



PARAESOPHAGEAL HERNIA REPAIR

WITH BIOLOGICAL MESH

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DEPARTMENT OF DIGESTIVE SURGERY

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- FRANCE -







✓ GERD → 10% of the population in Western countries

$\checkmark\,$ HH association in 5% of cases

✓ 5% among them are large size (OH>5cm or>6cm2)



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- ✓ Obesity is a known risk factor for GERD and/or hiatus hernia
- ✓ 50-70 % of patients undergoing bariatric surgery for morbid obesity have symptomatic reflux
- ✓ HH is present in 15 % of patients with BMI >35kg/m2





Soricelli E, Casella G, Rizzello M, et al. Initial experience with laparoscopic crural closure in the management of hiatal hernia in obese patients undergoing sleeve gastrectomy. Obes Surg. 2010;20(8):1149–53.

Braghetto I, Lanzarini E, Korn O, et al. Manometric changes of the ower esophageal sphincter after sleeve gastrectomy in obese patients. Obes Surg. 2010;20(3):357–62.













Hashemi M, De Meester T et al.J Am Coll Surg 2000;190:553-60



Biologic Prosthesis to Prevent Recurrence after Laparoscopic Paraesophageal Hernia Repair: Long-term Follow-up from a Multicenter, Prospective, Randomized Trial

Brant K Oelschlager, MD, FACS, Carlos A Pellegrini, MD, FACS, John G Hunter, MD, FACS, Michael L Brunt, MD, FACS, Nathaniel J Soper, MD, FACS, Brett C Sheppard, MD, FACS, Nayak L Polissar, PhD, Moni B Neradilek, MS, Lee M Mitsumori, MD, Charles A Rohrmann, MD, Lee L Swanstrom, MD, FACS





Primary repair = Recurrence of 59 %



Oelschlager BK, Pellegrini CA et al. J Am Coll Surg 2011;213:461-8



TO MESH OR NOT TO MESH?... THAT IS THE QUESTION







Surg Endosc

DOI 10.1007/s00464-013-3173-3 GUIDELINES

Guidelines for the management of hiatal hernia

Geoffrey Paul Kohn · Raymond Richard Price · Steven R. DeMeester · Jörg Zehetner · Oliver J. Muensterer · Ziad Awad · Sumeet K. Mittal · William S. Richardson · Dimitrios Stefanidis · Robert D. Fanelli · for the SAGES Guidelines Committee





- A necessary step of HH repair is to return the gastroesophageal junction to an infradiaphragmatic position (+++ strong)
- ✓ During paraesophageal HH repair the hernia sac should be dissected away from mediastinal structures (+++ strong) and then preferably excised (++ weak)
- The use of mesh for reinforcement of large HH repairs leads to decreased short term recurrence rates (+++ strong)







































Surg Endosc (2009) 23:1219–1226 DOI 10.1007/s00464-008-0205-5

Mesh complications after prosthetic reinforcement of hiatal closure: a 28-case series

Rudolf J. Stadlhuber · Amr El Sherif · Sumeet K. Mittal · Robert J. Fitzgibbons Jr · L. Michael Brunt · John G. Hunter · Tom R. DeMeester · Lee L. Swanstrom · C. Daniel Smith · Charles J. Filipi



Reintervention 23 cases (7 esophagectomies)

CHARACTERISTICS OF AN IDEAL PROSTHETICS



- ✓ No physically modified by host tissues
- ✓ Chemically inert
- ✓ Not cause too many inflammatory reactions type giant cells
- ✓ No carcinogenic
- ✓ Not cause allergy or hypersensitivity
- Possibility to be manufactured to a desired shape and at a reasonable
 - cost

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✓ Possibility to be







Scales JT. Proc Roy Soc Med 1953;46:647-52

NO SYNTHETIC MATERIALS



- Prevent long-term foreign bodies
- Forming a solid natural tissue \checkmark

Surg Endosc (2006) 20: 1693-1697 DOI: 10.1007/s00464-006-0680-5

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Histologic results 1 year after bioprosthetic repair of paraesophageal hernia in a canine model

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¹ Department of Surgery and Institute for Minimally Invasive Surgery, Washington University School of Medicine, St. Louis, MO, USA ² Department of Surgery, Northwestern University, Chicago, IL, USA





Before implantation



9 months











Submucosal pig intestinal	Porcine dermis	Human dermis	Bovine pericardium					
 Surgisis[®] Lyosis [®] SIS Gold [®] FortaGen [®] 	 Permacol[®] Collamend[®] Xenmatrix[®] Strattice[®] CELLIS[®] 	 AlloMax[®] FlexHD[®] AlloDerm[®] SurgiMend [®] 	 Tutopatch[®] Veritas[®] Peri-guard[®] 					
Price / cm2								

