaijiri, T. & Louridas, G. (2012). Incisional hernia post repair of abdominal aortic occlusive and aneurysmal disease: Five-year incidence. *Vascular*, 20(5):273-277.
- Awad, S.S. & Fagan, S.P. (2004). Current approaches to inguinal hernia repair. *American Journal of Surgery*, 188(6A Suppl):9--16-.
- Bay-Nielsen, M., Kehlet, H., Strand, L., Malmstrøm, J., Andersen, F.H., Wara, P., Juul, P., Callesen, T. & Danish Hernia Database Collaboration_(2001). Quality assessment of 26,304 herniorrhaphies in Denmark: a prospective nationwide study. *Lancet*, 358(9288): 1124-8.
- Beard, J.H., Oresanya, L.B., Ohene-Yeboah, M., Dicker, R.A. & Harris, H.W. (2013). Characterizing the global burden of surgical disease: a method to estimate inguinal hernia epidemiology in Ghana. *World Journal of Surgery*, 37: 498–503.
- Brooks, D.C. (2017) Overview of treatment for inguinal and femoral hernia in adults. In: UpToDate, Rosen, M & Chen, W. (Ed), UpToDate, Waltham, MA.
- Chung, L., Norrie, J. & O'Dwyer, P.J. (2011). Long-term follow-up of patients with a painless inguinal hernia from a randomized clinical trial. *The British Journal of Surgery*, 98: 596–599.
- Fitzgibbons, R.J. Jr., Giobbie-Hurder, A., Gibbs, J.O., Dunlop, D.D., Reda, D.J., McCarthy, M. Jr., Neumayer, L.A., Barkun, J.S., Hoehn, J.L., Murphy, J.T., Sarosi, G.A. Jr., Syme, W.C., Thompson, J.S., Wang, J. & Jonasson, O. (2006). Watchful waiting vs repair of inguinal hernia in minimally symptomatic men: a randomized clinical trial. *The Journal of the American Medical Association*, 295(3): 285-92.
- Fitzgibbons, R.J. Jr., Ramanan, B., Arya, S., Turner, S.A., Li, X., Gibbs, J.O., Reda, D.J. & Investigators of the Original Trial_(2013). Long-term results of a randomized controlled trial of a nonoperative strategy (watchful waiting) for men with minimally symptomatic inguinal hernias. *Annals of Surgery*, 258: 508–515.
- Fornari, F., Gurski, R.R., Navarini, D., Thiesen, V., Mestriner, L.H. & Madalosso, C.A. (2010). Clinical utility of endoscopy and barium swallow X-ray in the diagnosis of sliding hiatal hernia in morbidly obese patients: a study before and after gastric bypass. *Obesity Surgery*, 20: 702-708.
- Gallegos, N.C., Dawson, J., Jarvis, M. & Hobsley, M._(1991). Risk of strangulation in groin hernias. *The British Journal of Surgery*, 78(10): 1171-3.
- Hwang, M.J., Bhangu, A., Webster, C.E., Bowley, D.M., Gannon, M.X. & Karandikar, S.S. (2014). Unintended consequences of policy change to watchful waiting for asymptomatic inguinal hernias. *Annals of the Royal College of Surgeons of England*, 96(5): 343-7.

