Péče o nemocné s aneurysmatem abdominální aorty

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Aneurysma abdominální aorty

Etiologie

Etipatogeneze

Prognosa

Populační screening

Diagnostika

Léčba

Aneuryzmata břišní aorty

- Do 1 roku od diagnózy dojde k ruptuře u 30% a do 5let u 70% aneuryzmat >5cm!!!!
- 80% aneuryzmat má tendenci k progresi, 20% roste o více jak 0,5cm/rok
- Elektivní chirurgické řešení má závažné komplikace do 2-4%, endovaskulární řešení do 1-2%
- Riziko ruptury po chirurgickém řešení či EVAR je 1%/rok
- Mortalita rupturovaného aneuryzmatu 50-80%!!!!
- Hospitalizační mortalita rAAA 35-50%

Etiologie

- medionekrosa
- cystická degenerace medie – Marfanův, Ehler-Danlosův syn.
- trauma
- iatrogenní postižení
- mykotická aneuryzmata, vaskulitidy, syphylis
- Incidence: 1-6% populace starší 60 let, muži x ženy 4-6:1

Etiopatogeneze

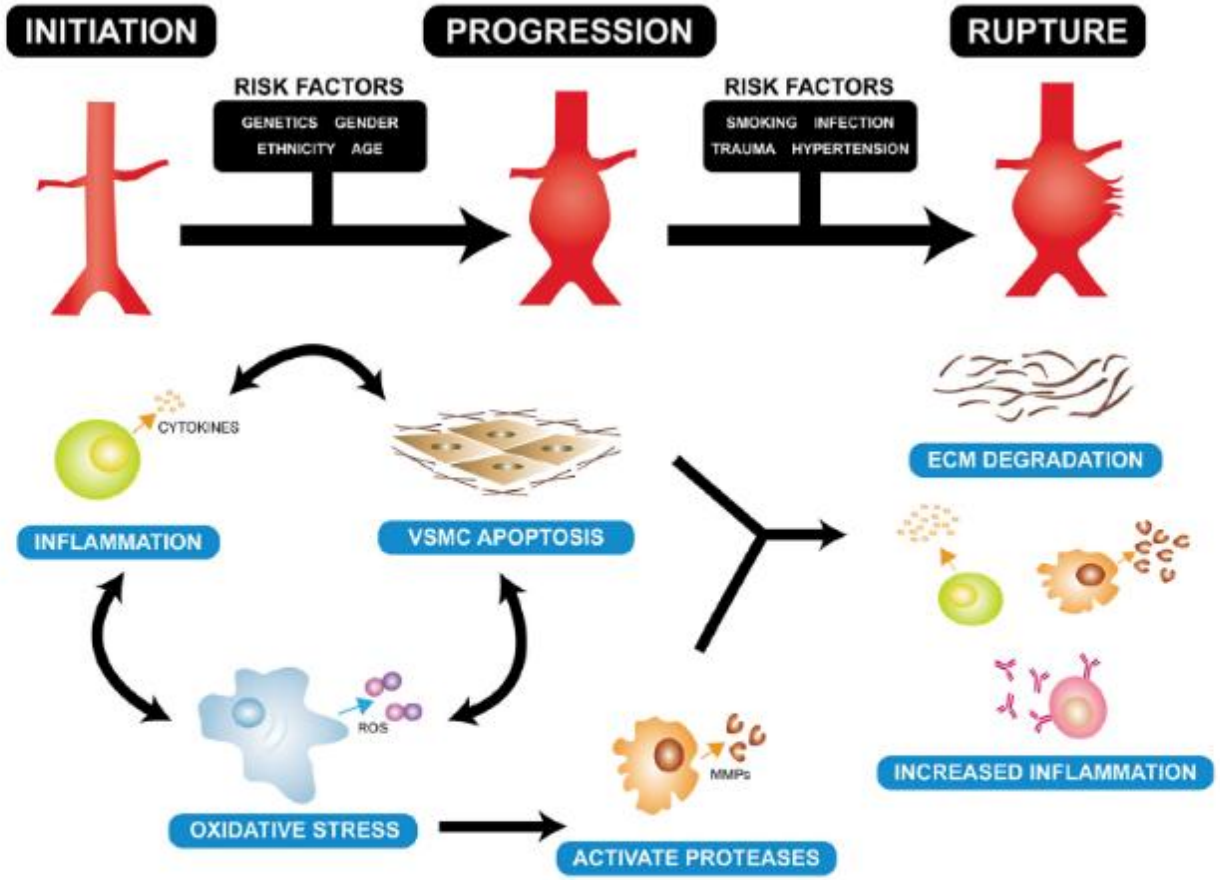


Figure 3. Summary of the pathogenesis of AAA
Several biological processes and risk factors have been identified that contribute to AAA pathogenesis. Genes in the biological pathways have been used in candidate gene studies. VSMC, vascular smooth muscle cell; ECM, extracellular matrix; ROS, reactive oxygen species; MMPs, matrix metalloproteinases. Reproduced with permission from Boddy et al. Drug News Perspect 2008, 21(3): 142–148 [37]. Copyright © 2008–2015 Prous Science, S.A.U. or its licensors. All rights reserved. DOI: 10.1358/dnp.2008.21.3.1203410.

