Prothèses prophylactiques

Pr C.Barrat

Chirurgie digestive et métabolique
Pôle des Activités Interventionnelles Ambulatoires et Nutritionnelles
Hôpitaux Universitaire de Paris Seine Saint Denis
Centre Intégré de l'Obésité Nord Francilien
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UMR 0914 INRA/AgroParisTech

Incidence des éventrations après laparotomie

- Incidence est élevée : 11-20%
- Incidence plus élevée pour les patients a risques : 30 % (69%)*

  Obésité +++

  AAA +++

  Diabétiques non équilibrés (HbA1C 6.5%)

  Fumeurs

*Alnassar S Vascular 2012 ;20:273-277

The economic burden of incisional ventral hernia repair: a multicentric cost analysis

"The mean total cost for an IVHR in France in 2011 was estimated to be 6451€, ranging from 4731€for unemployed patients to 10,107€for employed patients whose indirect costs (5376€) were slightly higher than the direct costs"

J-F GillionM. M Miserez. D Sanders F Muysoms
Hernia (2016) 20:819–830
DOI 10.1007/s10029-016-1480-z

Prothèses prophylactiques

- Dans quel cas ?

  1°Stomie permanente

  2°Fermeture d'une stomie

  3°Laparotomie médiane

- **Pour quel patient ?**

- Quelle prothèse ? (Pas de recommandations pour l'EHS)

- Quelle position ? (Pas de recommandation pour l'EHS)

- Quelle fixation ? (Pas de recommandation pour EHS)

AJ Cross Meta-analysis of prophylactic mesh to prevent parastomal hernia BJS 2016
HT Brandsam Prophylactic mesh placement to PREVENT PSH, early results of a multicentre RCT Hernia 2016
FE Muysoms EHS guidelines on the closure of abdominal wall incisions Hernia 2015

Hernia

Does prophylactic mesh placement in elective, midline laparotomy reduce the incidence of incisional hernia? A systematic review and meta-analysis

Zachary M. Borab, BA[a], Sameer Shakir, MD[b], Michael A. Lanni, BS[b], Michael G. Tecce,DO[b], John MacDonald, MA[c], William W. Hope, MD[d], John P. Fischer, MD, MPH[b]

Surgery 161, Issue 4, April 2017, Pages 1149–1163

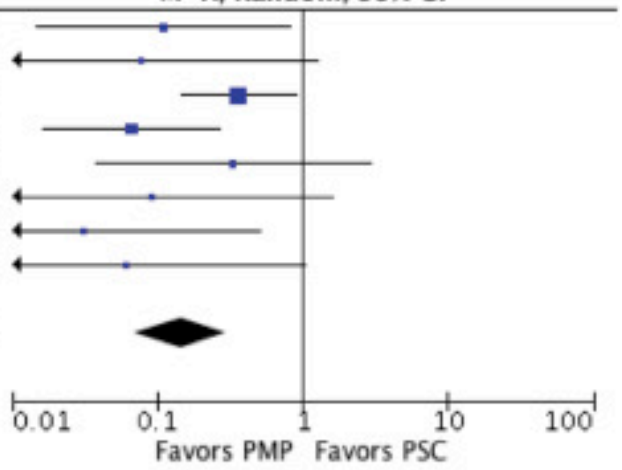
- 14 études
- 11 études RCT et 3 études prospective de cohorte
- 2114 patients
- 1152 ont eu une prothèse prophylactique
- Pas de différence entre les deux groupes

- Suivi de 25.67+/- 9.92 mois

A

Study or Subgroup	PMP Events	PMP Total	PSC Events	PSC Total	Weight	Risk Ratio M-H, Random, 95% CI
Abo-Ryia 2013	1	32	9	32	11.2%	0.11 [0.01, 0.83]
Bali 2015	0	20	6	20	6.2%	0.08 [0.00, 1.28]
Bevis 2010	5	37	16	43	34.7%	0.36 [0.15, 0.90]
Caro-Tarrago 2014	2	80	30	80	19.9%	0.07 [0.02, 0.27]
El Khadrawy 2009	1	20	3	20	9.7%	0.33 [0.04, 2.94]
Gutierrez 2003	0	44	5	44	5.9%	0.09 [0.01, 1.60]
Muysoms 2016	0	56	16	58	6.2%	0.03 [0.00, 0.51]
Strzelczyk 2006	0	36	8	38	6.1%	0.06 [0.00, 1.04]
Total (95% CI)		**325**		**335**	**100.0%**	**0.15 [0.07, 0.30]**
Total events	9		93			

