Incisional and parastomal hernias after harvesting of vertical rectus abdominis myocutaneous (VRAM) flaps: incidence, outcomes, and treatment options

Camille Vervaet[2], Camille Maeyaert[2], Mathias Allaeys[1], Frederik Berrevoet[1], Hasan H. Eker[1], Gabrielle H. van Ramshorst[1,2]

Ghent University Hospital[1], Ghent University[2]

Background

The VRAM flap is used for the reconstruction of large soft-tissue defects, however it is associated with complications such as incisional hernia (IH) and parastomal hernia (PSH). Open, fascia-sparing, and robotic harvest are possible, followed by closure methods such as primary, component separation, or mesh closure.

Method

- Systematic review, PRISMA and AMSTAR2 guidelines - Search in PubMed, Embase and Scopus
- Study selection (Rayyan), data-extraction, risk of bias (Robins-I, Rob2) and quality assesment (GRADE)

Study objectives

Primary endpoints:
IH and PSH incidence, min follow-up 1 year

Secondary endpoints:
Morbidity and mortality related to IH and PSH and their treatment options

Inclusion criteria:
- RCTs, retrospective studies, case series
- From inception to 1 June 2024
- Reporting on VRAM flap and IH and/or PSH

Exclusion criteria:
- <1 year follow-up, <10 participants
- Systematic review, meta-analysis, comment, letter, narrative review, no full text available

Results

- 24 studies, 2.200 patients, mean 60 years, 49% male, BMI 23-32 kg/m^2, smoking ranged from 16-48%
- 19 retrospective cohort studies, 3 retrospective case series, 2 RCTs
- Very low to moderate quality (GRADE), some concerns to high risk of bias (RoB 2, ROBINS-I)
- IH incidence:10.2% (226/2200, range 0-50%). PSH incidence: 19.2% (219/1143, range 0-53%)
- Mean follow-up: 31 months [range 12-66]

Table 1: IH and PSH incidences associated with different harvest and closure methods

	IH		PSH		Mean follow-up m (range)	Studies reporting incidence (studies using the method)
	%	n/n$_{tot}$	%	n/n$_{tot}$		
Primary fascial closure	13.2	60 / 454	11.4	38/322	28 (12 – 43)	10 (18)
Harvest methods						
Robotic	12.5	2/16	NR	NR	39 (NR)	1 (1)
Fascia sparing	1.5	2/133	NR	NR	25 (NR)	1 (5)
Prophylactic techniques						
Component separation	5.4	2/37	8.0	2/25	21 (15 – 21)	3 (6)
Mesh reinforcement	8.4	30/359	11.0	34/163	24 (12 – 25)	5 (16)

Table 2: Hernia repair listed by study

Tang et al. (MFU 49 months) IH repair (n=3)	PSH repair (n=10)
Primary suture (n=1) => Reintervention after 7 months: retromuscular biological mesh + unilateral CS (n=1)	Primary suture (n=7) => Reintervention: intraperitoneal keyhole repair with biological mesh (n=1) => Reintervention: (unknown type) mesh repair (n=1)
Retromuscular biological mesh (n=1)	Retromuscular biological mesh (n=3) => Reintervention: intraperitoneal sugarbaker repair with biological mesh (n=1)
Retromuscular hybrid mesh (n=1)	
Galbraith et al. (MFU 13 months) IH repair (n=1)	
Hernia repair with composite mesh (position not reported)	
Davilla et al. (MFU 30 months) IH repair (n=2)	
Retromuscular hernia repair with biological mesh	

Conclusion

To our knowledge, this is the first systematic review reporting on IH and PSH incidence after min. 1 year follow-up. There is heterogeneity in follow-up period, surgical techniques and diagnosis (clinical, radiological or both) across studies. Prophylactic techniques show promise; especially fascia-sparing harvest and prophylactic mesh closure. Further, hernia recurrence was more frequently following primary suture repair, subsequent repairs were often done utilizing retromuscular biological mesh. The quality of life outcomes and donor-site morbidity risk factors are scarcely reported in literature. Future study registries and expert consensus to establish clinical guidelines for hernia prophylaxis and management in patients undergoing VRAM flap harvest.