



AAA sous-rénale: Chirurgie ouverte ou endovasculaire? Que choisir en 2024?

Dr Reuben Veerapen

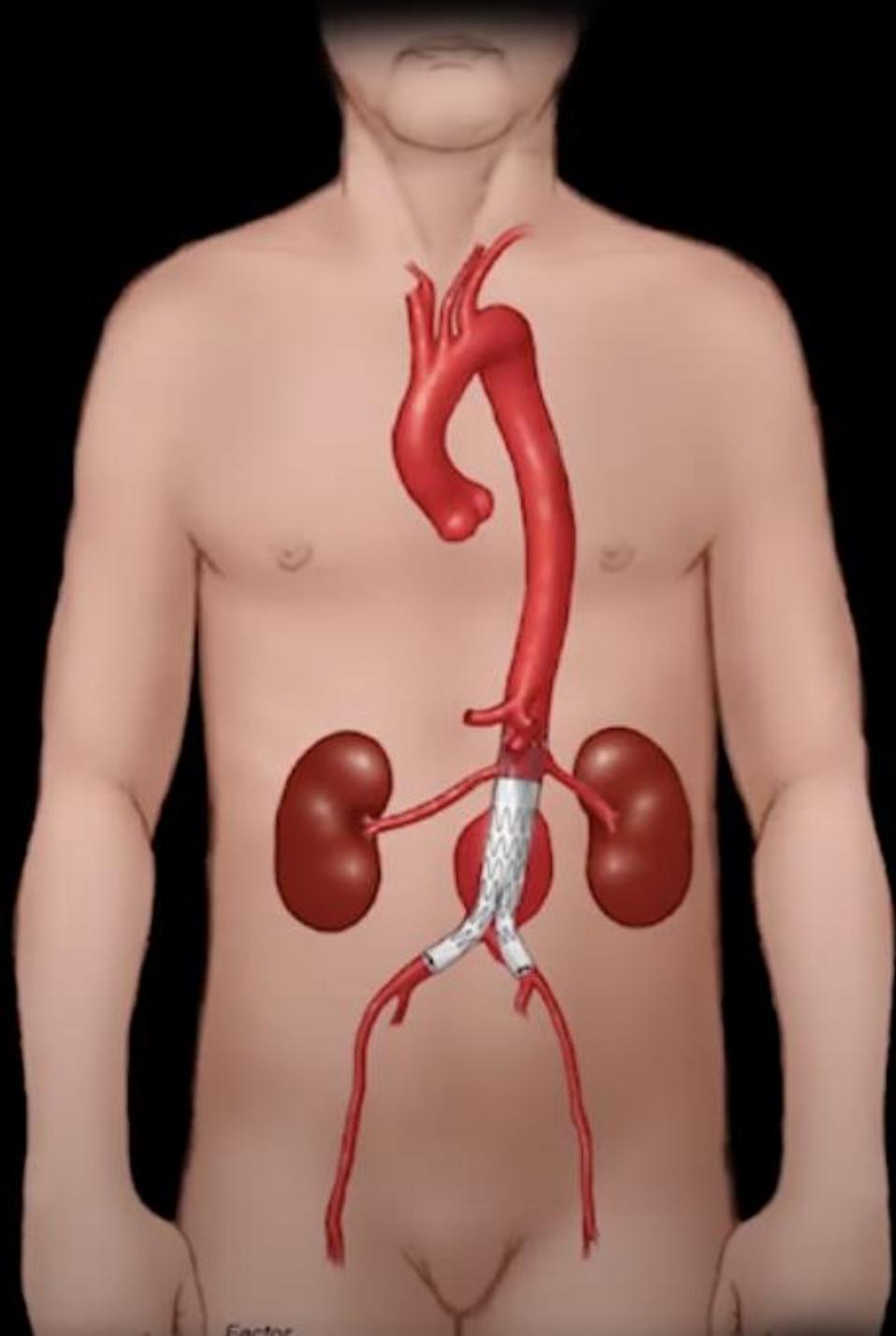
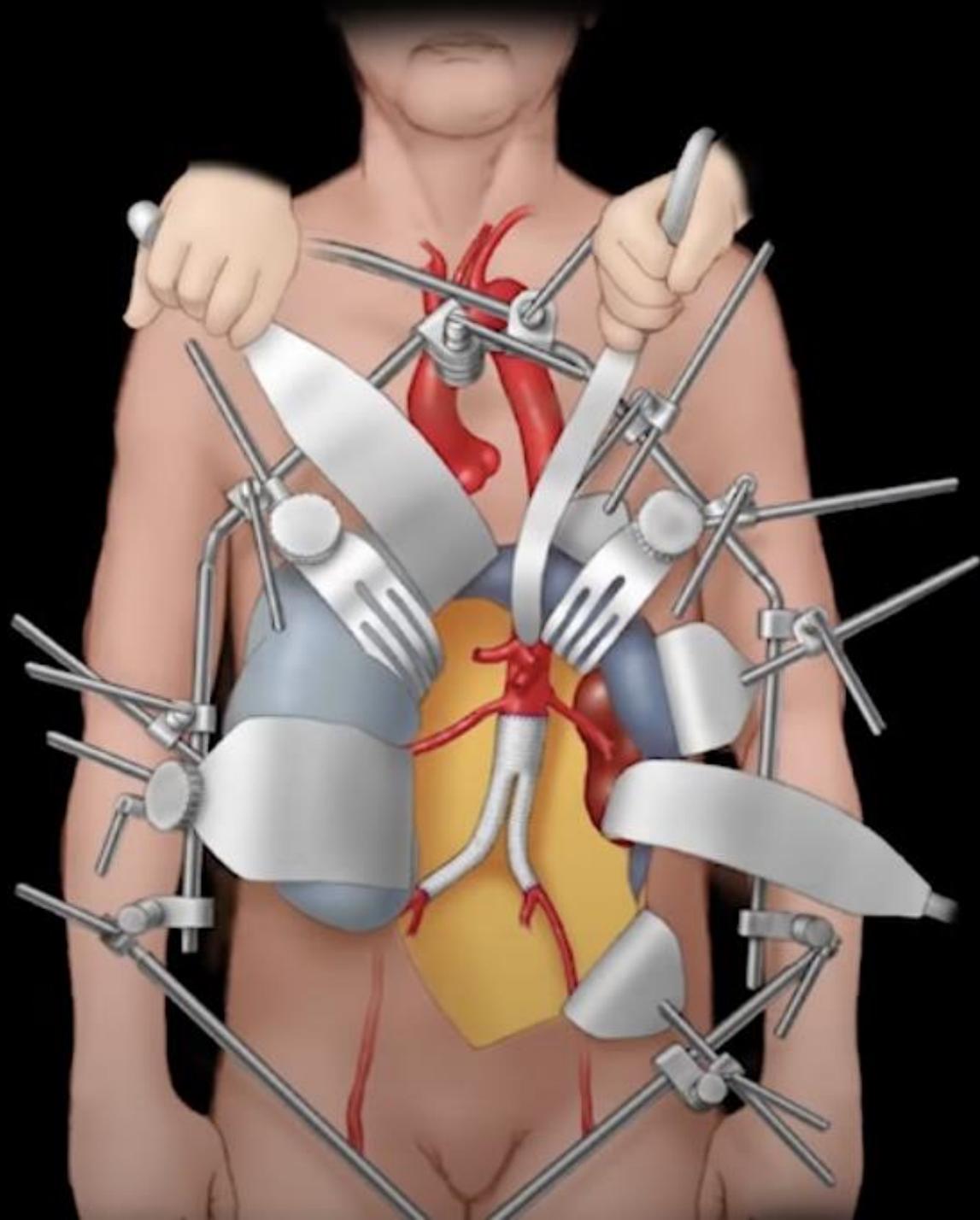
Chirurgien Thoracique et Vasculaire

