

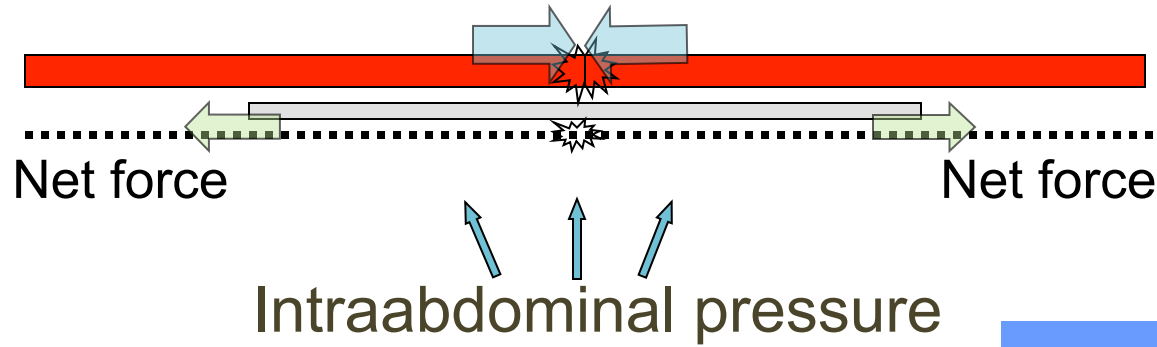
Hernie ventrale coelio sans fermeture du defect: facteurs prédictifs de récurrence

Philippe Hauters

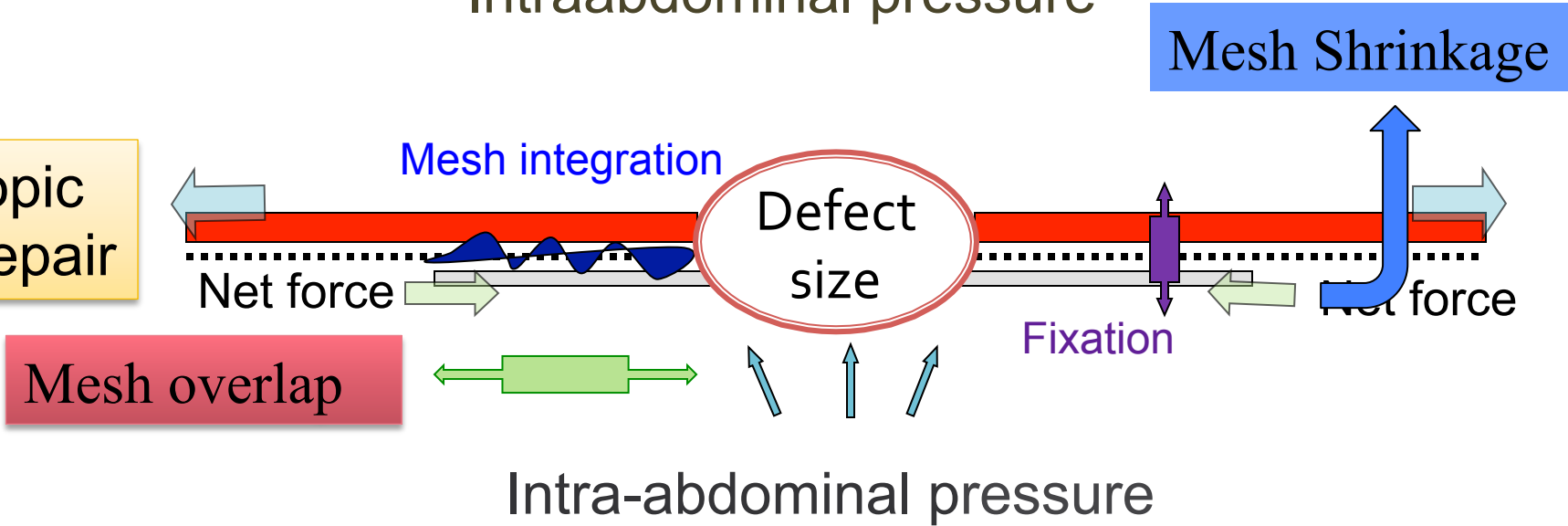
CH Wapi - Tournai

Le traitement des hernies ventrales par laparoscopie sans fermeture de l'orifice \neq une réparation sans tension