Rizikové faktory

- Kouření – ↑OR 3!!(ženy)
- Generalizovaná ateroskleróza
- Hypertenze
- Bílá rasa
- Rodinná anamnéza
- Hereditární faktor

- Diabetes II typu – pozitivní OR(1/2prevalence)

Prevalence(65let>) a progrese

- USA(kuřáci) 5%
- UK 1,7%
- Švédsko 1,3%
- Dánsko 3,3%

➢ Muži x Ženy 4-6:1

➢ Prevalence klesá

➢ 20-50% pokles rAAA

- AAA 3,0-5,5cm 2,2mm/rok
- 3,0-3,6cm 1,3mm/rok
- 3,6-5,5cm 3,6mm/rok

➢ Kouření a hypertenze ⬆ Diabetes IItypu ⬇

Roční riziko ruptury:

- <4cm 0%
- 4-4,9cm 0,5-2%
- 5-5,9cm 3-15%
- 6-6,9cm 10-20%
- 7-7,9cm 20-40%
- >8cm 30-50%
- >10cm 60%

Abdominal aortic aneurysm: A comprehensive review. S. Aggarwal, A. Qamar, V. Sharma, A. Sharma, *Exp Clin Cardiol Vol 16 No 1* 2011

Roční riziko ruptury:

- <4cm <0,5%
- 5,5-6,0cm 3,5%
- 6,1-7,0cm 4,1%
- >7cm 6,3%

Roční, 3 a 5leté riziko ruptury:

- 5,5-7cm 4% - 16% - 36%
- >7cm 35% - 71% - 100%

Please cite this article in press as: Wanhainen A, et al., European Society for Vascular Surgery (ESVS) 2019 Clinical Practice Guidelines on the Management of Abdominal Aorto-iliac Artery Aneurysms, European Journal of Vascular and Endovascular Surgery (2018), https://doi.org/10.1016/j.ejvs.2018.09.020