Heterogeneity: $Tau^2 = 0.19$; $Chi^2 = 8.42$, $df = 7$ ($P = 0.30$); $I^2 = 17\%$
Test for overall effect: $Z = 5.19$ ($P < 0.00001$)

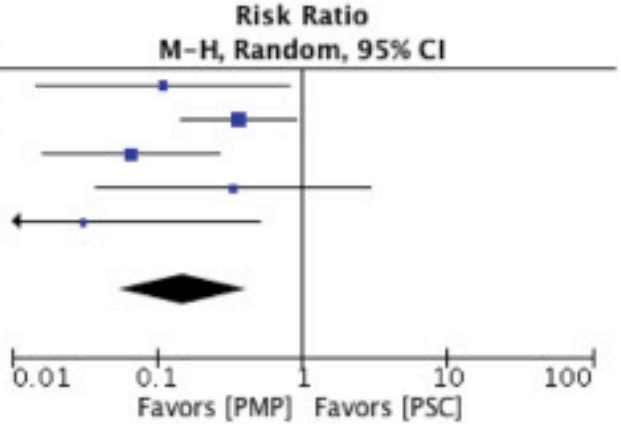


PMP Polypropyléne

B

Study or Subgroup	PMP Events	PMP Total	PSC Events	PSC Total	Weight	Risk Ratio M-H, Random, 95% CI
Abo-Ryia 2013	1	32	9	32	16.4%	0.11 [0.01, 0.83]
Bevis 2010	5	37	16	43	33.9%	0.36 [0.15, 0.90]
Caro-Tarrago 2014	2	80	30	80	24.6%	0.07 [0.02, 0.27]
El Khadrawy 2009	1	20	3	20	14.7%	0.33 [0.04, 2.94]
Muysoms 2016	0	56	16	58	10.2%	0.03 [0.00, 0.51]
Total (95% CI)		**225**		**233**	**100.0%**	**0.15 [0.06, 0.42]**
Total events	9		74			

Heterogeneity: $Tau^2 = 0.57$; $Chi^2 = 7.33$, $df = 4$ ($P = 0.12$); $I^2 = 45\%$
Test for overall effect: $Z = 3.66$ ($P = 0.0003$)



Conclusions

- Réduction significative du risque d'éventration
- Quelque soit la position de la prothèse

- Augmente le risque de sérome (onlay)
- Augmente le risque de douleurs chroniques

BMC Surg. 2013 Oct 28;13:48. doi: 10.1186/1471-2482-13-48.

A double blind randomized controlled trial comparing primary suture closure with mesh augmented closure to reduce incisional hernia incidence.

Nieuwenhuizen J, Eker HH, Timmermans L[1], Hop WC, Kleinrensink GJ, Jeekel J, Lange JF; PRIMA Trialist Group.

" Ann Surg 2015 Feb ;261 (2): 276-81 doi: 10.1097/SLA0000000000798

Short-term results of a randomized controlled trial comparing primary suture closure glued mesh augmentation to prevent incisional hernia

Timmermans L[1] PRIMA Trialist Group.

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Eventrations après AAA avec un suivi 2 ans

Author	Year	Follow-up	Article type	# Hernias	# AAA	%
Fassiadis et al. [9]	2005	50 months	RCT	20	22	90,9
Rodriguez et al. [29]	2004	36 months	Prospective	14	61	22,9
Liapis et al. [30]	2004	63 months	Prospective	32	197	16,2
Raffetto et al. [28]	2003	33 months	Prospective	50	177	28,2
Augestad et al. [31]	2002	42 months	Case series	49	140	35
Musella et al. [32]	2001	49 months	Prospective	16	51	31,4
Adye and Luna [26]	1998	36 months	Retrospective	18	58	31,0
Holland et al. [33]	1996	24 months	Case series	13	34	38,2
Stevick et al. [34]	1988	38 months	Retrospective	10	27	37,