Stoppa repair



Laparoscopic Bridging repair



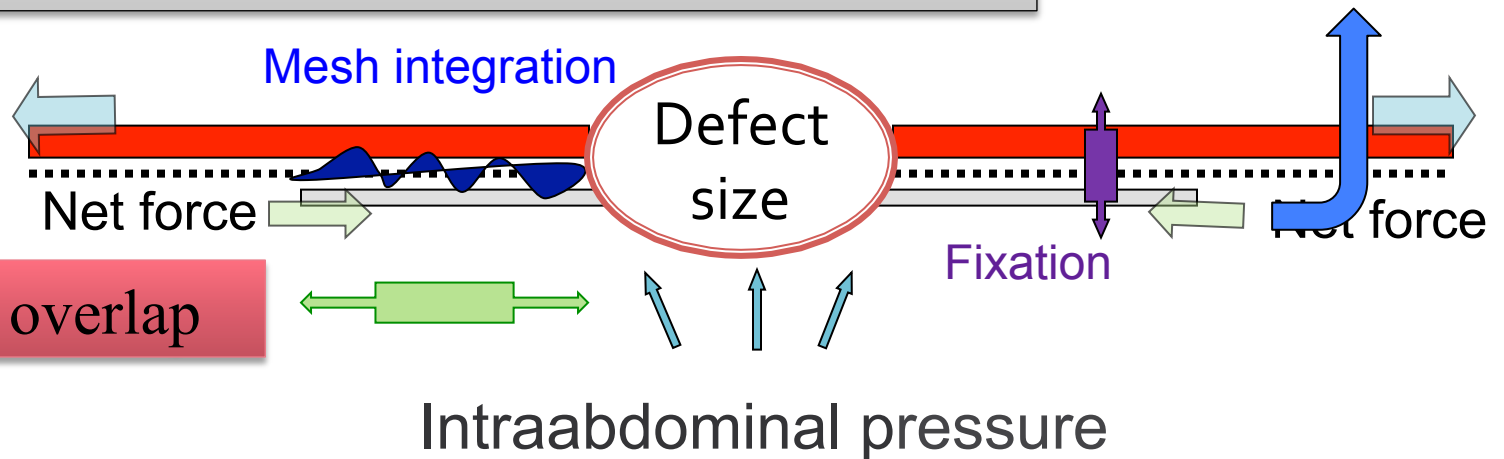
Technique chirurgicale: le chirurgien peut modifier le mode de fixation et l'overlap de la prothèse

Les paramètres que le chirurgien peut contrôler sont :

- ✧ « Le choix de la prothèse »
- ✧ le type de fixation
- ✧ Le chevauchement de la prothèse

