Egyptian Guidelines for the Management of Ventral Hernia

Acknowledgement:

We would like to acknowledge the Guideline Development Group, (GDG) committee for developing this guideline.

Chair of GDG: Mostafa Abdel-Hamed Soliman, Professor of Surgery, Cairo University.

Moderator of GDG: Mohamed Ali Mohamed Nada, Professor of Surgery, Ain Shams University.

Members of GDG (Alphabetically):

Abdel-Wahab Mohamed Ezzat, Professor of Surgery, Ain Shams University.

Ahmed Abdel-Raouf Elgeidie, Professor of Digestive Surgery, Mansoura University.

Alaa Abdallah, Professor of Surgery, Ain Shams University.

Atef Abdel-Ghani Salem, Professor of Surgery, Benha University.

Hesham Abdel-Raouf El-Akkad, Professor of Surgery, Ain Shams University.

Ibrahim El-Zayat, Head of Surgery Department, Aswan University.

Khaled Abdallah El-Fiky, Professor of Surgery, Ain Shams University.

Khaled Amer, Professor of Surgery, Military Medical Academy.

Khaled Safwat, Professor of Surgical Oncology and Endoscopy, Zagazig University.

Mohamed Ibrahim Abdel-Hamed Al-Said, Professor of Surgery, Zagazig University.

Tarek Ibrahim, Professor of Surgery, National Liver Institute, Menofia University.

Contents:

Abbreviations:

AGREEII	Appraisal of Guidelines for Research and Evaluation II
BMI	Body Mass Index.
COPD	Chronic Obstructive Pulmonary Disease.
DVT	Deep Vein Thrombosis.
EHS	European Hernia Society.
GDG	Guideline Development Group.
GRADE	Grading of Recommendations, Assessment, Development and Evaluation.
SSI	Surgical site infection.

Executive Summary:

This guideline describes the management of ventral hernia.

- We recommend that all midline laparotomies should be closed with non-absorbable or long-term absorbable sutures, (Strong recommendation).
- We advise closing all midline laparotomies with a small bite continuous technique achieving a wound to suture length ratio of at least 4:1. Prophylactic mesh may be advised in high-risk patients, (Conditional recommendation).

- We recommend that the decision for surgery in patients with asymptomatic hernias should individualized based on patient risk, co-morbidities, life expectancy and type of hernia, (Strong recommendation).
- We recommend repair for all symptomatic hernias, unless there are contra-indications to surgery or anesthesia, (Strong recommendation).
- We recommend performing emergency surgery for strangulated hernia without delay, aiming for the simplest procedure with the lowest complication rate, (Strong recommendation).

- Where technically feasible laparoscopic ventral hernia surgery is the preferred and advised approach for patients with BMI >35kg/m^2, (Conditional recommendation).
- We advise performing laparoscopic repair in the setting of incarcerated or strangulated hernias. The risk reduction in SSI rates is noted though the surgeon's experience will dictate the approach, (Conditional recommendation).
- We recommend performing concurrent umbilical hernia repair during laparoscopic cholecystectomy, (Strong recommendation).
- We advise performing umbilical hernia repair with mesh as a concurrent procedure when performing laparoscopic groin hernia repair, (Conditional recommendation).
- We advise performing concomitant repair of an incisional or ventral hernia as a single stage procedure during bariatric surgery, (Conditional recommendation).
- In patients with liver disease, we advise performing an early elective mesh repair of umbilical hernia. Preoperative control of ascites is especially critical to a successful outcome, (Conditional recommendation).
- We advise performing mesh repair for hernia at the time of Caesarean Section, (Conditional recommendation).
- We recommend repairing rectus diastasis accompanied by a midline hernia during the hernia repair, (Strong recommendation).
- We recommend administration of a single dose preoperative prophylactic antibiotic before hernia repair, (Strong recommendation).
- We recommend the general surgical principles of DVT prophylaxis before the hernia repair, (Strong recommendation).
- Care should be taken to optimize the patient both medically and surgically preoperatively in order to ensure the best surgical and anesthetic outcome, (Strong recommendation).
- A minimum overlap of 5 cm before defect closure should be planned in all mesh repairs, (Strong recommendation).
- We recommend performing extra-peritoneal repairs in ventral hernia with plain large pore polypropylene or polyester mesh, (Strong recommendation).
- We recommend performing intraperitoneal mesh repairs with a composite barrier mesh or strand coated anti-adhesion mesh, (Strong recommendation).
- We do not advise the use of polypropylene mesh in grade 3A wounds, as it carries a high risk for septic complications, (Conditional recommendation).
- There is no evidence to support the routine use of biologic meshes. We may advise the use of biologics or delayed fully re-absorbable meshes in grade 3A and 3B wounds, (Conditional recommendation).
- We recommend performing every incisional hernia with a mesh repair because there is a significantly lower recurrence rate, (Strong recommendation).
- We recommend performing mesh repair for primary ventral hernias with a defect greater than 2 cm, (Strong recommendation).
- For primary hernias less than 2 cm in patients with risk factors for recurrence (obesity, concurrent hernia, recurrent hernia, concurrent diastasis or aneurysmal disease), we recommend a mesh repair, (Strong recommendation).
- Mesh placement for small hernias less than 2 cm is advised as the treatment of choice