Author	Year	Type article	# Patients	Hernia primary	Hernia Mesh	Follow-up	Mesh type	Mesh position
G. Currò et al. [14]	2011	Prospective	95	15/50	2/45	24 months	**Polypropylene**	**Sublay**
O. H. Llaguna et al. [15]	2011	Prospective	134	11/62	1/44	17 months	**Biological**	**Intraperitoneal**
P. M. Bevis et al. [16]	2010	RCT	85	16/43	5/37	36 months	**Polypropylene**	**Sublay**
G. Currò et al.	2010	Prospective	50	8/25	1/25	12 months	**Polypropylene**	**Sublay**
M. P. Hidalgo et al.	2010	Cohort	72	-	0/72	46 months	**Polypropylene**	**Onlay**
O. H. El-Khadrawy et al. [19]	2009	RCT	40	1/20	3/20	36 months	**Polypropylene**	**Preperitonial**
G. Hebert et al.	2009	Cohort	16	-	1/16	6 months	**Mix**	**Sublay**
J. Strzelczyk et al. [21]	2006	RCT	74	8/38	0/36	28 months	**Polypropylene**	**Sublay**
J.L. O'Hare et al. [22]	2007	Cohort	39	-	1/28	48 months	**Polypropylene**	**Sublay**
C. Gutierrez de la Pena et al. [23]	2003	RCT	88	5/44	0/44	36 months	**Polypropylene**	**Onlay**
J. Strzelczyk et al. [24]	2002	Prospective	60	9/48	0/12	12 months	**Polypropylene**	**Sublay**
A. Pans [25]	1998	RCT	288	41/144	33/144	29 months	**Vicryl**	**Intraperitoneal**

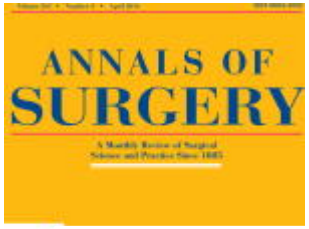

Ceci n'est pas une noix

CONCLUSIONS

The use of prosthetic mesh has proven effective and safe in incisional hernia surgery however its use in a prophylactic manner has yet to be properly investigated.

The PRIMA trial will provide level 1b evidence whether mesh augmented midline abdominal closure reduces incisional hernia incidence in high risk groups”

Increase in seroma formation after OMA but without an increased risk of surgical site infection



Annals of Surgery
Numéro : Volume 263(4), April 2016, p 638–645
DOI : 10.1097/SLA.0000000000001369

Prevention of Incisional Hernias by Prophylactic Mesh-augmented Reinforcement of Midline Laparotomies for Abdominal Aortic Aneurysm Treatment: A Randomized Controlled Trial

Muysoms, Filip E. MD; Detry, Olivier MD, PhD; Vierendeels, Tijl MD; Huyghe, Marc MD; Miserez, Marc MD, PhD; Ruppert, Martin MD; Tollens, Tim MD; Defraigne, Jean-Olivier MD, PhD; Berrevoet, Frederik MD, PhD

	NONMESH (N = 58)	MESH (N = 56)
Length of fascia incision (cm)	28 (4.6)	27 (3.6)
Length of suture used to close the fascia (cm)	112 (54.6)	94 (28.2)
SL/WL ratio	3.9 (1.61)	3.5 (0.98)
SL/WL ratio ≥ 4	31% (17/55)	28% (13/46)
Length of mesh used (cm)	—	32 (3.7)
Estimated overlap of the mesh beyond the incision (cm)	—	3 (0.8)
Number of fixation sutures used	—	12 (4.6)
Drains used		
None	55 % (32/58)	57% (32/56)
Retromuscular (on the mesh)	—	9% (5/56)
Retro- or intraperitoneal	41% (24/58)	32% (18/56)
Subcutaneous	2% (1/58)	4% (2/56)
Duration of surgery		
Overall operation time (min)	190 (83)	211 (62)*
Time to close the abdominal wall (min)	30 (18)	46 (19)‡
Intraoperative complications		
Related to aneurysm surgery	5% (3/58)	5% (3/56)
Related to abdominal wall closure	0% (0/58)	0% (0/56)
Early postoperative complications§		
None	52% (30/58)	55% (31/56)
Grade I	7% (4/58)	16% (9/56)
Grade II	19% (11/58)	13% (7/56)
Grade IIIa	2% (1/58)	0% (0/56)
Grade IIIb	2% (1/58)	9 (5/56)
Grade IV	12% (7/58)	5% (3/56)
Grade V (mortality)	7% (4/58)	2% (1/56)
Hospital stay (d)	13 (11)	12 (7)

Data are means (SD) or % (n/N).
*$P < 0.05$.
‡$P < 0.001$.
§Classified according to the Clavien-Dindo classification of postoperative complications.[6]
SL/WL ratio indicates suture length to wound length ratio.