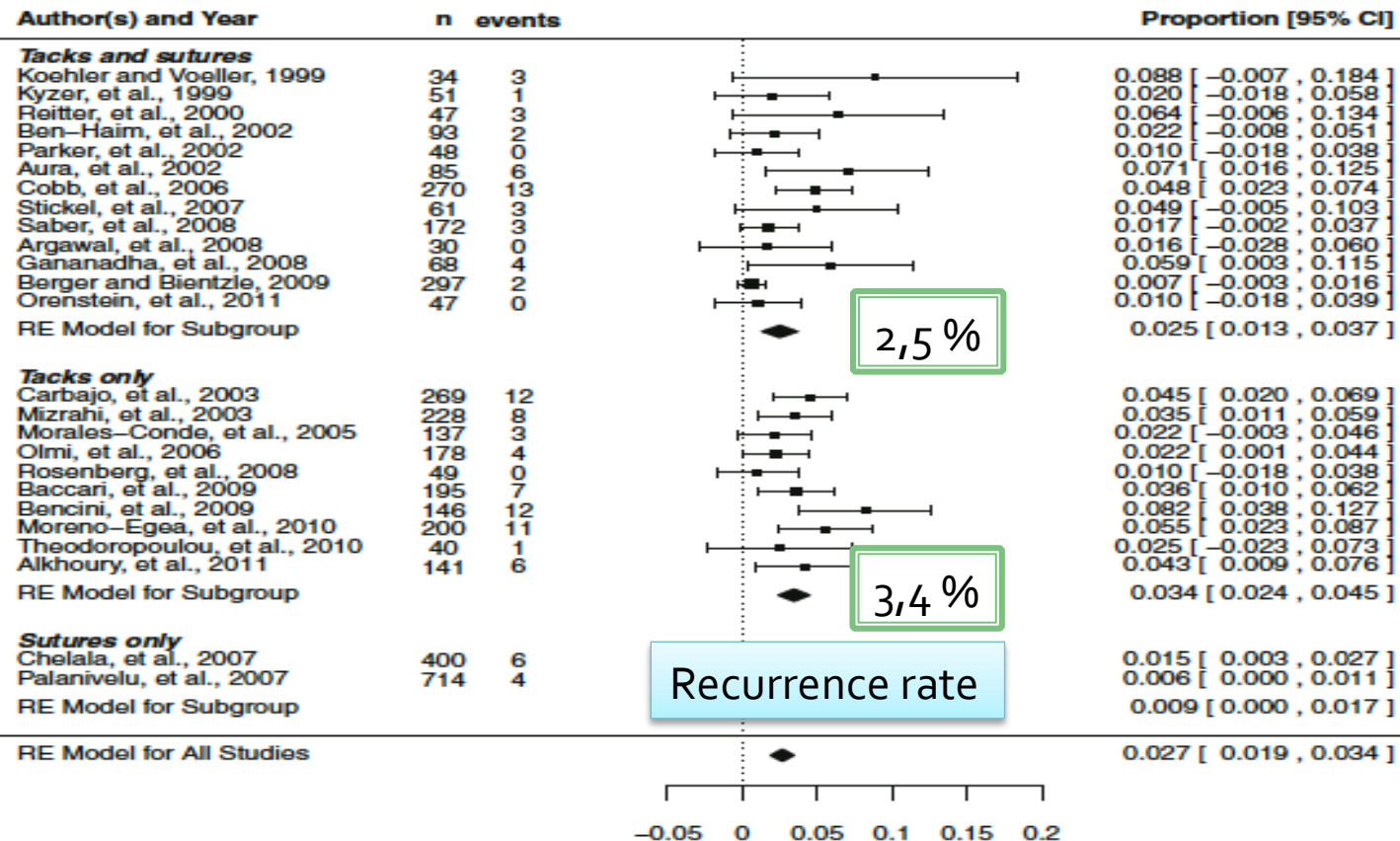
Laparoscopic
Bridging repair

Mesh overlap



✧ La fermeture ou pas du défaut <> autre débat !

Influence du type de fixation (tacks seuls vs. tacks & sutures trans-fasciales) sur la récurrence



SYSTEMATIC REVIEWS AND META-ANALYSES

Laparoscopic ventral hernia repair: is there an optimal mesh fixation technique? A systematic review

Emmelle Reynvoet - Ellen Deschepper - Xavier Rogiers -
Roberto Troisi - Frederik Berrevoet

Plus le chevauchement est grand, moins élevé est le taux de récurrence

Table 1 Pooled estimation of risk of hernia recurrence based on hernia size and amount of mesh overlap used for ventral hernia repair