based on less recurrence rate, (Conditional recommendation).

- Patients presenting with a para-stomal hernia are recommended to have an elective repair, (Strong recommendation).
- We recommend careful inspection of the bowel pre, intra and post dissection to avoid missed enterotomy, (Strong recommendation).
- We recommend management of superficial wound sepsis with standard conservative means, (Strong recommendation).
- For deep surgical site infection with the possibility of mesh sepsis, we advise removal of the mesh, (Conditional recommendation).
- We recommend conservative management of post-operative seroma, (Strong recommendation).
- We advise performing laparoscopic ventral hernia repair as it had has a lower rate of wound infections and complications compared to open repair, (Conditional recommendation).
- We recommend against laparoscopic ventral hernia repair in special situations such as loss of domain, active entero-cutaneous fistula, the need to remove previously placed prosthetic mesh, (Strong recommendation).

Introduction:

Ventral hernia is one of the most common general surgical pathologies. An estimated 20 million patients with hernias are operated on worldwide every year, of which approximately 30% are ventral. An incisional hernia will develop in 10–15% of patients with an abdominal incision and the risk increases to up to 23% in those who develop surgical site infection, [1&2]. Incidence rates up to 69% have been reported in high-risk patients, [3].

Ventral hernias are defined as a defect of the fascia in the anterior abdominal wall with or without a bulge, [4]. Clinical presentation varies from small incidental defects to giant and complicated hernias with fistulas and viscera located outside the abdominal cavity covered only by peritoneum and skin (loss of domain), [4]. The symptoms range from minor cosmetic concerns to severe pain and life-threatening conditions such as bowel obstruction, incarceration, strangulation and perforation, [4].

Ventral hernia repairs are mostly elective (90%) procedures, but the repair methods are highly variable, [5].

Any injury or incision to the abdominal wall could lead to a hernia. Surgical technique and wound infection are considered the most important preventable causes of an incisional hernia, [6].

Many patient-related risk factors have been implicated. Surgical site infections (SSI) are independent risk factors that significantly increase the risk of incisional hernias, [7]. Other factors are male gender, obesity, [8] old age, [9] diabetes mellitus, jaundice, [10] anaemia, the use of vasopressor drugs, [11] smoking, [12] postoperative respiratory failure, aneurysmal disease, malnutrition, steroids, kidney failure, malignancy, [6]. Abdominal distention,[13] postoperative peritonitis, [14] and multiple operations through the same incision, [10]. Chronic Obstructive Pulmonary Disease (COPD), benign prostatic hypertrophy, constipation and ascites increase the intra-abdominal pressure, increasing the risk of incisional hernias, but they are not considered independent risk factors. Diastasis of the rectus muscles also predisposes to an incisional hernia, [15&16].

According to the European Hernia Society (EHS) classification, it divides hernias into primary and incisional (secondary) and then further subdivides them by anatomical location and size. Incisional hernias are also categorized by recurrence in a binary fashion, [17], (see Tables 1-4).

Scope and Purpose:

The scope of this guideline is to set recommendations for the diagnose and treatment of ventral hernia

The main purpose of these guidelines is to minimize malpractice and poor surgical decision, to improve the quality of medical care and surgical service, to provide the good surgical practice to our patients, and finally to be cost effective.

Target Audience:

The principle targeted candidates are the practicing surgeons, however radiologists, ICU specialists and nursing staff may be included.