+16 minutes

TABLE 2 Description of (Post-)Operative Characteristics According to Randomization of the PRIMAAT Trial: A Randomized Clinical Trial on the Prevention of Incisional Hernias by Prophylactic Mesh-Augmented Reinforcement of Midline Laparotomies for Abdominal Aortic Aneurysm Treatment (for More Detailed Description of Early Postoperative Complications, See Table 3)

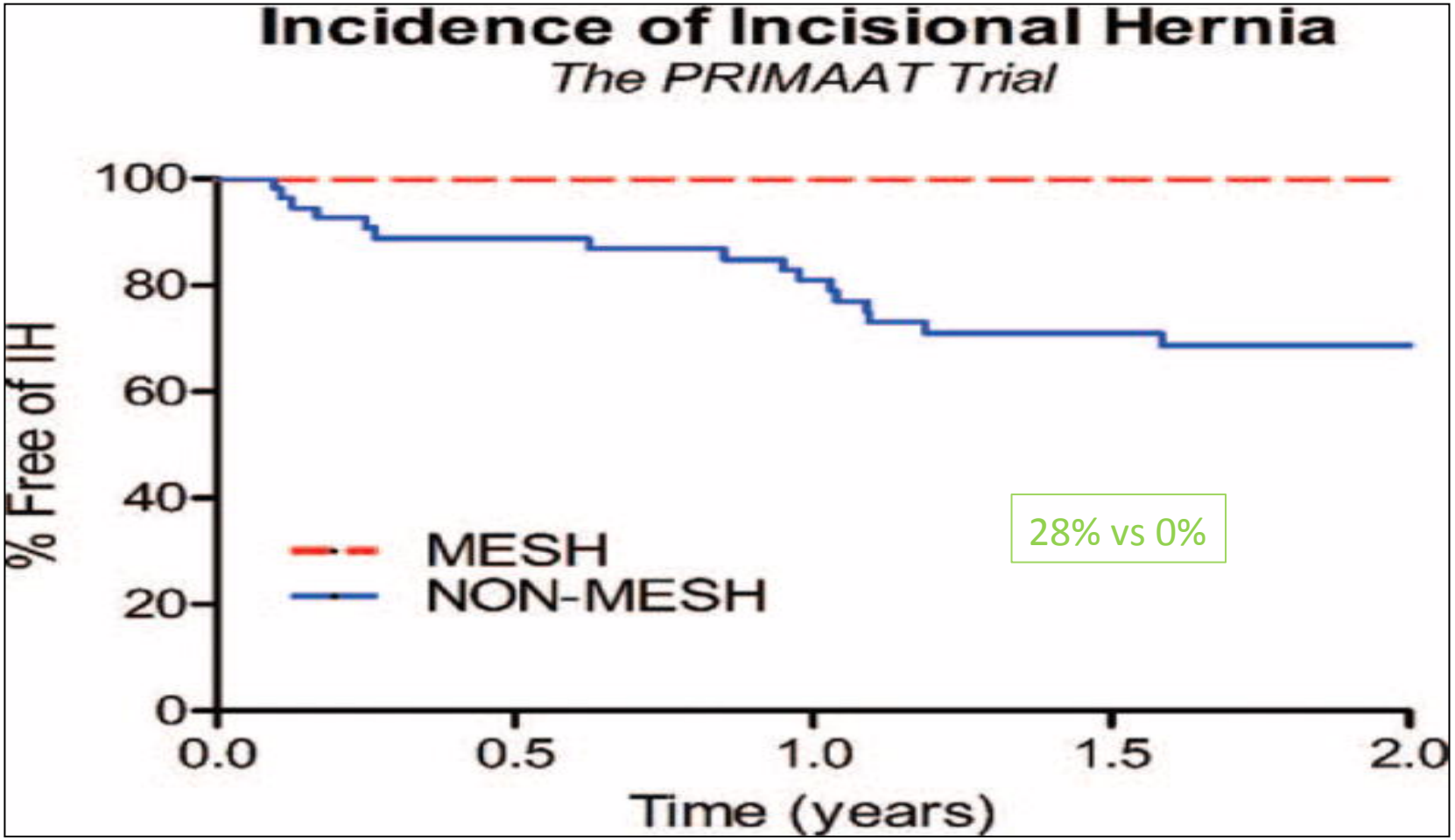


FIGURE 2 . Estimated freedom of incisional hernia curves (Kaplan-Meier) in 114 patients treated for abdominal aortic aneurysm through a midline laparotomy randomly allocated to conventional laparotomy closure or closure of the wound with a prophylactic retromuscular mesh-augmented reinforcement. They were significantly different across study arms ([chi]2 = 19.50, P < 0.0001; Mantel-Cox test).