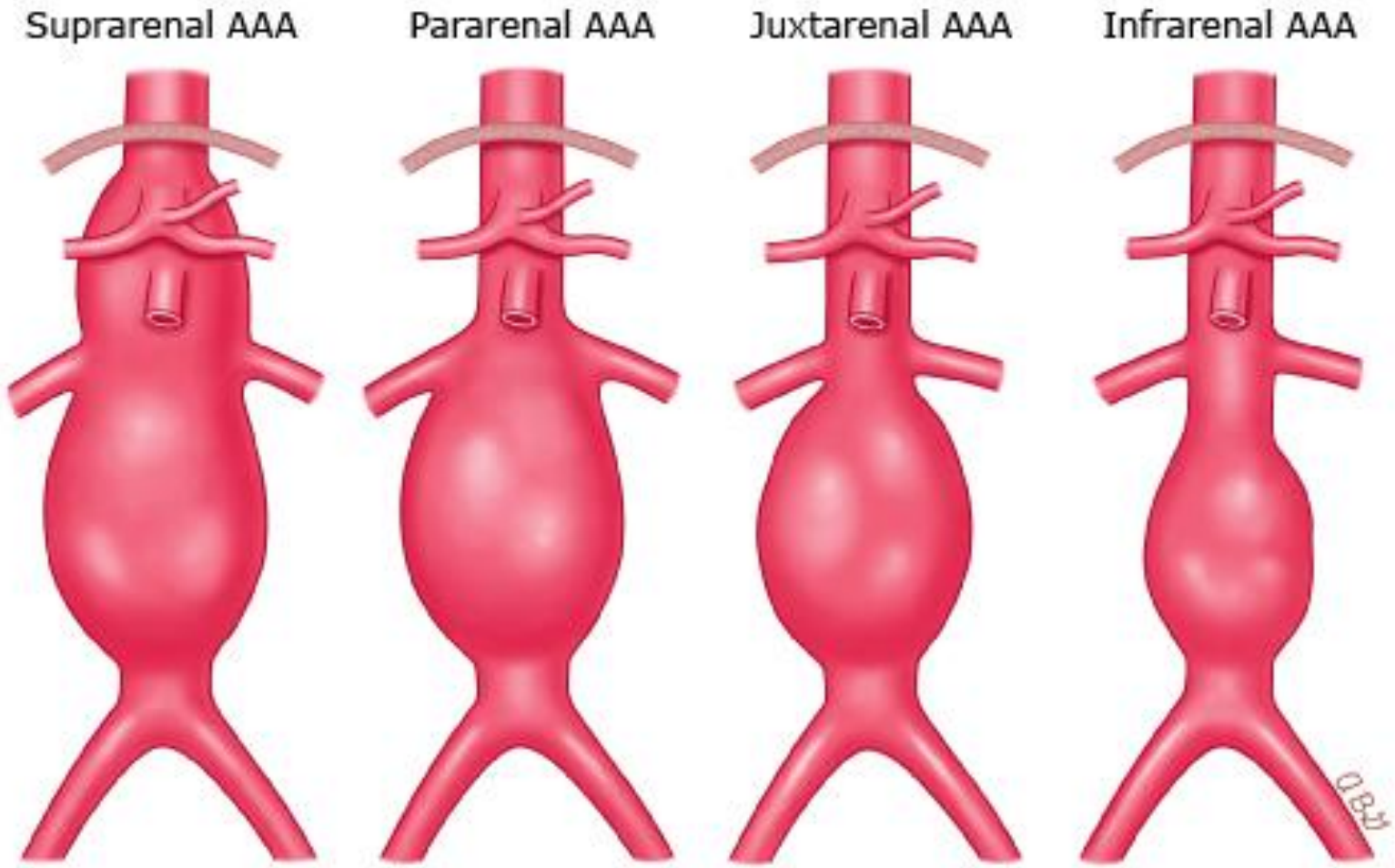
Recommendation 5	Class	Level	References
Once the intervention threshold has been reached, the waiting time for vascular surgical care is recommended to be kept to a minimum, with an eight week pathway as a reasonable upper limit from referral to elective treatment of abdominal aortic aneurysms.	I	C	[192,193,275, 407,511,533, 615]

Diagnostika aneuryzmatu abdominální aorty

- Palpace
- Ultrazvuk + Doppler.vyš.
- Spirální CTA (3D rekonst)
- Magnetická rezonance (MR)
- Angiografie (DSA-kalibrace)
- IVUS
- Prosté snímky břicha a event. hrudníku (RTG) (přítomnost aortálních kalcifikací?)

Recommendation 9	Class	Level	References
In patients with abdominal aortic aneurysms computed tomography angiography is recommended for therapeutic decision making and treatment planning, and for the diagnosis of rupture.	I	C	[370,416,589]

AAA anatomické dělení



Populační screemning AAA

- Je populační screening schopen snížit mortalitu spojenou s AAA?
- Je populační screening schopen snížit celkovou mortalitu?
- Máme k dispozici EBM data podporující populační screening AAA?
- U kterých podskupin pacientů je screening nejefektivnější?

Table 2.1. Summary of randomised trials of population based screening for abdominal aortic aneurysm in men.