Methods:

A comprehensive search for guidelines was undertaken to identify the relevant guidelines to consider for adaptation.

Inclusion/ exclusion criteria followed in the search and retrieval of guidelines to be adapted:

- Selecting only evidence-based guidelines (guideline must include a report on systematic literature searches and explicit links between individual recommendations and their supporting evidence)
- Selecting only national and/or international guidelines
- Specific range of dates for publication (using Guidelines published or updated in 2014 and later)
- Selecting peer reviewed publications only
- Selecting guidelines written in English language
- Excluding guidelines written by a single author, not on behalf of an organization to be valid and comprehensive, a guideline ideally requires multidisciplinary input
- Excluding guidelines published without references as the panel needs to know whether a thorough literature review was conducted and whether current evidence was used in the preparation of the recommendations

The following characteristics of the retrieved guidelines were summarized in:

- Developing organization/authors
- Date of publication, posting, and release
- Country/language of publication
- Date of posting and/or release
- Dates of the search used by the source guideline developers

All retrieved Guidelines were screened and appraised using AGREE II instrument (www.agreetrust.org) by at least three members. The panel decided on a cut-off point (any guideline scoring above 50% on the rigor dimension was retained). The GDG decided to adapt

the HIG (SA) Guidelines for the Management of Ventral Hernias. 2016 and Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias. 2014.

Evidence assessment

According to WHO Handbook for Guidelines, we used the GRADE (Grading of Recommendations, Assessment, Development and Evaluation) approach to assess the quality of a body of evidence, develop and report recommendations. GRADE methods are used by WHO because these represent internationally agreed standards for making transparent recommendations. Detailed GRADE information is available on the following sites:

- GRADE working group: https://www.gradeworkinggroup.org/
- GRADE online training modules: http://cebgrade.mcmaster.ca/

Specifically, the quality of evidence was graded as 'High', 'Moderate', 'Low' or 'Very low', (tables 5& 6).

The strength of the recommendation

The strength of a recommendation communicates the importance of adherence to the recommendation.

Strong recommendations

With strong recommendations, the guideline communicates the message that the desirable effects of adherence to the recommendation outweigh the undesirable effects. This means that in most situations the recommendation can be adopted as policy.

Conditional recommendations

these are made when there is greater uncertainty about the four factors above or if local adaptation has to account for a greater variety in values and preferences, or when resource use makes the intervention suitable for some, but not for other locations. This means that there is a need for substantial debate and involvement of stakeholders before this recommendation can be adopted as policy.

When not to make recommendations

When there is lack of evidence on the effectiveness of an intervention, it may be appropriate not to make a recommendation.

Recommendations:

Section 1: Prevention of incisional hernia:

- We recommend that all midline laparotomies should be closed with non-absorbable or long-term absorbable sutures, (Strong recommendation, high certainty evidence, [18]).
- We advise closing all midline laparotomies with a small bite continuous technique achieving a wound to suture length ratio of at least 4:1. Prophylactic mesh may be advised in high-risk patients, (Conditional recommendation, high certainty evidence, [18]).

Section 2: Indications for surgery:

- We recommend that the decision for surgery in patients with asymptomatic hernias should individualized based on patient risk, co-morbidities, life expectancy and type of hernia, (Strong recommendation, high certainty evidence, (18)).
- We recommend repair for all symptomatic hernias, unless there are contra-indications to surgery or anesthesia, (Strong recommendation, high certainty evidence, (18)).

- We recommend performing emergency surgery for strangulated hernia without delay, aiming for the simplest procedure with the lowest complication rate, (Strong recommendation, high certainty evidence, [18]).
- Where technically feasible laparoscopic ventral hernia surgery is the preferred and advised approach for patients with BMI >35kg/m^2, (Conditional recommendation, high certainty evidence, [18]).
- We advise performing laparoscopic repair in the setting of incarcerated or strangulated hernias. The risk reduction in SSI rates is noted though the surgeon's experience will dictate the approach, (Conditional recommendation, moderate certainty evidence, [18]).
- We recommend performing concurrent umbilical hernia repair during laparoscopic cholecystectomy, (Strong recommendation, moderate certainty evidence, [18]).
- We advise performing umbilical hernia repair with mesh as a concurrent procedure when performing laparoscopic groin hernia repair, (Conditional recommendation, low certainty evidence, [18]).
- We advise performing concomitant repair of an incisional or ventral hernia as a single stage procedure during bariatric surgery, (Conditional recommendation, moderate certainty evidence, [18]).
- In patients with liver disease, we advise performing an early elective mesh repair of umbilical hernia. Preoperative control of ascites is especially critical to a successful outcome, (Conditional recommendation, moderate certainty evidence, [18]).
- We advise performing mesh repair for hernia at the time of Caesarean Section, (Conditional recommendation, moderate certainty evidence, [18]).
- We recommend repairing rectus diastasis accompanied by a midline hernia during the hernia repair, (Strong recommendation, high certainty evidence, [18]).