Defect size (cm)	Mesh overlap (cm)					
	<3		3-5		>5	
	Number of studies	Pooled estimation of recurrence (%)	Number of studies	Pooled estimation of recurrence (%)	Number of studies	Pooled estimation of recurrence (%)
Small (<4)	2	6.23	2	2.99	0	Insufficient data
Medium (4-10)	1	7.84	28	6.48	5	2.93
Large (>10)	2	7.42	32	4.98	2	2.36

Recommandation: le chevauchement de la prothèse ≥ 5 cm

REVIEW

Proper mesh overlap is a key determinant in hernia recurrence following laparoscopic ventral and incisional hernia repair

K. LeBlanc¹

Ce chiffre de 5 cm est empirique et n'est pas basé sur des données biomécaniques

Surg Laparosc Endosc Percutan Tech. 1999 Apr;9(2):106-9.

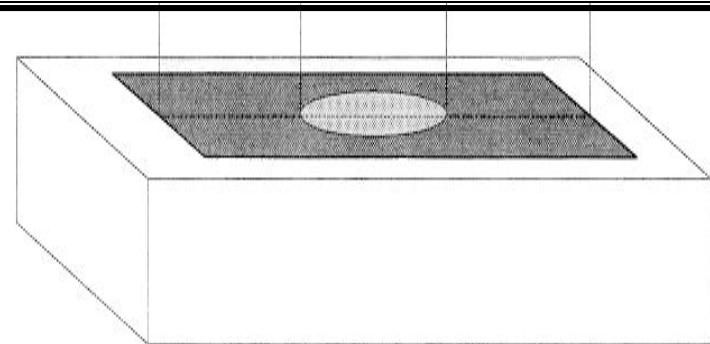
Static calculations for mesh fixation by intraabdominal pressure in laparoscopic extraperitoneal herniorrhaphy.

Hollinsky C, Hollinsky KH.

Surgical Department, Kaiserin Elisabeth Hospital, Vienna, Austria.

STATIC MATHEMATICAL MODEL

Mesh diameter should be
3 times the hernia diameter



Original article

Biomechanical abdominal wall model applied to hernia repair

M. Lyons¹, H. Mohan², D. C. Winter^{2,3} and C. K. Simms¹

IN VITRO MODEL

Mesh diameter = 2x defect diameter + 2.5 cm

Un chevauchement de 5 cm sans tenir compte de la taille de l'orifice est illogique !

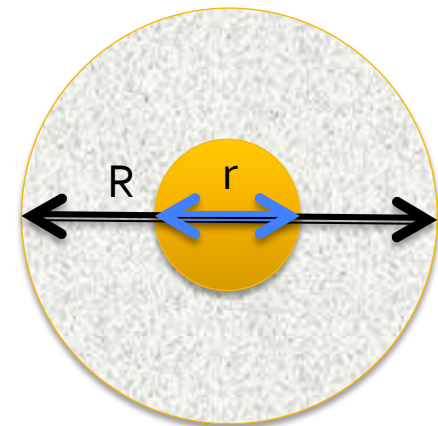
- According to the law of Laplace, the surface of the “donut” must be greater than the surface of the defect

TRAITEMENT COELIOSCOPIQUE DES ÉVENTRATIONS
PAR GRANDES PROTHÈSES INTRA-ABDOMINALES

DES EXIGENCES PARTICULIÈREMENT RIGOUREUSES.

E. Estour

Resistance forces/ Displacing forces
= Donut aerea / Defect aerea
= $(\pi R^2 - \pi r^2) / \pi r^2$
= $\pi R^2 / \pi r^2 - \pi r^2 / \pi r^2$
= $\pi R^2 / \pi r^2 - 1 \rightarrow$ M/D ratio !



- The ratio between mesh surface/ defect surface is a parameter that should be predictive of the risk of mesh expulsion
 - What should be the minimum M/D ratio to prevent mesh expulsion ??