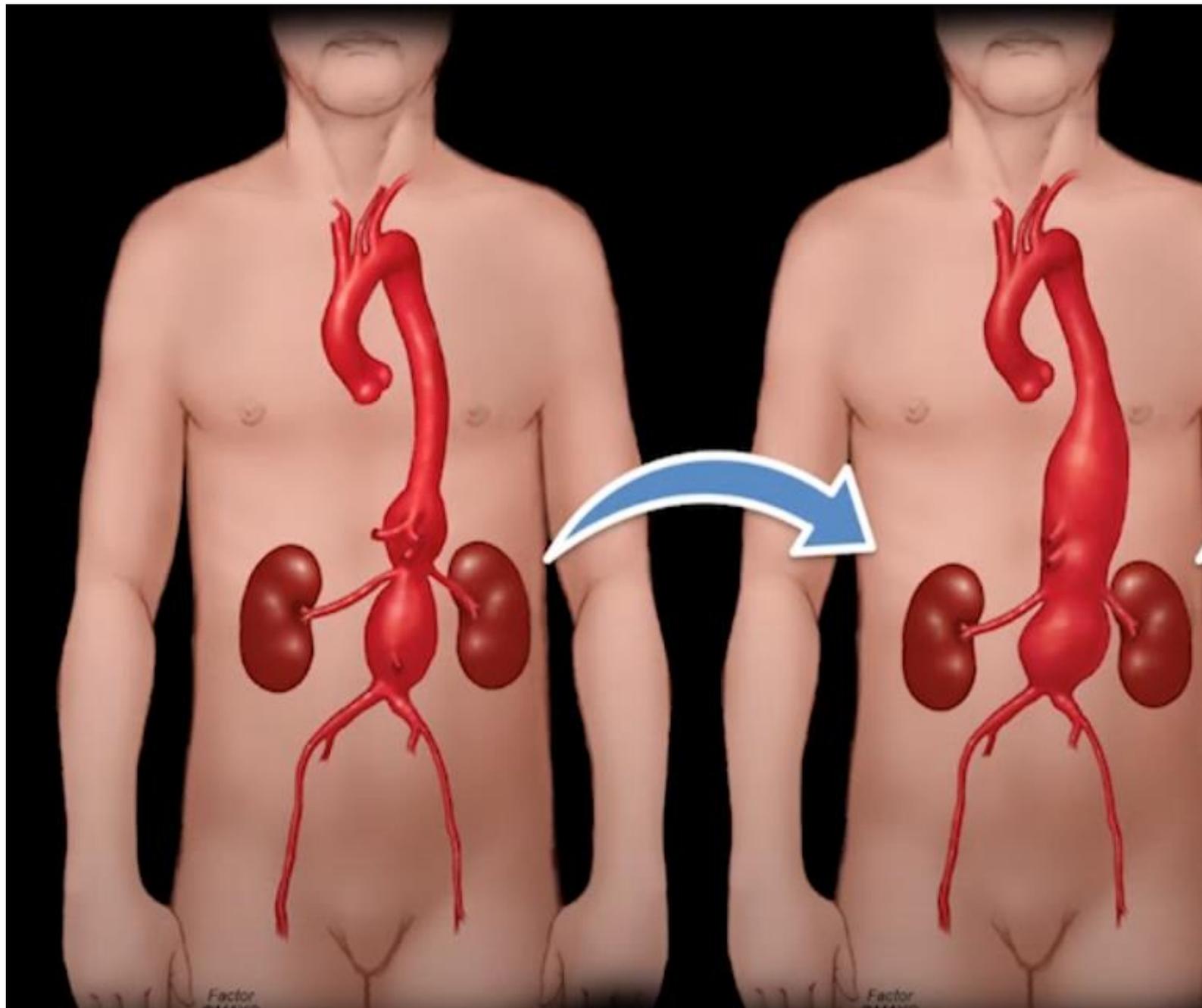
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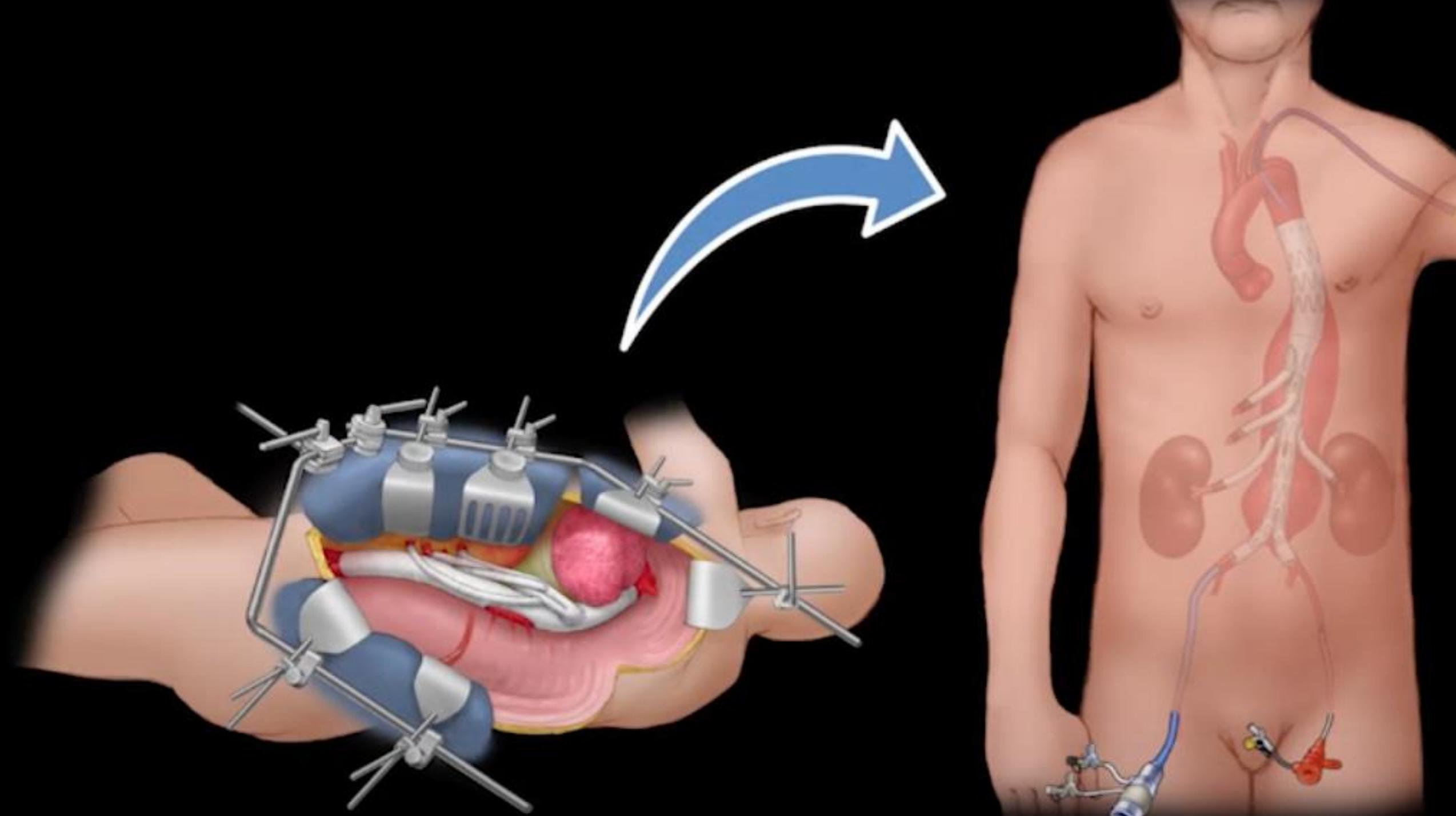
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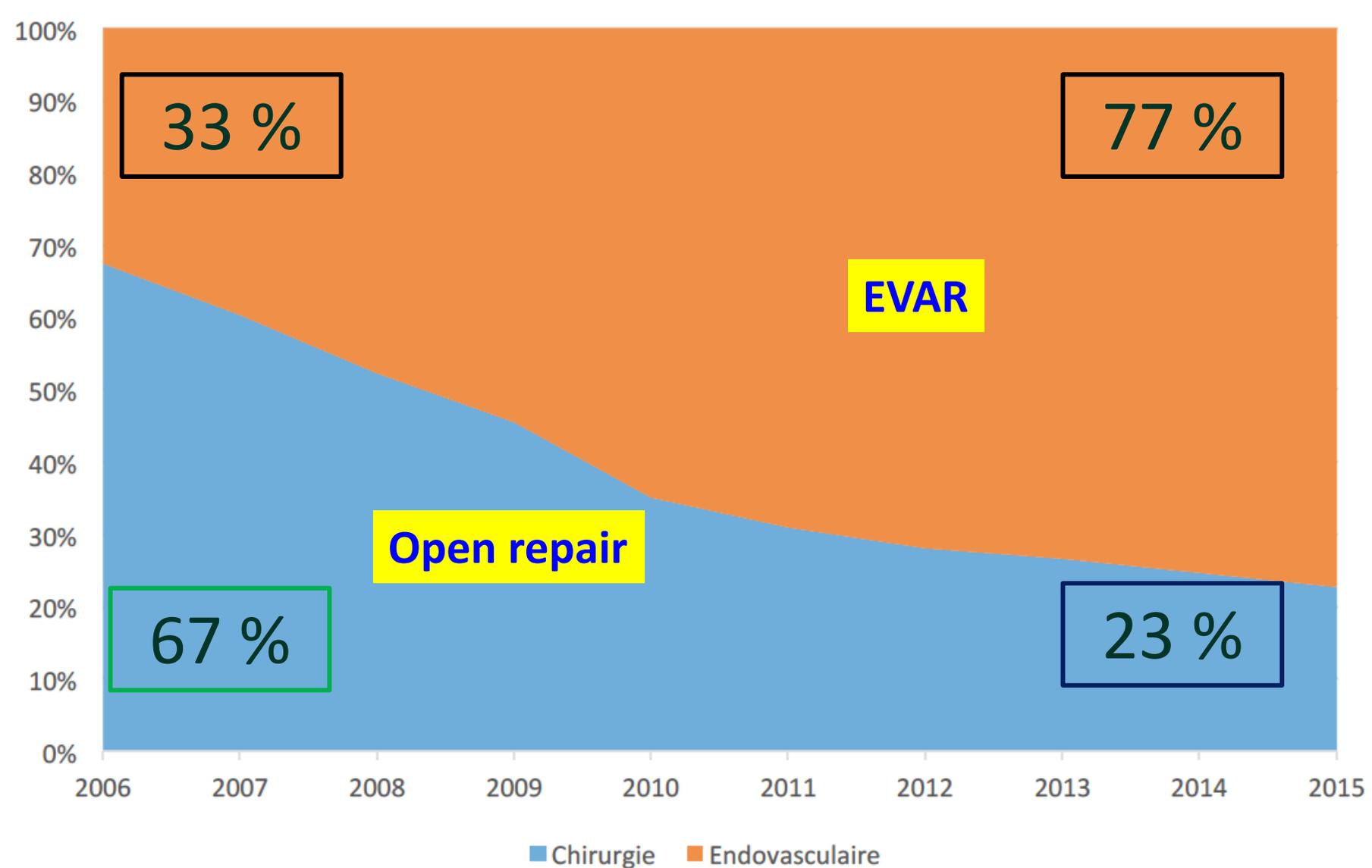