Section 3: Perioperative management:

- We recommend administration of a single dose preoperative prophylactic antibiotic before hernia repair, (Strong recommendation, high certainty evidence, [18]).
- We recommend the general surgical principles of DVT prophylaxis before the hernia repair, (Strong recommendation, moderate certainty evidence, [18]).
- Care should be taken to optimize the patient both medically and surgically preoperatively in order to ensure the best surgical and anesthetic outcome, (Strong recommendation, high certainty evidence, [18]).

Section 4: Use of mesh:

- A minimum overlap of 5 cm before defect closure should be planned in all mesh repairs, (Strong recommendation, high certainty evidence, [18]).
- We recommend performing extra-peritoneal repairs in ventral hernia with plain large pore polypropylene or polyester mesh, (Strong recommendation, high certainty evidence, [18]).
- We recommend performing intraperitoneal mesh repairs with a composite barrier mesh or strand coated anti-adhesion mesh, (Strong recommendation, moderate certainty evidence, [18]).
- We do not advise the use of polypropylene mesh in grade 3A wounds, as it carries a

high risk for septic complications, (Conditional recommendation, moderate certainty evidence, [18]), (table 7).

- There is no evidence to support the routine use of biologic meshes. We may advise the use of biologics or delayed fully re-absorbable meshes in grade 3A and 3B wounds, (Conditional recommendation, Low certainty evidence, [18]).
- We recommend performing every incisional hernia with a mesh repair because there is a significantly lower recurrence rate, (Strong recommendation, high certainty evidence, [18]).
- We recommend performing mesh repair for primary ventral hernias with a defect greater than 2 cm, (Strong recommendation, high certainty evidence, [18]).
- For primary hernias less than 2 cm in patients with risk factors for recurrence (obesity, concurrent hernia, recurrent hernia, concurrent diastasis or aneurysmal disease), we recommend a mesh repair, (Strong recommendation, high certainty evidence, [18]).
- Mesh placement for small hernias less than 2 cm is advised as the treatment of choice based on less recurrence rate, (Conditional recommendation, high certainty evidence, [18]).
- Patients presenting with a para-stomal hernia are recommended to have an elective repair, (Strong recommendation, high certainty evidence, [18]).

Section 5: Complications:

- We recommend careful inspection of the bowel pre, intra and post dissection to avoid missed enterotomy, (Strong recommendation, high certainty evidence, [18]).
- We recommend management of superficial wound sepsis with standard conservative means, (Strong recommendation, high certainty evidence, [18]).
- For deep surgical site infection with the possibility of mesh sepsis, we advise removal of the mesh, (Conditional recommendation, moderate certainty evidence, [18]).
- We recommend conservative management of post-operative seroma, (Strong recommendation, moderate certainty evidence, [18]).

Section 6: Laparoscopic versus Open:

- We advise performing laparoscopic ventral hernia repair as it had has a lower rate of wound infections and complications compared to open repair, (Conditional recommendation, moderate certainty evidence, [19]).
- We recommend against laparoscopic ventral hernia repair in special situations such as loss of domain, active entero-cutaneous fistula, the need to remove previously placed prosthetic mesh, (Strong recommendation, moderate certainty evidence, [19]).

Research Needs:

1. Management of ventral hernia with loss of domain.
2. Management of ventral hernia in morbidly obese patients.
3. Management of infected mesh.
4. Prevention and management of postoperative seroma after ventral hernia repair.

Clinical Indicators for Monitoring:

1. Pre-operative US and /or CT.
2. Documentation of the site of hernia.
3. Documentation of the size of Hernia.
4. Documentation of the associated co-morbidities.
5. Documentation of surgical steps.