Prevention of Incisional Hernias by Prophylactic Mesh-augmented Reinforcement of Midline Laparotomies for Abdominal Aortic Aneurysm Treatment: A Randomized Controlled Trial.

Muysoms, Filip; Detry, Olivier; MD, PhD; Vierendeels, Tijl; Huyghe, Marc; Miserez, Marc; MD, PhD; Ruppert, Martin; Tollens, Tim; Defraigne, Jean-Olivier; MD, PhD; Berrevoet, Frederik; MD, PhD

Annals of Surgery. 263(4):638-645, April 2016.
DOI : 10.1097/SLA.0000000000001369

European Hernia Society guidelines on the closure of abdominal wall incisions

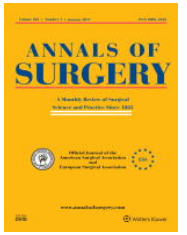
F. E. Muysoms;S. A. Antoniou;K. Bury;G. Campanelli;J. Conze; D. Cuccurullo; A. C. de Beaux;E. B. Deerenberg;B. East;R. H. Fortelny;J.-F. Gillion;N. A. Henriksen;L. Israelsson;A. Jairam;A. Janes;J. Jeekel;M. Lopez-Cano;M. Miserez;S. Morales-Conde;D. L. Sanders;M. P. Simons;M. Smietanski;L. Venclauskas;F. Berrevoet.

RECOMMENDATIONS:

To decrease the incidence of incisional hernias it is strongly recommended to utilise a non-midline approach to a laparotomy whenever possible. For elective midline incisions, it is strongly recommended to perform a continuous suturing technique and to avoid the use of rapidly absorbable sutures. It is suggested using a slowly absorbable monofilament suture in a single layer aponeurotic closure technique without separate closure of the peritoneum. A small bites technique with a suture to wound length (SL/WL) ratio at least 4/1 is the current recommended method of fascial closure. Currently, no recommendations can be given on the optimal technique to close emergency laparotomy incisions. Prophylactic mesh augmentation appears effective and safe and can be suggested in high-risk patients, like aortic aneurysm surgery and obese patients. For laparoscopic surgery, it is suggested using the smallest trocar size adequate for the procedure and closure of the fascial defect if trocars larger or equal to 10 mm are used. For single incision laparoscopic surgery, we suggest meticulous closure of the fascial incision to avoid an increased risk of incisional hernias.