AAA 2006 - 2015

TRT Chir vs Endo (%)



CLINICAL PRACTICE GUIDELINE DOCUMENT

Editor's Choice – European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Abdominal Aorto-Iliac Artery Aneurysms[☆]

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Recommendation 16			Changed
All patients with an abdominal aortic aneurysm should receive cardiovascular risk factor management with smoking cessation*, blood pressure control*, statin and antiplatelet therapy*, and lifestyle advice (including exercise and healthy diet).			
Class	Level	References	ToE
I	B	Bahia <i>et al</i> (2016), ⁸⁸ Bath <i>et al</i> (2015), ¹⁸² Niebauer <i>et al</i> (2021), ¹⁸⁸ Bhak <i>et al</i> (2015), ¹⁸⁹ Robertson <i>et al</i> (2017), ¹⁹⁰ Wemmelund <i>et al</i> (2014) ¹⁹¹	

* For details regarding nicotine replacement therapy, specific drug choice, doses, and target values for medical treatment, reference is made to the latest dedicated guidelines on cardiovascular risk reduction.

Recommendation 17			Unchanged
Patients with a small abdominal aortic aneurysm are recommended to stop smoking and should receive help to do this, to reduce the abdominal aortic aneurysm growth rate and risk of rupture.			
Class	Level	References	ToE
I	B	Sweeting <i>et al</i> . (2012), ²¹⁰ Hartmann-Boyce <i>et al</i> . (2022) ²¹¹	

Décision opératoire et balance bénéfice/risque

Risque de rupture
Risque opératoire
Espérance de vie



Risque de rupture

2 facteurs

La taille

La vitesse de croissance

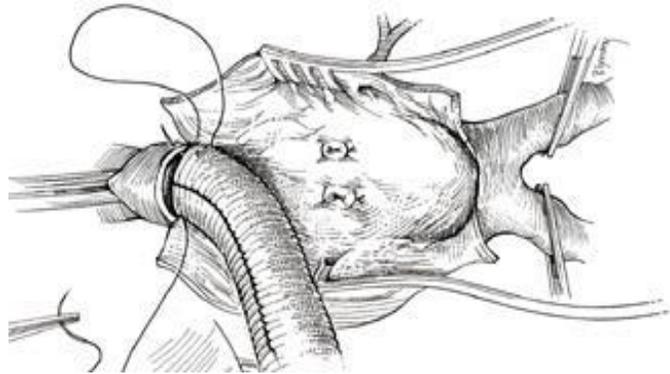
AAA rompu: Mortalité > 80%

Près de la moitié des AAA resteront < 50 mm

Taille AAA	Risque annuel
< 50 mm	<1%
50 << 60 mm	5 à 10 %
60 << 70 mm	10 à 20 %
> 70 mm	> 20%