Protocole: étude rétrospective de cohorte - une base de données enregistrées prospectivement

- Major outcomes of the study
 - Long-term recurrence rate
 - Predictive factors of recurrence assessment
- Uni- and multivariate statistical analyses were performed using the following variables:
 - age, gender, ASA score, BMI, type of hernia, risk or comorbidity factors, location of the hernia, width of the defect, surface of the defect, mesh overlapping, type of mesh fixation
 - the ratio between mesh and defect surfaces (M/D ratio)
- Clinical outcome was assessed by a combination of office consultation, case notes review and telephone interview

Study design: a retrospective cohort study based on a prospective maintained database

INCLUSION CRITERIA

- Elective laparoscopic repair of ventral hernia between 2002 & 2014 (n=213)
- Primary or incisional hernias
- Midline or lateral hernias
- IPOM mesh repair without closure of the fascia defect
- A single mesh: Parietex[®] composite
- Overlapping of at least 3 cm

EXCLUSION CRITERIA

- Pregnancy
- Emergency operation
- Supra-pubic hernia
- Incarcerated hernia
- ASA score > 3
- Cirrhosis with ascites
- Prior ventral hernia repair with mesh

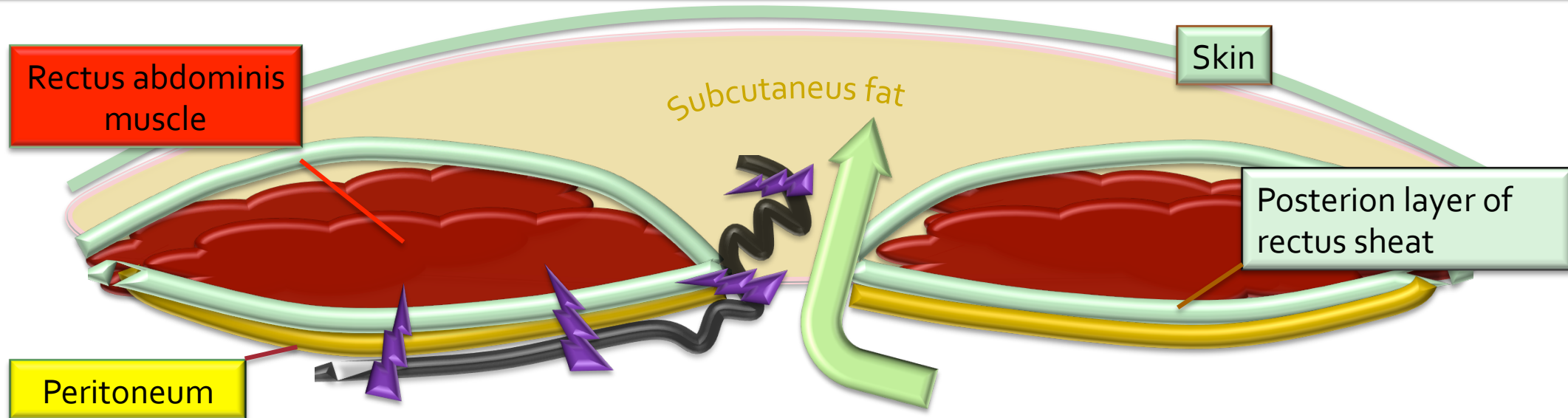
Caractéristiques des patients

	Primary hernia (n=158)			Incisional hernia (n=55)			P value
Hernia location	Midline	Umbilical	130	Midline	41		N.A.
		Epigastric	19				
		Umbilical & epigastric	5				
	Lateral	Spigelian	4	Lateral	14		
Stage according to the EHS classification	I	Width < 2 cm	10	I	Width < 4 cm	28	N.A.
	II	Width ≥ 2-4 cm	128	II	Width ≥ 4-10 cm	27	
	III	Width ≥ 4 cm	20	III	Width ≥ 10 cm	0	
Width of the defect (cm)	Mean ± SD: 2,3 ± 0,8 Median: 2			Mean ± SD: 3,8 ± 1,8 Median: 3,5			0,001
Surface of the defect (cm ²)	Mean ± SD: 5 ± 4 Median: 3			Mean ± SD: 23 ± 20 Median: 16			0,001