(mayor differences by origin) € 6 → 24 euros €





A Multicenter, Prospective, Randomized Trial

Brant K. Oelschlager, MD,* Carlos A. Pellegrini, MD,* John Hunter, MD,† Nathaniel Soper, MD,‡ Michael Brunt, MD,§ Brett Sheppard, MD,† Blair Jobe, MD,† Nayak Polissar, PhD, Lee Mitsumori, MD,* James Nelson, MD,* and L. Swanstrom, MD¶





- ✓ Hernia size > 5cm
- ✓ 57 (PR) vs 51 (Bio-Mesh)



- ✓ Upper gastro intestinal series at 6 month
- Comparable functional results
- No complications related to the mesh





SYSTEMATIC REVIEW AND META-ANALYSIS



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Laparoscopic augmentation of the diaphragmatic hiatus with biologic mesh versus suture repair: a systematic review and meta-analysis

Stavros A. Antoniou^{1,2,7} · Beat P. Müller-Stich³ · George A. Antoniou⁴ · Gernot Köhler⁵ · Ruzica-Rosalia Luketina⁵ · Oliver O. Koch⁵ · Rudolph Pointner⁶ · Frank-Alexander Granderath¹

Α	Author	Year(s) of publication	Study design	Patient characteristics	Graft	No. of patients (suture/mesh)	Details of suture repair	Details of mesh repair	Follow-up data	Hemia recurrence (suture vs mesh repair)
C)elschlage [19, 20]	r2006 2011	Assessor-blind RCT	Symptomatic paraesophageal hernia size >5 cm	SIS	108 (57/51)	Interrupted #2-0 or #0 sutures Nissen fundoplication	U-shaped 7×10 cm mesh anchored with interrupted sutures, Nissen fundoplication	-Short term: 6 months -Long term: median 58 months (range, 40-78) -UGIS	12/50 vs 4/44 ^a 20/39 vs 14/33 ^b
F	tingley [21]	2006	Prospective case-control	Size of hiatal defect ≥5 cm	HACD	44 (22/22)	#0 silk sutures Nissen fundoplication	U-shaped 4×8 cm mesh anchored with #2-0 silk sutures –Nissen fundoplication	-12 months -UGIS	2/22 vs 0/22
S	t Peter [22]	2007	Retro spective case-control	Pediatric patients with hernia recurrence	SIS	21 (13/18)	# 2-0 silk sutures and esophagopex y with 4 #3-0 silk sutures± fundoplication	Pantaloon shaped mesh anchored to the diaphragm and the esophagus with #3-0 silk sutures± fundoplication	-Mean 26 months	4/13 vs 0/18
S	chmidt [23]	2014	Retrospective case-control	Hernia size 1-5 cm in UGIS or UGIE	HACD	70 (32/38)	#0 silk sutures	U-shaped mesh anchored with 4-6 #2-0 silk sutures	-12 months -UGIS or UGIE	5/32 vs 0/38
v	Vatson [24]	2014	Double blind RCT	Herniation of ≥50% of the stomach	SIS	84 (43/41)	NR	2-3 cm×4-5 cm mesh posterior repair anchored with sutures or tacks	-6 months UGIE ±UGIS -12 months symptom outcome	3/39 vs 2/39





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	Suture re	pair	Biologic mesh	repair		Odds Ratio	Odds	Ratio	Risk of Bias
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% C	M-H, Rand	om, 95% Cl	ABCDEFG
Oelschlager 2006	12	50	4	44	52.1%	3.16 [0.94, 10.65]			••?••
Ringley 2006	2	22	0	22	8.0%	5.49 [0.25, 121.18]			
Schmidt 2014	5	32	0	38	8.9%	15.40 [0.82, 290.18]	-		
St Peter 2007	4	13	0	18	8.4%	17.53 [0.85, 360.82]	1	. →	
Watson 2014	3	39	2	39	22.6%	1.54 [0.24, 9.78]		•	••••
Total (95% CI)		156		161	100.0%	3.74 [1.55, 8.98]		•	
Total events	26		6						
Heterogeneity: Tau ² =	Heterogeneity: Tau ² = 0.00; Chi ² = 3.00, df = 4 (P = 0.56); l ² = 0%								
Test for overall effect:	Z = 2.95 (P	= 0.003	3)				Favors suture	Favors biologic m	esh

Short-term recurrence = 16.7 % suture repair vs 3.7 % biologic mesh repair (OR 3.74, 95 % Cl 1.55–8.98, p=0.003)





REVIEW





Systematic review and meta-analysis of laparoscopic mesh versus suture repair of hiatus hernia: objective and subjective outcomes