Risque opératoire

Chirurgie



Mortalité 2 à 5 %

Patients à risque 10 à 15 %

La mortalité est fonction des comorbidités du patient

Endoprothèse



Mortalité

0,6% ACE study

0,3% Wanhainen, Circulation 2016, Outcome of the Swedish Nationwide Abdominal Aortic Aneurysm Screening Program

Indications opératoires

Risque opératoire < Risque de rupture

Recommendation 22		Changed	
Men with an abdominal aortic aneurysm \geq 55 mm should be considered for elective repair.			
Class	Level	References	ToE
Ila	C	Oliver-Williams <i>et al.</i> (2019), ¹¹⁷ Filardo <i>et al.</i> (2015) ²⁶⁵	

Recommendation 23		Changed	
Women with an abdominal aortic aneurysm \geq 50 mm may be considered for elective repair.			
Class	Level	References	ToE
Iib	C	Bown <i>et al.</i> (2013), ¹⁰⁶ Sweeting <i>et al.</i> (2012), ²¹⁰ Brown and Powell (1999), ²⁶⁰ Grootenboer <i>et al.</i> (2010), ²⁶² Ulug <i>et al.</i> (2017) ²⁶⁴	

Recommendation 24		Unchanged	
Patients with small abdominal aortic aneurysms showing rapid growth (\geq 10 mm/year) should be considered for re-measurement of the aneurysm diameter as the first measure.			
Class	Level	References	ToE
Ila	C	Kurvers <i>et al.</i> (2004), ²⁵⁷ Sharp <i>et al.</i> (2003), ²⁵⁹ Olson <i>et al.</i> (2022) ²⁶⁶	

En France, il existe un consensus pour opérer les AAA à 50mm

F. Cochenec, H. Kobeiter, P. Desgranges. EMC. Techniques endo AAA sos-rénaux

Patients fragiles ou âgés



Predictors of Mortality in Nonagenarians Undergoing Abdominal Aortic Aneurysm Repair

Review of the National Surgical Quality Improvement Program Database 1356 nonagenarians undergoing aneurysm repair

Endovascular Aneurysm Repair

2.6%

28.6%

ELECTIVE REPAIR:
30 Day Mortality

EMERGENT REPAIR:
30 Day Mortality

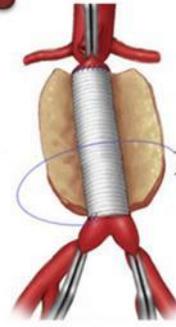
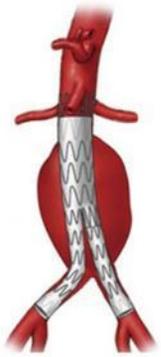
Open Surgical Repair

19.1%

53.7%

PREDICTORS OF HIGHER PERIOPERATIVE MORTALITY

- Dependent functional status
- ASA classification ≥ 4
- Emergent case
- Open surgical repair



Endovascular Aneurysm Repair (EVAR) Offers a Survival Advantage and is Cost-Effective Compared with Conservative Management in Patients Physiologically Unfit for Open Repair

Single center, retrospective study Propensity matched 122 EVAR and 122 conservative management patients

PATIENTS UNFIT FOR OPEN REPAIR

CONSERVATIVE MANAGEMENT

ENDOVASCULAR REPAIR

30 months

25%
68%
82%

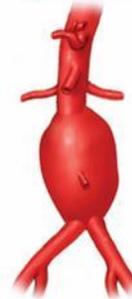
Median Overall Survival
P<.001

One-, Three-, Five-Year
Mortality
P<.001

84 months

7%
40%
68%

Incremental cost-effectiveness ratio for EVAR was \$11,644 per quality-adjusted life year gained