Trial characteristics	Chichester UK	Viborg Denmark	MASS UK	Western Australia
Number randomised	15,775	12,628	67,800	41,000
Gender	Men and women	Men	Men	Men
Age (year)	65–80	65–73	65–74	65–79
Period recruited	1988–1990	1994–1998	1997–1999	1996–1998
Year published	1995	2002	2002	2004
Attendance rate	68%	76%	80%	70%[a]
AAA detection rate	4% (7.6% in men)	4%	4.9%	7.2%
Place of screening	Hospital	Hospital	Community	Community
Intervention policy	At 6.0 cm	At 5.0 cm measured as external diameter	At 5.5 cm measured as internal diameter	none
Mean follow up (year)	4.1	13.0	13.1	12.8
AAA mortality, odds ratio (95% CI) Screened vs. not	0.59 men only (0.27–1.29)	0.31 (0.13–0.79)	0.58 (0.42–0.78	0.91 (0.68–1.21)
All cause mortality, odds ratio (95% CI) Screened vs. not	1.07 (men only) (0.93–1.22)	0.98 (0.95–1.02)	0.97 (0.93–1.02)	0.98 (0.96–1.01)

Recommendation 12	Class	Level	References
Population screening for abdominal aortic aneurysm with a single ultrasound scan for all men at age 65 years is recommended.	I	A	[132,390,408, 410,495,509, 614,690,691, 758]

- Recentní populačně screeningové programy pro AAA (UK, Švédsko), dánský VIVA Trial potvrzují cost efektivitu programu i pro dnešní populaci
- OSR a EVAR mortalita a morbidita pacientů ze screening programů je signifikantně menší než u AAA náhodně zjištěných

Populační screening AAA u ostatních podskupin pacientů

- Ženy
- Rodinní příslušníci pacientů s AAA
- Pacienti s periferními aneurysmaty

Ženy

- 4x vyšší počet ruptur malých AAA, horší operační výsledky

Recommendation 14	Class	Level	References
Population screening for abdominal aortic aneurysm in women is not recommended.	III	B	[395,613,671, 672]

Rodinní příslušníci

Recommendation 15	Class	Level	References
All men and women aged 50 years and older with a first degree relative with an abdominal aortic aneurysm may be considered for abdominal aortic aneurysm screening at 10 year intervals.	IIb	C	[7,380,743]

Pacienti s aneurysmaty periferních cév

Recommendation 16	Class	Level	References
Screening for abdominal aortic aneurysm at 5—10 year intervals may be considered for all men and women with a true peripheral arterial aneurysm.	IIb	C	[571]

Ovlivnění expanze AAA

Recommendation 19	Class	Level	References
No specific medical therapy has been proven to slow the expansion rate of an abdominal aortic aneurysm, and therefore is not recommended.	III	A	[352,591]

Recommendation 21	Class	Level	References
Blood pressure control, statins and antiplatelet therapy should be considered in all patients with abdominal aortic aneurysm.	IIa	B	[2,31,233, 551,762]

Ovlivní K-V mortalitu, ale ne mortalitu spojenou s AAA a růst aneurysmatu

Recommendation 18	Class	Level	References
Patients with a small abdominal aortic aneurysm are recommended to stop smoking (to reduce the abdominal aortic aneurysm growth rate and risk of rupture) and to receive help to do this.	I	B	[259,668]

Diabetes II typu zpomaluje progresi a pravděpodobnost ruptury AAA (metformin??)

Sledování AAA

Recommendation 7	Class	Level	References
Ultrasonography is recommended for the first line diagnosis and surveillance of small abdominal aortic aneurysms.	I	B	[389,409,416, 770]

- AAA 3-3,9cm — USG 1x za 3roky
- AAA 4-4,9cm — USG 1x za 1rok
- AAA >5,0cm — USG 1x za 3-6měsíců

- Po EVAR — USG co 6-12měsíců

Recommendation 17	Class	Level	References
Ultrasonography is recommended for aneurysm surveillance; every three years for aneurysms 3—3.9 cm in diameter, annually for aneurysms 4.0—4.9 cm, and every 3—6 month for aneurysms ≥5.0 cm.	I	B	[578]

Dělení dle symptomatologie

- Asymptomatická aneuryzmata - nalezena náhodně (palpace, ultrazvuk, CT či MR vyšetření, DSA)
- Symptomatická aneuryzmata - projevují se bolesti břicha, zad, trávicí potíže, občasné zvracení, pocity plnosti atd.(nárůst velikosti, tlak, zatékání kontrastní látky do trombu)
- Rupturovaná aneurysmata – bolest, hemodynamická nestabilita, šokový stav

Cíl léčby AAA

- Vyřadit pomocí otevřené operace či endovaskulární protézy(EVAR) vak aneuryzmatu z toku krve v aortě a tím snížit pravděpodobnost ruptury