 $\begin{array}{l} Chao \ Zhang^{1} \cdot Diangang \ Liu^{1} \cdot Fei \ Li^{1} \cdot David \ I. \ Watson^{2} \cdot Xiang \ Gao^{1} \cdot \\ Jan \ H. \ Koetje^{2} \cdot Tao \ Luo^{1} \cdot Chao \ Yan^{1} \cdot Xing \ Du^{1} \cdot Zhonggao \ Wang^{1} \end{array}$

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✓ 4 RCT, 3 retrospective case–control and 4 prospective case–control studies

- ✓ Published from 2002 to 2016
- ✓ 755 (PR) vs 719 (mesh)

- 5 biological mesh
 5 permanent mesh
 - 1 biosynthetic mesh
- ✓ Follow-up from 6 to 58 months





Recurrence : 2.6 vs. 9.4%, OR 0.23 (95% CI 0.14-0.39), P<0.00001

	Mes	h	Sutu	re		Odds Ratio	Odds Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl	M-H, Fixed, 95% Cl
Asti 2016	1	41	1	43	2.8%	1.05 [0.06, 17.36]	
Crespin 2016	1	110	1	36	4.3%	0.32 [0.02, 5.27]	
Frantzides 2002	2	36	1	36	2.7%	2.06 [0.18, 23.77]	
Granderath 2006	1	50	1	50	2.8%	1.00 [0.06, 16.44]	
Kamolz 2002	1	100	6	100	17.2%	0.16 [0.02, 1.34]	
Oelschlager 2011	12	45	10	49	20.4%	1.42 [0.54, 3.70]	
Ozmen 2014	1	30	1	31	2.8%	1.03 (0.06, 17.33)	
Ringley 2006	4	22	4	22	9.5%	1.00 [0.22, 4.63]	
Schmidt 2014	3	38	2	32	5.8%	1.29 [0.20, 8.21]	
Turkcapar 2007	1	164	2	313	4.0%	0.95 [0.09, 10.60]	
Watson 2015	8	83	8	43	27.6%	0.47 [0.16, 1.35]	
Total (95% CI)		719		755	100.0%	0.81 [0.49, 1.33]	•
Total events	35		37				
Heterogeneity: Chi ² = 5.99, df = 10 (P = 0.82); l ² = 0%							
Test for overall effect:	Z=0.83	(P = 0.4	0)				0.01 0.1 1 10 100 Favours (Suture) Favours (Mesh)

Complications : 4,8% vs 4,9%, P=0,4

2017

CHU

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Improvement in QOL SF-36 and GERD-HRQL for biological mesh vs suture repair (MD = 13.68, 95% Cl 2.51–24.85, P = 0.020)







Diseases of the Esophagus (2014) 27, 13–17 DOI: 10.1111/dote.12042



Hiatal hernia repair with biologic mesh reinforcement reduces recurrence rate in small hiatal hernias

E. Schmidt, A. Shaligram, J. F. Reynoso, V. Kothari, D. Oleynikov

Department of Surgery, University of Nebraska Medical Center, Omaha, Nebraska, USA

✓ Single-institution retrospective review between 2002 and 2009

- ✓ Hiatal Hernia measuring 1 to 5 cm
- ✓ 38 P Mesh(HumanADM) vs 32 P cruroplasty
- ✓ Follow-12 months

	Suture cruroplasty (n = 32)	Biologic mesh $(n = 38)$	P value
Males (%)	12 (38)	17 (45)	0.62
Females (%)	20 (63)	21 (55)	1
Age (mean)	41	51	0.031
Smokers (%)	4 (13.8)	5 (14.3)	1
BMI average	29.5	31.37	0.22
Hiatal hernia size (cm, mean, range)	1.25 (1–4)	1.23 (1-4)	1
Preoperative evaluation			
UĞI (%)	25 (78)	32 (84)	0.55
EGD (%)	19 (60)	22 (57)	1
Either UGI or EGD (%)	32 (100)	38 (100)	1

✓ Recurrence rate at one year:

(0/38) vs (5/32) 16% p 0.014



KEY STRATEGIES



- ✓ Prefer a u-shaped and not a keyhole configuration
- Cover the hiatus posterior to the esophagus taking care to avoid "pulling" the mesh anteriorly
- ✓ Leave a small space between the edge of the mesh and the esophageal wall to avoid excessive contact of the mesh with the esophagus









TAKE HOME MESSAGE



- ✓ Laparoscopic treatment of large HH is exposed to a high % of recurrences.
- ✓ Biologic grafts represent a major advancement in complex hernia repair.
- ✓ The use of biological mesh gives good morphological and functional results.
- ✓ The laparoscopic surgeon should be familiar with the current "supply" of prostheses, their advantages and disadvantages (risk / benefit).
- The type of prosthesis and its long-term behavior must be still evaluated by future randomized studies.





Merci pour votre Attention !

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