Choix de la technique

- **Endoprothèse aortique (EVAR)**

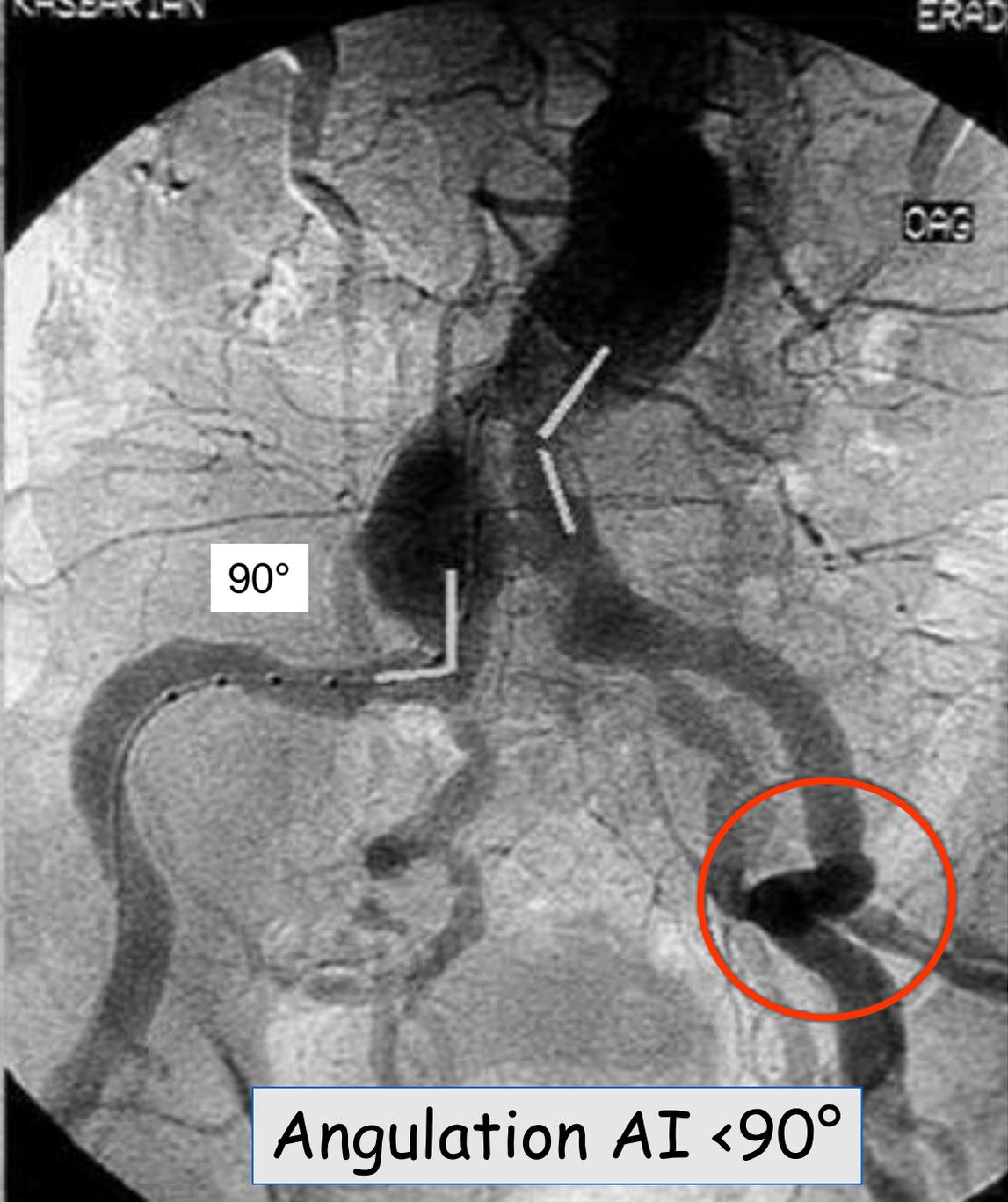
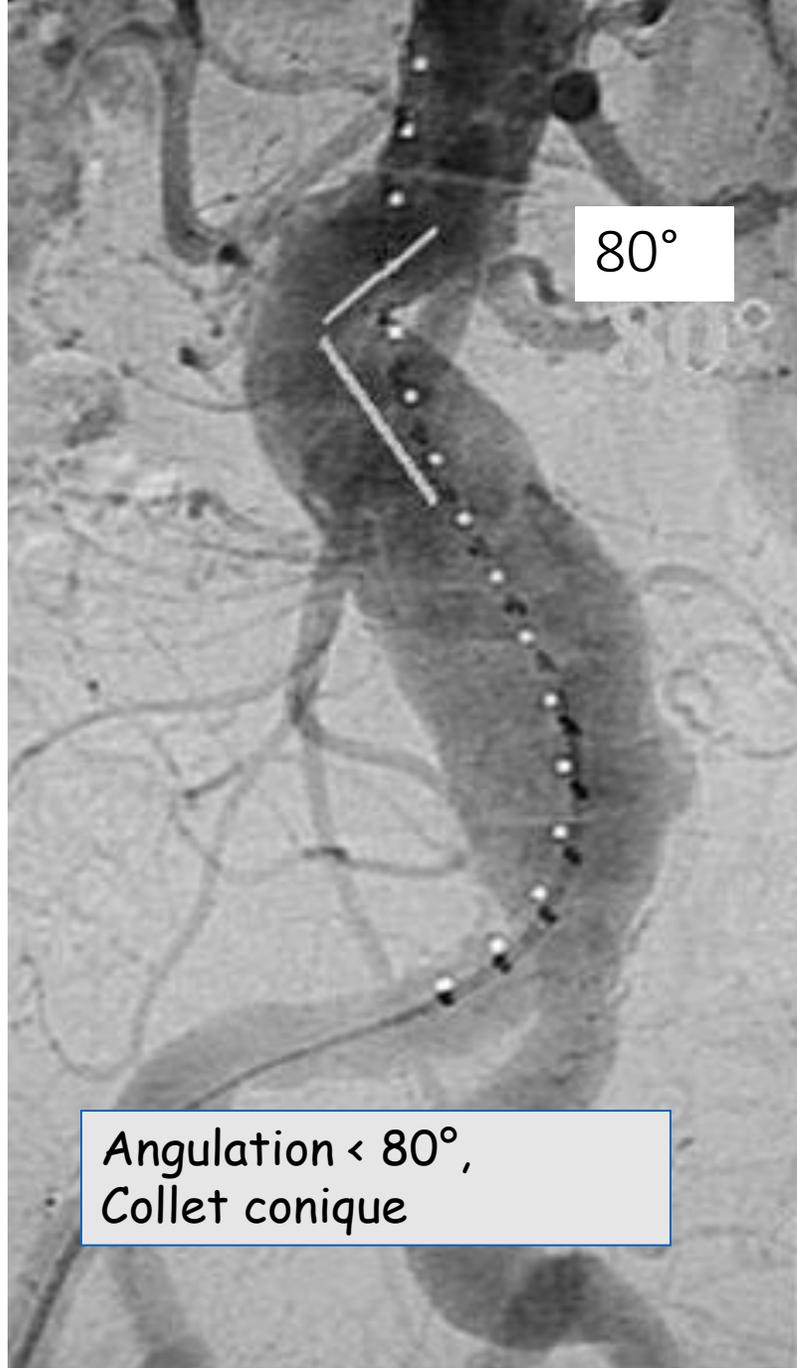
Limites : anatomie de l'anévrisme

- **Chirurgie ouverte (OR)**

Limites : risque chirurgical du patient

Avantages / Inconvénients de chaque technique

→ *Consentement éclairé du patient*



Avantages et inconvénients endoprothèse aortique (EVAR)

- Mini-invasif, mortalité opératoire ↘ (0,3%-1%)
- Mortalité à 6 ans équivalente à OR
- Technique préférée des patients

Mais

- Ré-interventions dans 25% (endofuites)
- Surcoût +++
- Suivi important
- Ruptures secondaires (1% à 4%)
- Surmortalité très tardive ? (EVAR 1)

Inconvénients et avantages chirurgie ouverte (OR)

- Invasive, mortalité opératoire ↗ (2,5% à 4,8%)
- Technique moins choisie par les patients

Mais

- Peu de ré-interventions
- Coût moindre
- Suivi plus simple
- Pas de rupture secondaire
- Mortalité très tardive moindre ? (EVAR 1)

Chirurgie ouverte(OR) vs chir endovasculaire (EVAR)

- **TCMM péri-op**
 - Endovasculaire <1%
 - Chir 3-5%
- **Patients fragiles**
- **Technique séduisante pour les patients**
 - **Mais indications trop larges**
 - **Non-respect des critères anatomiques**

AAA 2006 - 2015

TRT Chir vs Endo (%)