- Jak velké aneuryzma by mělo být léčeno
- Jaká metoda léčby by měla být zvolena

Velikost aneuryzmatu

- Nebyl prokázán střednědobý benefit chirurgické léčby aneuryzmat pod 5cm (UK and US Small Aneurysm Trial) ani endovaskulární léčby malých aneuryzmat (CAESAR, PIVOTAL study)

- Muži

Recommendation 22	Class	Level	References
In men, the threshold for considering elective abdominal aortic aneurysm repair is recommended to be ≥5.5 cm diameter.	I	A	[204]

- Ženy

Recommendation 23	Class	Level	References
In women with acceptable surgical risk the threshold for considering elective abdominal aortic aneurysm repair may be considered to be ≥5.0 cm diameter.	IIb	C	[242,578,668, 685,708]

- Rychlá progrese

Recommendation 24	Class	Level	References
When rapid abdominal aortic aneurysm growth is observed (≥1 cm/year), fast track referral to a vascular surgeon with additional imaging should be considered.	IIa	C	[369,626]

Výběr metody léčby

Chirurgická resekce

x

Implantace stentgraftu

x

Konzervativní léčba

Výběr metody léčby

- Registry – EUROSTAR, RETA

- Randomizované studie - EVAR 1, DREAM, OVER, ACE
  - EVAR 2

Chirurgická *x* endovaskulární léčba(DREAM, EVAR 1, OVER, ACE)

Celková mortalita

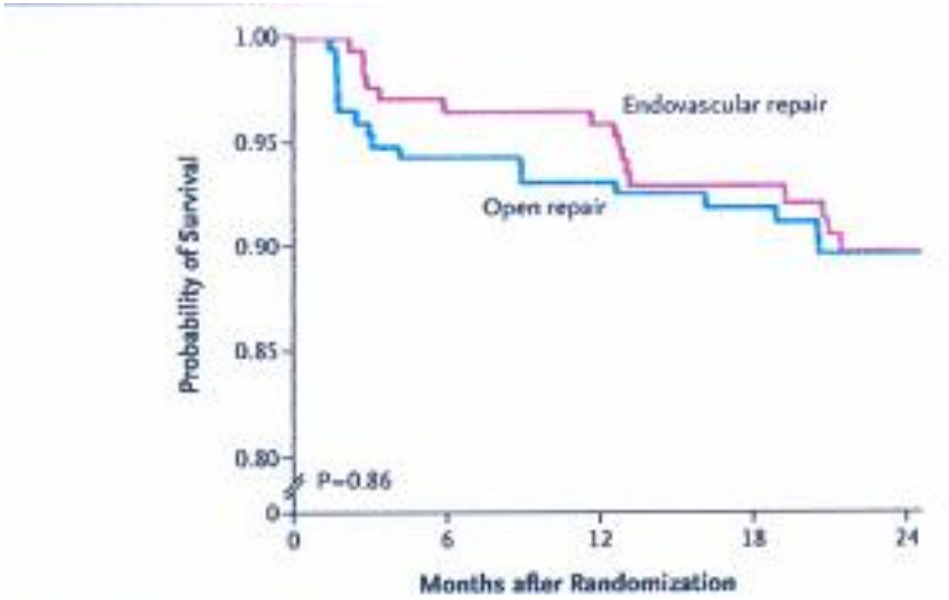


Figure 1. **Kaplan–Meier Estimates of Survival among Patients Assigned to Undergo Open or Endovascular Aneurysm Repair.**

Chirurgická *x* endovaskulární léčba(DREAM, EVAR 1, OVER, ACE)