- INCA Trialists Collaboration. (2011). Operation compared with watchful waiting in elderly male inguinal hernia patients: a review and data analysis. *Journal of the American College of Surgeons*, 212(2): 251-259 .
- Kingnorth, A.N. & Leblanc, K.A. (2003). *Management of abdominal hernias*. 3rd ed. Edward Arnold, London: Springer-Verlag London.
- Koch, A., Edwards, A., Haapaniemi, S., Nordin, P. & Kald, A. (2005). Prospective Evaluation of 6895 Groin Hernia Repairs in Women. *British Journal of Surgery*, 92 (12): 1553–58.
- Kuhry, E., van Veen, R.N., Langeveld, H.R., Steyerberg, E.W., Jeekel, J. & Bonjer, H.J._(2007). Open or endoscopic total extraperitoneal inguinal hernia repair? A systematic review. *Surgical Endoscopy*, 21(2): 161-6.
- Light, D., Ratnasingham, K., Banerjee, A., Cadwallader, R., Uzzaman, M.M. & Gopinath, B_(2011). The role of ultrasound scan in the diagnosis of occult hernias. *International Journal of Surgery*, 9: 169–172.
- Magnusson, J., Videhult, P., Gustafsson, U., Nygren, J. & Thorell, A. (2013). Relationship between preoperative symptoms and improvement of quality of life in patients undergoing elective inguinal herniorrhaphy. *Surgery*, 155(1): 106-13.
- McCormack, K., Scott, N.W., Go, P.M., Ross, S., Grant, A.M. & EU Hernia Trialists Collaboration. (2003). Laparoscopic techniques versus open techniques for inguinal hernia repair. *Cochrane Database of Systematic Reviews*, 1: 1-278.
- Mizrahi, H. & Parker, M.C. (2012). Management of asymptomatic inguinal hernia: a systematic review of the evidence. *Archives of Surgery*, 147: 277–281.
- Mizrahi, S. (2012). Mechanisms of objectionable textural changes by microwave reheating of foods: a review. *Journal of Food Science*, 77(1): 57-62.
- Nilsson, H., Stylianidis, G., Haapamäki, M., Nilsson, E. & Nordin P. (2007). Mortality after groin hernia surgery. *Annals of Surgery*, 245(4): 656-60.
- Oodit, R. (2015). Hernia surgery. *South African Journal of Surgery*, 53(2): 37.
- Orchard, M.R., Wright, J.A., Kelly, A., McCabe, D.J. & Hewes, J. (2016). The impact of healthcare rationing on elective and emergency hernia repair. *Hernia*, 20(3): 405-9.
- Pierides, G., Mattila, K. & Vironen, J. (2013). Quality of life change in elderly patients undergoing open inguinal hernia repair. *Hernia*, 17: 729–736.

Pisanu, A., Podda, M., Saba, A., Porceddu, G. & Uccheddu, A. (2014). Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair. *Hernia*, 19(3): 355-66.

Rettenbacher, T., Hollerweger, A., Macheiner, P., Gritzmann, N., Gotwald, T., Frass, R. & Schneider, B. (2001). Abdominal wall hernias: cross-sectional imaging signs of incarceration determined with sonography. *American Journal of Roentgenology*, 177: 1061–1066.

Sarosi, G.A., Wei, Y., Gibbs, J.O., Reda, D.J., McCarthy, M., Fitzgibbons, R.J. & Barkun, J.S. (2011). A clinician's guide to patient selection for watchful waiting management of inguinal hernia. *Annals of Surgery*, 253(3): 605-10.

Simons, M.P., Aufenacker, T., Bay-Nielsen, M., Bouillot, J.L., Campanelli, G., Conze, J., de Lange, D., Fortelny, R., Heikkinen, T., Kingsnorth, A., Kukleta, J., Morales-Conde, S., Nordin, P., Schumpelick, V., Smedberg, S., Smietanski, M., Weber, G. & Miserez, M. (2009). European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia: the journal of hernias and abdominal wall surgery*, 13(4): 343-403.

Stoppa, R.E. (1989). The treatment of complicated groin and incisional hernias. *World journal of surgery*, 13(5): 54-545.

Treadwell, J., Tipton, K., Oyesanmi, O., Sun, F. & Schoelles, K. (2012). Surgical Options for Inguinal Hernia: Comparative Effectiveness Review. Comparative Effectiveness Review No. 70. (Prepared by the ECRI Institute Evidence-based Practice Center under Contract No. 290-2007-10063.) AHRQ Publication No. 12-EHC091-EF. Rockville, MD: Agency for Healthcare Research and Quality.

Wright, D., Paterson, C., Scott, N., Hair, A. & O'Dwyer, P. (2002). Five-year follow-up of patients undergoing laparoscopic or open groin hernia repair: a randomised controlled trial. *Annals of Surgery*, 235: 333–7.