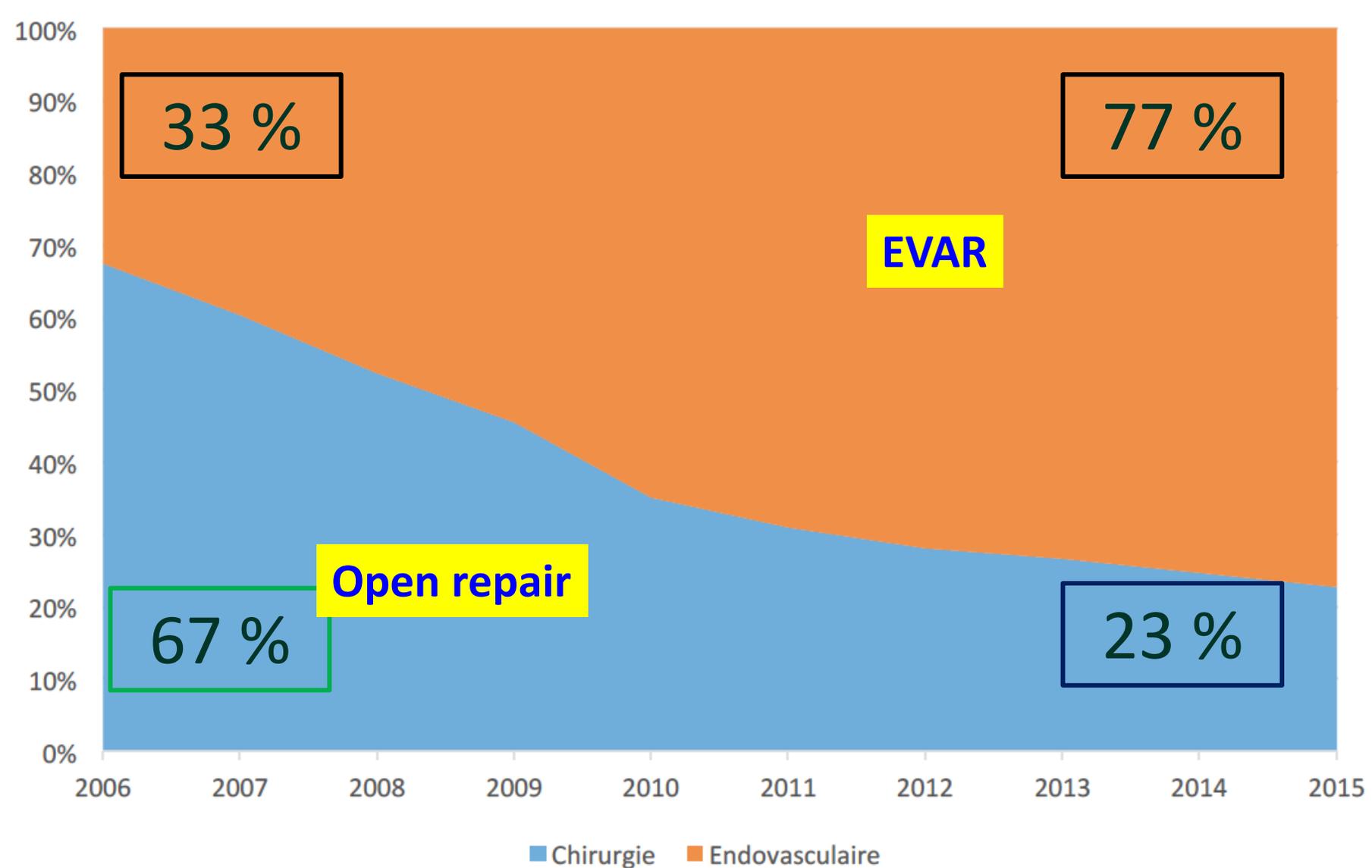


Table 14. Summary of randomised controlled trials comparing elective endovascular aortic repair (treated within the Instruction For Use of the device) and open surgical repair for abdominal aortic aneurysms.

Study	Country	Recruitment period	Patients – <i>n</i>	Main findings
EVAR-1 ^{464–466}	UK	1999–2003	1 082	Lower peri-operative mortality after EVAR (1.7% vs. 4.7%) Early survival benefit lost after two years, with similar long term survival Higher aneurysm related mortality in the EVAR group after 8 years (7% vs. 1%), mainly attributable to secondary aneurysm sac rupture Higher re-intervention rate after EVAR
DREAM ^{467,468}	The Netherlands and Belgium	2000–2003	351	Lower peri-operative mortality after EVAR (1.2% vs. 4.6%) Early survival benefit was lost by the end of the first year, with similar long term survival (38.4% vs. 41.7% after 12–15 year follow up) Higher re-intervention rate after EVAR (86.4% vs. 65.1%)
OVER ⁴⁶⁹	USA	2002–2008	881	Lower peri-operative mortality after EVAR (0.5% vs. 3%) Early survival benefit sustained up till three years but not thereafter No difference in re-intervention rate No difference in quality of life No difference in cost and cost effectiveness
ACE ⁴⁷⁰	France	2003–2008	316	No difference in peri-operative mortality rate (1.3% vs. 0.6%) No difference in long term survival up till three years Higher re-intervention rate after EVAR (16% vs. 2.4%)

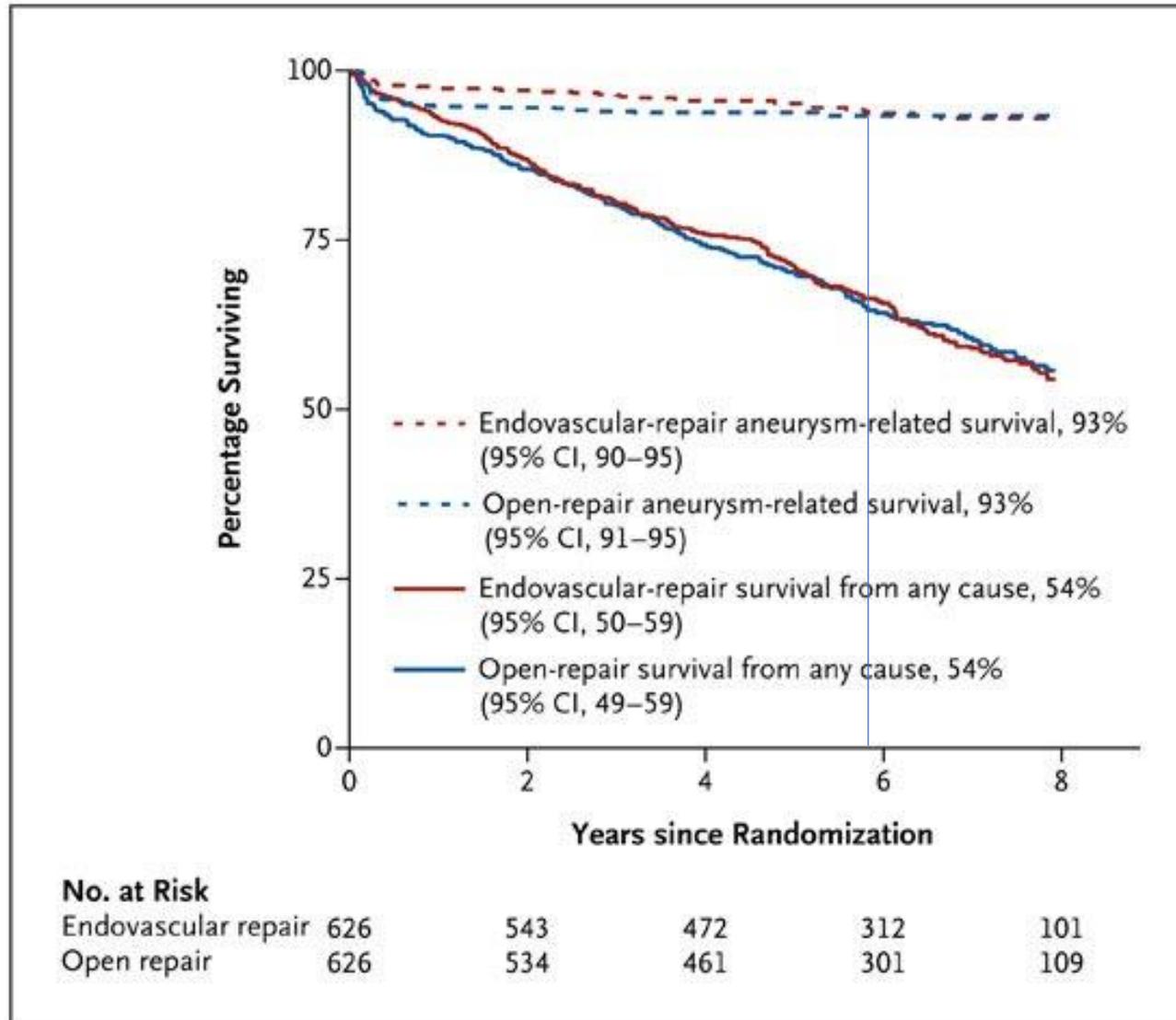
EVAR-1 = the United Kingdom Endovascular Aneurysm Repair 1 trial; DREAM = the Dutch Randomised Endovascular Aneurysm Management trial; OVER = the Open vs. Endovascular Repair of Abdominal Aortic Aneurysm trial; ACE = the Aneurysme de l'aorte abdominale trial Chirurgie vs. Endoprothese.