Nutnost opakovaných reintervencí

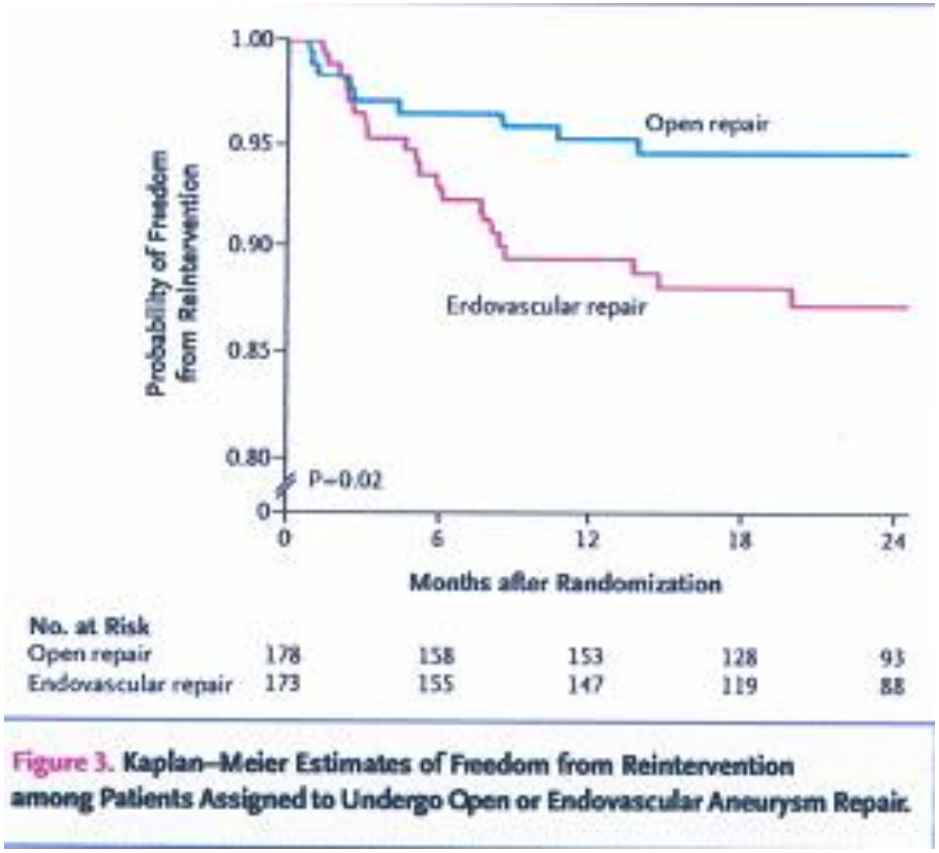


Figure 3. **Kaplan–Meier Estimates of Freedom from Reintervention among Patients Assigned to Undergo Open or Endovascular Aneurysm Repair.**

EVAR x konzervativní léčba(high risk pacienti) - EVAR2

- Stejná celková mortalita
- Stejné riziko mortality spojené s aneurysmatem
- Velké množství reintervencí u EVAR
- EVAR podstatně dražší

Recommendation 62	Class	Level	References
In patients with limited life expectancy, elective abdominal aortic aneurysm repair is not recommended.	III	B	[192,193,709, 710]

AAA management

Zobrazovací metody – UZ, CTA, MRA, DSA

Zhodnocení rizika:

-kardiovaskulární – ECHO, UZ karotid, zátěžové testy, SKG,

-neurologický status

-ventilační parametry

- renální funkce

-prognóza přežití

MULTIOBOROVÁ INDIKAČNÍ KOMISE

Recommendation 2	Class	Level	References
It is recommended that centres or networks of collaborating centres treating patients with abdominal aortic aneurysms can offer both endovascular and open aortic surgery at all times.	I	B	[50,70,237,287–289,378,386,541,558,606]

Recommendation 4	Class	Level	References
Abdominal aortic aneurysm repair should not be performed in centres with a yearly caseload <20.	III	B	[124,160,174,277,329,378,435,526,531]

Recommendation 27	Class	Level	Reference
Routine referral for cardiac work up, coronary angiography and cardiopulmonary exercise testing is not recommended prior to abdominal aortic aneurysm repair.	III	C	[206,360]

AAA management

Recommendation 29	Class	Level	References
In patients with stable coronary artery disease, routine coronary revascularisation before elective abdominal aortic aneurysm repair is not recommended.	III	B	[206,360,461]