Updating of the Guidelines:

The GDG committee for guidelines development is responsible for the continuous evaluation of evidence available about ventral hernia. The present guidelines will be updated in case of significant changes based on new evidence.

Annexes:

Table 1. Primary ventral hernia classification, [17]

Primary ventral hernia classification		**Diameter (cm).**		
Midline	Epigastric Umbilical	**Small** < 2 cm	**Medium** 2 – 4 cm	**Large** > 4 cm
Lateral	Spigelian Lumbar			

Table 2. Incisional hernia classification, [17]

Midline	Sub-xiphoid		**M1**
	Epigastric		**M2**
	Umbilical		**M3**
	Infra-umbilical		**M4**
	Suprapubic		**M5**
Lateral	Subcostal		**L1**
	Flank		**L2**
	Iliac		**L3**
	Lumbar		**L4**
Recurrent incisional hernia		Yes	No
Length (cm)			
Width (cm)		< 4cm	**W1**
		4 - 10 cm	**W2**
		>4 cm	**W3**

Table 3. Incisional hernia anatomical location borders, [17]

	Borders of Midline area	Borders of Lateral area
Cranial	Xiphoid process	Costal margin
Caudal	Pubic bone	Inguinal ligament
Lateral	Linea semilunaris	Lumbar region
Medial		Linea semilunaris

Table 4. M and L zones for incisional hernia, [17]

Medial			**Lateral**		
M1	**Sub-xiphoidal**	Xiphoid to 3 cm caudally	**L1**	Subcostal	Between the costal margin and a horizontal line 3 cm above the umbilicus
M2	**Epigastric**	3 cm below the xiphoid to 3 cm above the umbilicus	**L2**	Flank	Latera to the rectal sheath in the area 3 cm above and below the umbilicus
M3	**Umbilical**	3 cm above to 3 cm below the umbilicus	**L3**	Iliac	Between a horizontal line 3 cm below the umbilicus and the inguinal region
M4	**Infra-umbilical**	3 cm below the umbilicus To 3 cm above the pubis	**L4**	Lumbar	Latero dorsal to the anterior axillary line
M5	**Supra-pubic**	Pubic symphysis to 3 cm Cranially			

Table 5. Quality and Significance of the four levels of evidence in GRADE

Downgrade in presence of	**Upgrade in presence of**
Study limitations -1 Serious limitations -2 Very serious limitations	Dose-response gradient +1 Evidence of a dose-response gradient
Consistency -1 Important inconsistency	Direction of plausible bias +1 All plausible confounders would have reduced the effect
Directness -1 Some uncertainty -2 Major uncertainty	Magnitude of the effect +1 Strong, no plausible confounders, consistent and direct evidence
Precision -1 Imprecise data	+2 Very strong, no major threats to validity and direct evidence
Reporting bias -1 High probability of reporting bias	

Table 6. Factors that determine How to upgrade or downgrade the quality of evidence

Quality	Definition	Implications
High	The guideline development group is very confident that the true effect lies close to that of the estimate of the effect	Further research is very unlikely to change confidence in the estimate of effect
Moderate	The guideline development group is moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate
Low	Confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the true effect	Further research is very likely to have an important impact on confidence in the estimate of effect and is unlikely to change the estimate
Very low	The group has very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of the effect	Any estimate of effect is very uncertain

Table 7: Recommendations for mesh placed in the EXTRAPERITONEAL POSITION, [17].

VHWG 2013 grade[11] indicated mesh	Risk Factors	Recommended mesh	Mesh to consider	Contra-
Grade 1: Low risk	Low risk No history of wound infections	Plain mesh	Fully absorbable	Composite, Biologic, PTFE
Grade 2: Intermediate risk	Co-morbidities: Smoker, obese, diabetic, COPD, previous wound infection	Plain mesh	Fully absorbable	Composite, Biologic, PTFE
Grade 3A	Clean contaminated	No mesh	Plain Mesh*, Fully absorbable, Biologic	Composite, PTFE
Grade 3B	Contaminated	No mesh	Fully absorbable, Biologic	Composite, PTFE
Grade 3C	Dirty contaminated	No mesh	Fully absorbable	Composite, Biologic, PTFE

*It is recommended that if proceeding with a mesh repair after enterotomy, it should be large pore and placed in the retro-rectus position which is away from the peritoneal cavity and skin and is a well vascularized plane.

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