Hernia (2015) 19:1–24
DOI 10.1007/s10029-014-1342-5

Ventral Hernia Management: Expert Consensus Guided by Systematic Review

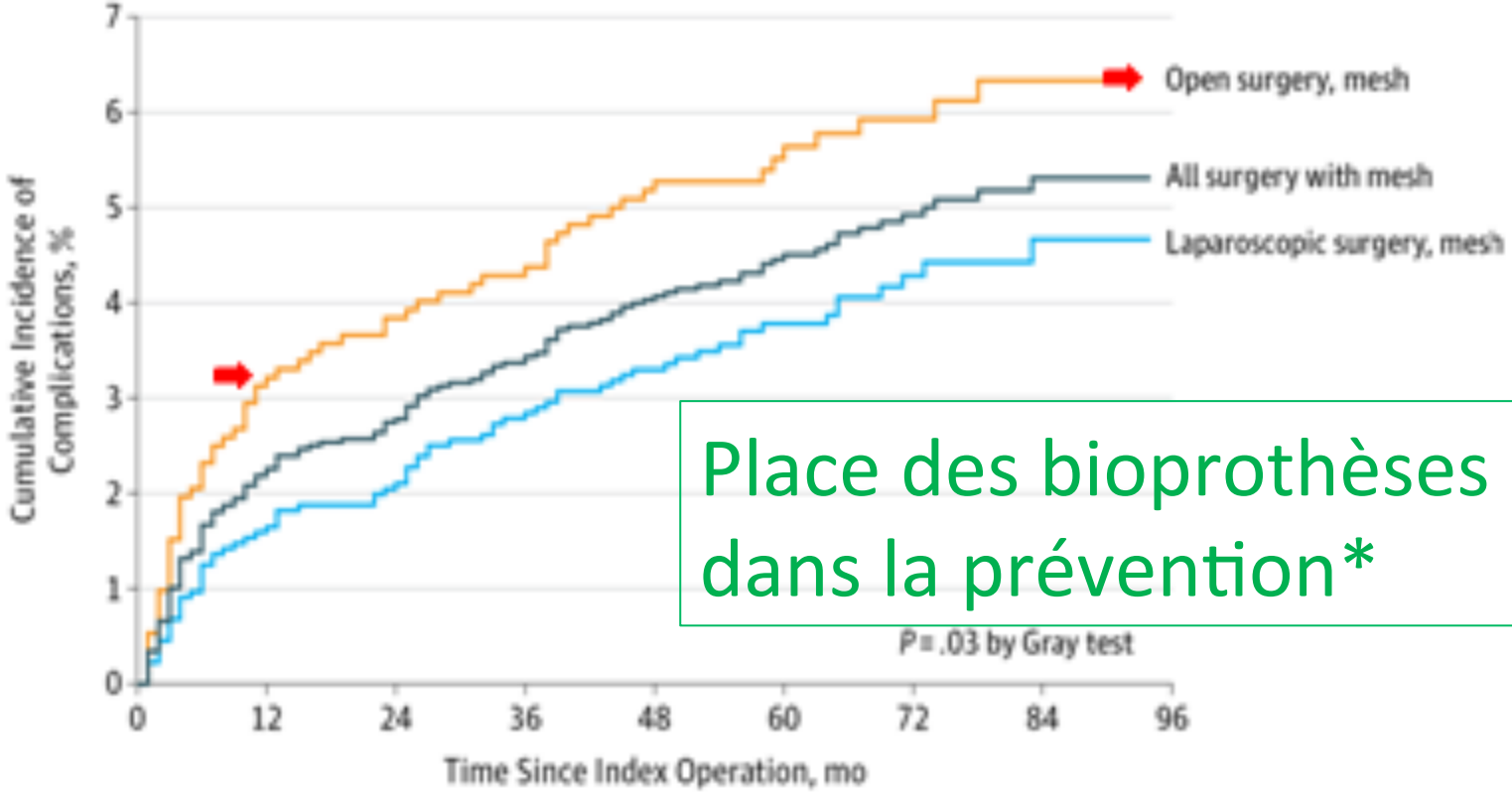


Liang, Mike K. MD; Holihan, Julie L. MD; Itani, Kamal MD; Alawadi, Zeinab M. MD, MS; Gonzalez, Juan R. Flores MD; Askenasy, Erik P. MD; Ballecer, Conrad MD; Chong, Hui Sen MD; Goldblatt, Matthew I. MD; Greenberg, Jacob A. MD; Harvin, John A. MD; Keith, Jerrod N. MD; Martindale, Robert G. MD, PhD; Orenstein, Sean MD; Richmond, Bryan MD; Roth, John Scott MD; Szotek, Paul MD; Towfigh, Shirin MD; Tsuda, Shawn MD; Vaziri, Khashayar MD; Berger, David H. MD

Annals of Surgery
Numéro : Volume 265(1), January 2017, p 80–89
DOI : 10.1097/SLA.0000000000001701

However, there are several barriers to its use in the US and none of the participants of the consensus panel reported using prophylactic mesh. Common reasons reported for not using prophylactic mesh reinforcement include lack of support from the Centers for Medicare and Medicaid services, lack of department support, limited effectiveness data, and unclear delineation of the risks and benefits. Although there is level one evidence to support the use of prophylactic mesh, there are a number of issues that will need to be resolved before the panelists would routinely utilize prophylactic mesh reinforcement.

Kokotovic D, Bisgaard T, Helgstrand F. Long-term Recurrence and Complications Associated With Elective Incisional Hernia Repair. *JAMA*. 2016;316(15):1575-1582. doi:10.1001/jama.2016.15217



No. at risk

Laparoscopic mesh	1757	1620	1532	1455	1332	942	578	260
Open mesh	1119	1000	942	880	790	556	370	211
All mesh	2876	2620	2474	2335	2122	1498	948	471