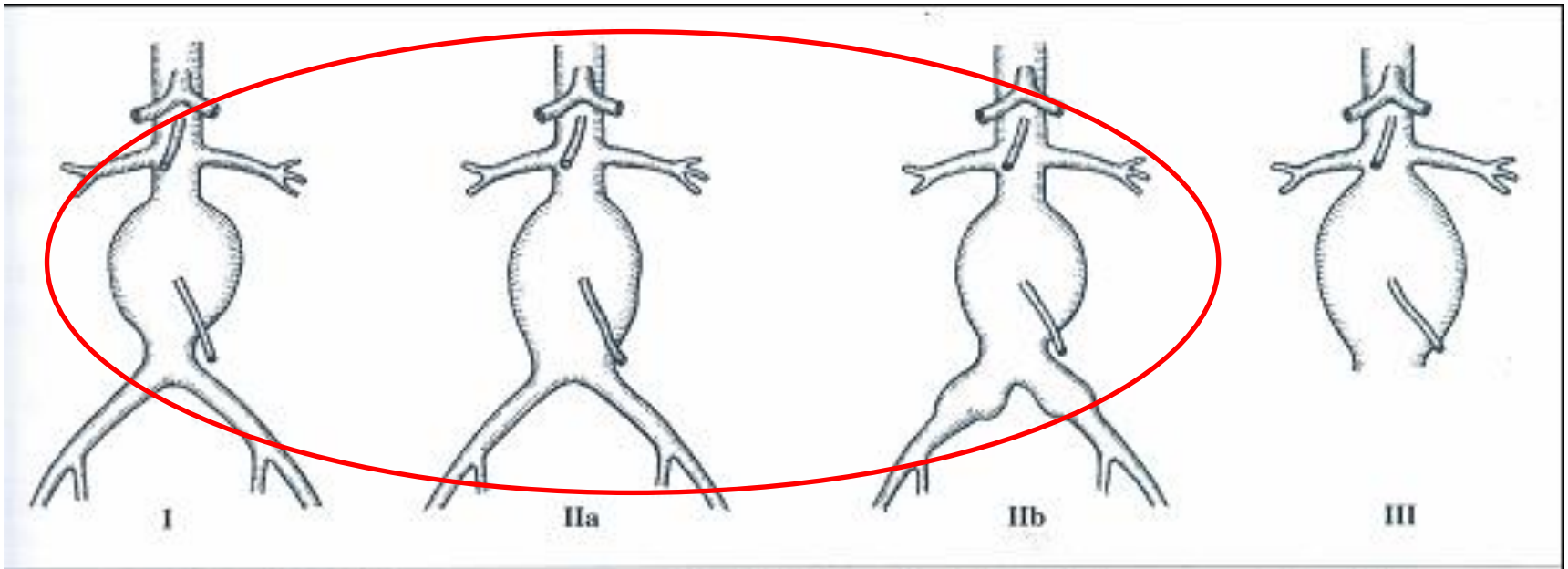
Recommendation 30	Class	Level	References
In patients with unstable coronary artery disease or considered to be at high risk of cardiac events following abdominal aortic aneurysm repair, prophylactic pre-operative coronary revascularisation should be considered.	IIa	B	[206,360,461]

- Přednostní řešení srdečního selhání, významné Ao stenosy a při duální antiagregaci preference EVAR

Recommendation 34	Class	Level	References
In all patients, pulmonary function testing with spirometry prior to elective abdominal aortic aneurysm repair should be considered.	IIa	C	[565]

Recommendation 37	Class	Level	References
In patients undergoing abdominal aortic aneurysm repair, assessment of pre-operative kidney function by measuring serum creatinine and estimating GFR is recommended, and those with severe renal impairment (estimated Glomerular Filtration Rate <30 mL/min/1.73 m^2) should be referred to a renal physician.	I	C	[112,144,601]