Résultats

- With a mean follow-up of 63 ± 47 months
 - Median: 60 / range: 6-168
- Recurrent hernia was noted in 16 patients (7,5%)
 - Those hernias were diagnosed with
 - A mean delay of 19 ± 13 months
 - A median delay of 16 months (range: 4-40) after initial surgery
 - Recurrence within the first post-operative year: 7 (44 %)
 - Recurrence within the two post post-operative year: 11 (69 %)
 - Twelve patients with symptomatic hernias were re-operated
 - 2 by laparoscopy
 - 10 by open approach.

Mécanisme des récurrences en cas de laparoscopie sans fermeture du défaut



DISLOCATION OF THE TACKS, RUPTURE OF THE MESH FROM THE TISSUE, MIGRATION AND SHRINKING OF THE MESH INTO THE FORMER DEFECT.

Facteurs prédictifs de récurrence: analyse statistique univariée

Variable		Percentage of recurrence		P value
Hernia type	Primary	5,1 %		0,045
	Incisional	14,5 %		
Body Mass Index	26-30	3,5 %		0,002
	> 35	20,5 %		
Width of the defect (cm)	≤ 2	0,7 %		0,001
	> 4	26,9 %		
Surface of the defect (cm ²)	< 10	1,9 %		0,001
	> 20	27,3 %		
Mesh overlapping (cm)	< 5	32,2 %		0,001
	≥ 5	3,4 %		
M/D ratio	≤ 8	70 %	48,1 %	0,001
	9-12	35,3%		
	13-16	9,4%	1,6 %	
	≥ 17	0 %		

Facteurs prédictifs de récurrence: analyse statistique multivariée

Variable	Coefficient	OR	95 % CI	P value
Hernia type	-1,779	0,165	0,012 - 2,172	0,171
Body Mass Index	0,045	1,047	0,916 - 1,196	0,503
Width of the defect	-0,069	0,933	0,275 - 3,165	0,912
Surface of the defect	-0,022	0,978	0,890 - 1,075	0,644
Mesh overlapping	-1,160	0,253	0,052 - 1,216	0,086
M/D ratio	-0,773	0,461	0,277 - 0,767	0,003

Effet cumulé du chevauchement et du M/D ratio sur le taux de récurrence

		<u>Mesh/Defect surfaces ratio</u>			
		≤ 12		> 12	
		Recurrence	%	Recurrence	%
<u>Overlap</u>	< 5 cm	9/9	RR : 100 %	1/22	RR : 5 %
	≥ 5 cm	4/19	RR : 21 %	2/163	RR : 1 %

Quelques exemples cliniques

Defect		Mesh		Overlap (cm)	M/D ratio	Expected Recurrence Rate
Diameter (cm)	Surface (cm ²)	Diameter (cm)	Surface (cm ²)			
3	7	15	176	6	25	0 - 1 %
4	13	15	176	5,5	13	1 - 9 %
5	19	15	176	5	9	21 - 33 %
5	19	20	314	7,5	17	0 - 1 %
6	28	20	314	7	13	1 - 9 %
7	38	20	314	6,5	9	21 - 33 %
7	38	25	490	9	13	1 - 9 %
8	50	25	490	8,5	10	21 - 33 %

Conclusions

- LVH repair with bridging technique remains an interesting technique
 - Less mesh infection / shorter hospital stay
- LVH repair with bridging technique has limitations
 - The risk of recurrence is very high in patients with “large” defects
- The M/D ratio is the most important predictive factor
 - If a mesh large enough to get a M/D ratio > 12 cannot be positioned, the risk of recurrence is 48 %
 - An other type of surgical repair should be proposed to the patient
- Take home message
 - Considering that it is often impossible to place a mesh larger than 20 cm, the technique should not be used for defect larger > 6 cm