Place des bioprothèses dans la prévention*

*H Soderback Fontiers in Surgery 2016

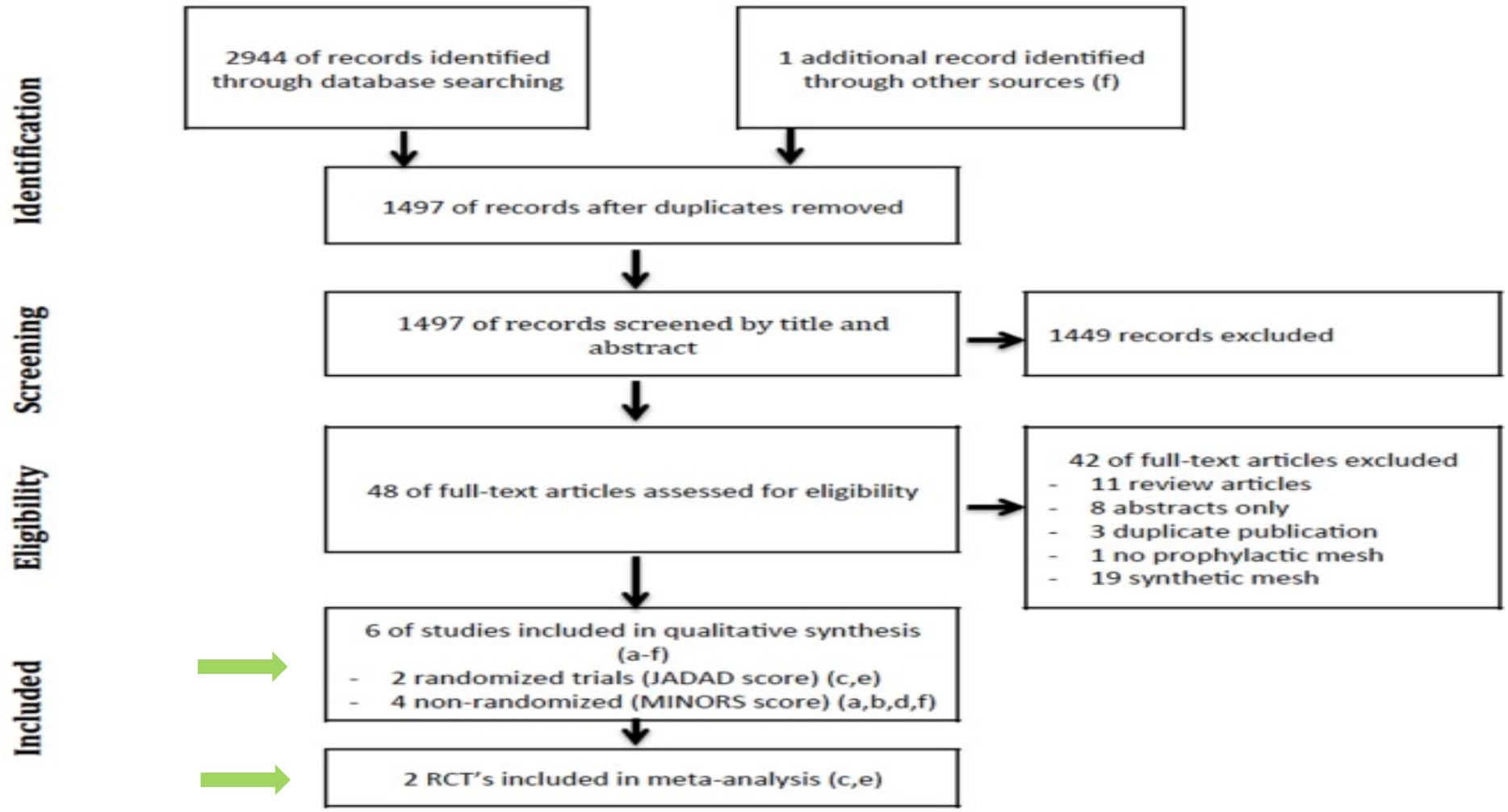
frontiers in Surgery

Prevention of Incisional Hernias with Biological Mesh: A Systematic Review of the Litterature

Filip E. Muysoms,[1,*†] An Jairam,[2,†] Manuel López-Cano,[3] Maciej Śmietański,[4,5] Guido Woeste,[6] Iris Kyle-Leinhase,[1] Stavros A. Antoniou,[7,8] Ferdinand Köckerling,[9] and BioMesh Study Group

Front Surg. 2016; 3: 53.
Published online 2016 Sep 26. doi: 10.3389/fsurg.2016.00053
PMCID: PMC5035749

Prisma flow diagram for the BioMesh search on the prevention of incisional hernias with biological mesh.