Table 15. Summary of meta-analysis comparing elective endovascular aortic repair and open surgical repair for abdominal aortic aneurysms.

Author	Study type included	Recruitment period	Patients – n	Main findings
Powell <i>et al.</i> (2017) ⁴⁷¹	4 RCTs	1999–2008	2783	Lower all cause mortality after EVAR within six months (3.3% vs. 5.3%, HR 0.61), thereafter no difference No difference in AAA related mortality between 30 days and three years, thereafter higher in the EVAR group Higher re-intervention rate after EVAR, but when taking laparotomy based complications into account, as was done in the OVER trial, the difference was less significant
Giannopoulos <i>et al.</i> (2020) ⁴⁷⁸	5 RCT	1998–2008	2823	No difference in all cause mortality or AAA related mortality after 4–8 and > 8 years follow up Higher re-intervention rate after EVAR (29% vs. 15%)
Antoniou <i>et al.</i> (2020) ⁴⁷⁹	7 RCT	1999–2011	2983	Lower all cause mortality within 30 days (OR 0.36) and six months (HR 0.62) after EVAR Lower AAA related mortality within six months after EVAR (HR 0.42), but higher after > 8 years follow up (HR 5.12) Higher re-intervention rate (HR 2.13), aneurysm rupture (OR 5.08) and death due to rupture (OR 3.57) after > 8 years after EVAR
Bulder <i>et al.</i> (2019) ⁴⁸⁰	4 RCT, 20 REG, 29 CS	1993–2015	189 022	Lower 30 day all cause mortality after EVAR (1.2% vs. 3.2%), thereafter no difference
Li <i>et al.</i> (2019) ⁴⁸¹	3 RCT, 68 CS	1999–2018	299 784	Higher all cause mortality (OR 1.19), re-intervention (2.12), and secondary rupture rate (OR 2.47) after 5–9 years follow up after EVAR No difference in all cause mortality, but higher re-intervention rate (OR 2.47) and secondary rupture rate (OR 8.10) after EVAR after > 10 years follow up (up to 15 years)
Yokoyama <i>et al.</i> (2020) ⁴⁸²	4 RCT, 7 PSS	1999–2016	106 243	Lower peri-operative all cause mortality after EVAR (RR 0.39), no difference between 0 and two years, higher between two and six years after EVAR (HR 1.15), and no difference between six and 10 years or ≥10 years
Alothman <i>et al.</i> (2020) ⁴⁸³	4 RCT, 12 CS	2004–2017	61 379	Lower peri-operative all cause mortality after EVAR (1.2% vs. 4.5%), thereafter no difference No difference in aneurysm related mortality, higher rate of late aneurysm sac rupture after EVAR (1.8% vs. 0.4%) and of re-intervention (OR 1.94)

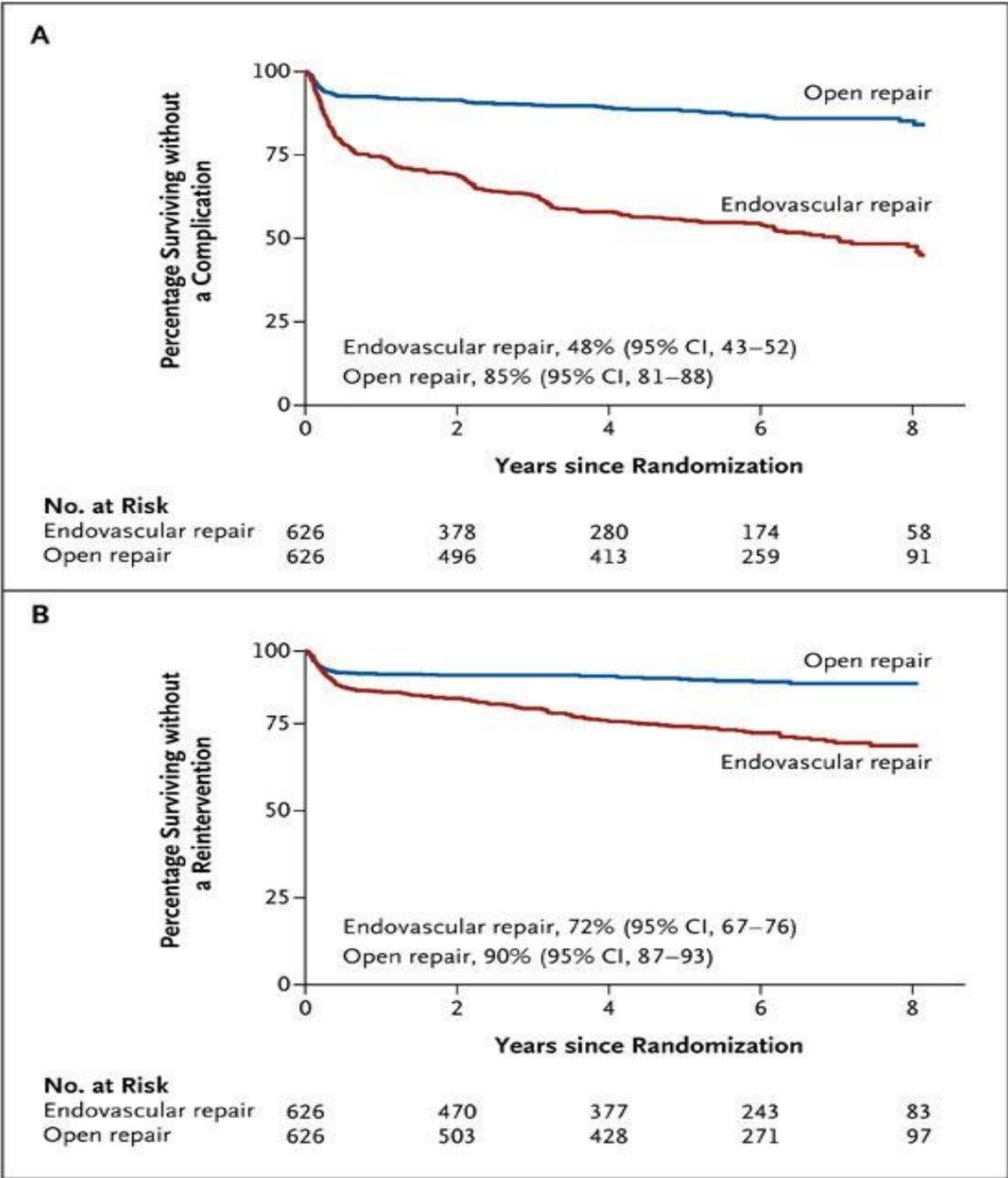
REG = registries; CS = cohort studies; PSS = propensity score matched studies; RCT = randomised controlled trial; EVAR = endovascular aneurysm repair; AAA = abdominal aortic aneurysm; HR = hazard ratio; OR = odds ratio; OVER = the Open vs. Endovascular Repair of Abdominal Aortic Aneurysm trial.