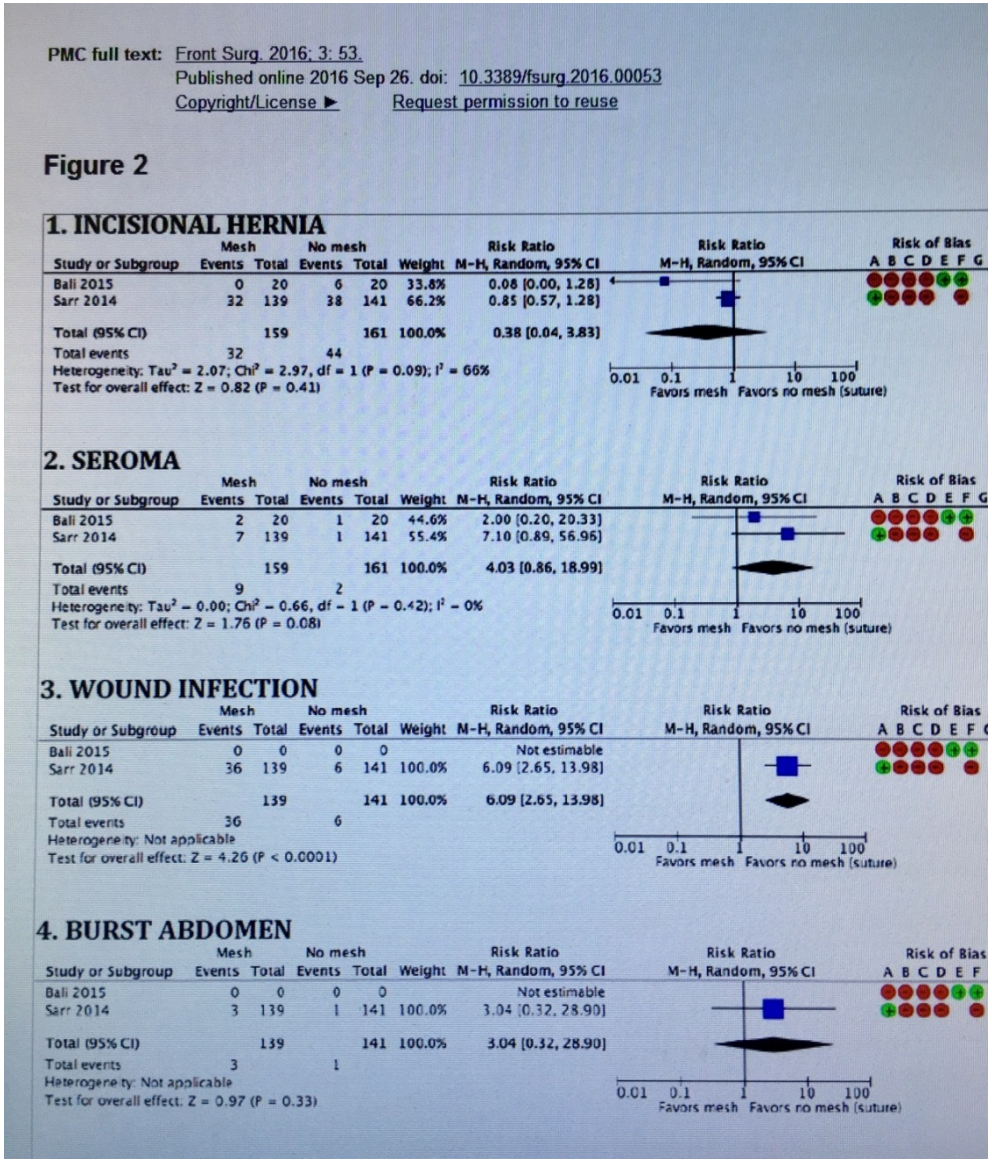


References

a. Boutros 2010
b. Llaguna 2011
c. Sarr 2014
d. Bhangu 2014
e. Bali 2015
f. Maggiore 2015

PMC full text: Front Surg. 2016; 3: 53.
Published online 2016 Sep 26. doi: 10.3389/fsurg.2016.00053

Figure 2



"There is no evidence that, in this setting, a non-permanent absorbable biological or biosynthetic mesh should be preferred to synthetic non-absorbable mesh, both in clean or clean-contaminated surgery".

Conclusions

- Laparotomie médiane en urgences ?
- Laparotomie médiane milieu propre contaminé ou contaminé ?
- Fermeture de stomie ?

Place des bio prothèses dans la prévention*

Etude du Club Hernie

REINFORCEMENT OF INTESTINAL STOMA CLOSURES
BY THE USE OF A SLOW-RESORPTION PARIETAL PROSTHESIS (PHASIX^{R})

The objectives of the study :
are to investigate whether the use of Phasix^{R} can reduce
the incidence of incisional hernias after stoma closure without increasing
morbidity at 30 days after the intervention.