EVAR I



NEJM 2010

EVAR I



NEJM 2010

AAA NICE guidelines:2018

Pas d'EVAR si la chirurgie de l'AAA est possible

Pas d'EVAR si la chirurgie de l'AAA n'est pas possible

???

Read about [our approach to COVID-19](#)

Home > NICE Guidance > Conditions and diseases > Cardiovascular conditions > Aortic aneurysms

Abdominal aortic aneurysm: diagnosis and management

NICE guideline [NG156] Published: 19 March 2020

Guidance

Tools and resources

Information for the public

Evidence

History

Overview

[Download guidance \(PDF\)](#)

- Envisager EVAR pour les personnes ayant un abdomen hostile, un rein en fer à cheval ou une stomie, ou d'autres considérations spécifiques à la personne et discutées avec elle , cela peut faire d'EVAR l'option préférée.
- Envisager EVAR ou une prise en charge conservatrice pour les personnes qui présentent des risques anesthésiques et/ou des comorbidités médicales qui contre-indiqueraient une chirurgie ouverte.

Recommendation 65			Unchanged
For most patients with suitable anatomy and reasonable life expectancy, endovascular repair should be considered the preferred treatment modality for elective abdominal aortic aneurysm repair.			
Class	Level	References	ToE
Ila	B	Lilja <i>et al.</i> (2017), ¹¹ Beck <i>et al.</i> (2016), ¹⁵ Mani <i>et al.</i> (2015), ¹⁹ Budtz-Lilly <i>et al.</i> (2018), ⁴⁴ Greenhalgh <i>et al.</i> (2004), ⁴⁶⁴ van Schaik <i>et al.</i> (2017), ⁴⁶⁸ Lederle <i>et al.</i> (2009), ⁴⁶⁹ Powell <i>et al.</i> (2017), ⁴⁷¹ Greenhalgh <i>et al.</i> (2010), ⁴⁷² Giannopoulos <i>et al.</i> (2020), ⁴⁷⁸ Antoniou <i>et al.</i> (2020), ⁴⁷⁹ Bulder <i>et al.</i> (2019), ⁴⁸⁰ Li <i>et al.</i> (2019), ⁴⁸¹ Yokoyama <i>et al.</i> (2020), ⁴⁸² Yin <i>et al.</i> (2019), ⁴⁸⁴ Verzini <i>et al.</i> (2014), ⁴⁸⁸ Hicks <i>et al.</i> (2016), ⁴⁹⁰ Reise <i>et al.</i> (2010), ⁴⁹⁴ Faggioli <i>et al.</i> (2011), ⁴⁹⁵ Trenner <i>et al.</i> (2018) ⁴⁹⁶	

Recommendation 66			Unchanged
For most patients with long life expectancy, open surgical repair should be considered as the preferred treatment modality for elective abdominal aortic aneurysm repair.			
Class	Level	References	ToE
Ila	B	Greenhalgh <i>et al.</i> (2004), ⁴⁶⁴ van Schaik <i>et al.</i> (2017), ⁴⁶⁸ Lederle <i>et al.</i> (2009), ⁴⁶⁹ Becquemin <i>et al.</i> (2011), ⁴⁷⁰ Powell <i>et al.</i> (2017), ⁴⁷¹ Giannopoulos <i>et al.</i> (2020), ⁴⁷⁸ Antoniou <i>et al.</i> (2020), ⁴⁷⁹ Bulder <i>et al.</i> (2019), ⁴⁸⁰ Li <i>et al.</i> (2019), ⁴⁸¹ Yokoyama <i>et al.</i> (2020) ⁴⁸²	

Recommendation 68			Unchanged
Laparoscopic abdominal aortic aneurysm repair is not recommended.			
Class	Level	References	ToE
III	C	Economopoulos <i>et al.</i> (2013), ⁴⁹⁹ Ricco <i>et al.</i> (2016) ⁵⁰⁰	

Calendrier de suivi des patients ayant une endoprothèse aortique - 2009

	En dehors du contrôle angiographique réalisé en fin de procédure, En post-opératoire immédiat ou dans les 30 jours qui suivent l'implantation	En l'absence d'endofuite, de détérioration de la prothèse ou d'évolutivité de l'anévrisme, Aux 6^{ème} et 12^{ème} mois post-opératoires, puis annuellement
Radiographie de l'abdomen sans préparation sous 3 incidences (face, profil, trois-quarts)	Indispensable	/
Examen tomodensitométrie après injection de produit de contraste	<u>Indispensable</u> (avec acquisitions précoce et tardive), sauf si impossible	<u>Indispensable</u> (avec acquisitions précoce et tardive), sauf si impossible
Imagerie par Résonance Magnétique	Si scanner impossible	Si scanner impossible (avec radiographie de l'abdomen sous 3 incidences)
Echographie-Döppler vasculaire	Si scanner et IRM impossibles	Si scanner et IRM impossibles (avec radiographie de l'abdomen sous 3 incidences)

3. Modalités de surveillance du patient

La surveillance du patient est obligatoire à long terme. En son absence le traitement ne peut pas être considéré comme complet. Cette surveillance est sous la responsabilité de l'implanteur selon un calendrier précis (cf. Annexe I) dont le patient aura été informé (cf. Annexe II).

CONCLUSION

- **Trouver un juste milieu entre EVAR et OR (50% / 50% ?)**
- **EVAR nécessite une bonne anatomie (sélection, IFU)**
- **Bien informer les malades des avantages et des inconvénients des 2 techniques**
- **Nécessité d'un suivi pour EVAR +++.**
- **Comment faire la formation des jeunes pour la chirurgie ouverte (majorité d'EVAR) ?**

SYSTEMATIC REVIEW

Meta-Analysis and Meta-Regression Analysis of Outcomes of Endovascular and Open Repair for Ruptured Abdominal Aortic Aneurysm

Nikolaos Kontopodis ^a, Nikolaos Galanakis ^b, Stavros A. Antoniou ^c, Dimitrios Tsetis ^b, Christos V. Ioannou ^a, Frank J. Veith ^{d,e,f}, Janet T. Powell ^f, George A. Antoniou ^{g,h,*}

WHAT THIS PAPER ADDS

Controversy surrounds the optimal management of ruptured abdominal aortic aneurysm (AAA). A comprehensive literature review and meta-analysis of some 267 259 patients from 136 studies demonstrated that endovascular aneurysm repair (EVAR) carries a lower peri-operative mortality risk than open surgery. The outcomes of both EVAR and open surgical repair have improved over the years, and the difference in peri-operative mortality in favour of EVAR has become more pronounced. There is a significant association between peri-operative mortality and institutional case load for open surgical repair of ruptured AAA but not for EVAR.

Conclusion: If EVAR can be done, it is a better treatment for ruptured AAA in view of the reduced peri-operative mortality compared with open surgery. The outcomes of both EVAR and open surgical repair have improved over the years, and the difference in peri-operative mortality in favour of EVAR has become more pronounced. There is a significant association between peri-operative mortality and institutional case load for open repair of ruptured AAA.



Merci de votre attention