Klasifikace aneuryzmat infrarenální abdominální aorty

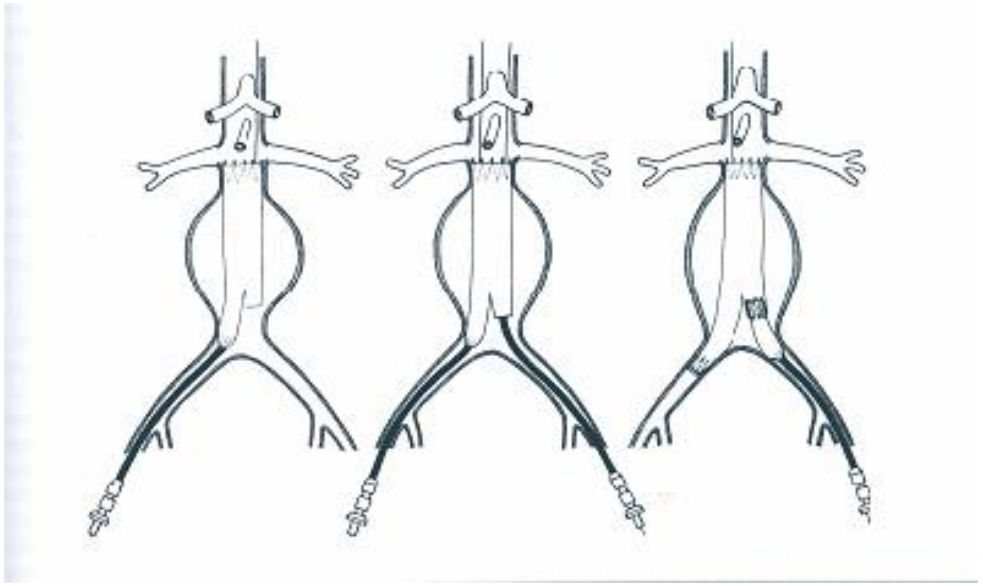


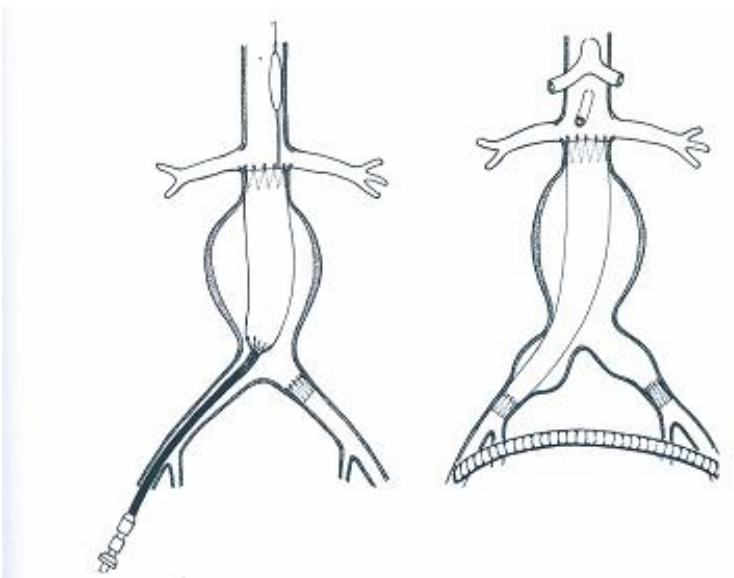
Obr. 1. Základní morfologické skupiny aneuryzmat abdominální aorty. I. - infrarenální aneuryzma abdominální aorty s dostatečným proximálním krčkem, kaudálně nezasahuje na iliakální řečiště. II. - skupina aortoiliakálních aneuryzmat, IIa - zasahující na bifurkaci aorty, IIb - skupina zasahující do proximální třetiny společných iliakálních tepen. III. - skupina aneuryzmat juxtarenálních.

Endovaskulární protéza stentgraft

- kombinace stentu(ocel či nitinol) a syntetické protézy (dakron, polytetrafluoroethylen)
- samoexpandibilní
- Flexibilní
- Bifurkační
- Aorto-uni

Implantace břišního stentgraftu





Typy endoleaků

„Endoleak“ – přetrvávající plnění vaku aneuryzmatu systémovou krví

- Typ I – netěsnost v oblasti kotvících zón
- Typ II – z kolaterálního toku
- Typ III – destrukce stentgraftu, rozpojení
- Typ IV – propustnost cévní protézy

Implantace břišního stentgraftu

- Celková, epidurální či lokální anestézii
- ASA, Heparin, ATB krytí
- Arteriotomie AFC bilat., perkutánní impl.
- Zavedení pod rtg kontrolou

Recommendation 45	Class	Level	References
An established monotherapy with aspirin or thienopyridines (e.g. clopidogrel) is recommended to be continued during the peri-operative period after open and endovascular abdominal aortic aneurysm repair.	I	B	[101,170, 354,658]

Recommendation 46	Class	Level	References
In all patients undergoing open or endovascular abdominal aortic aneurysm repair, peri-operative systemic antibiotic prophylaxis is recommended.	I	A	[655]

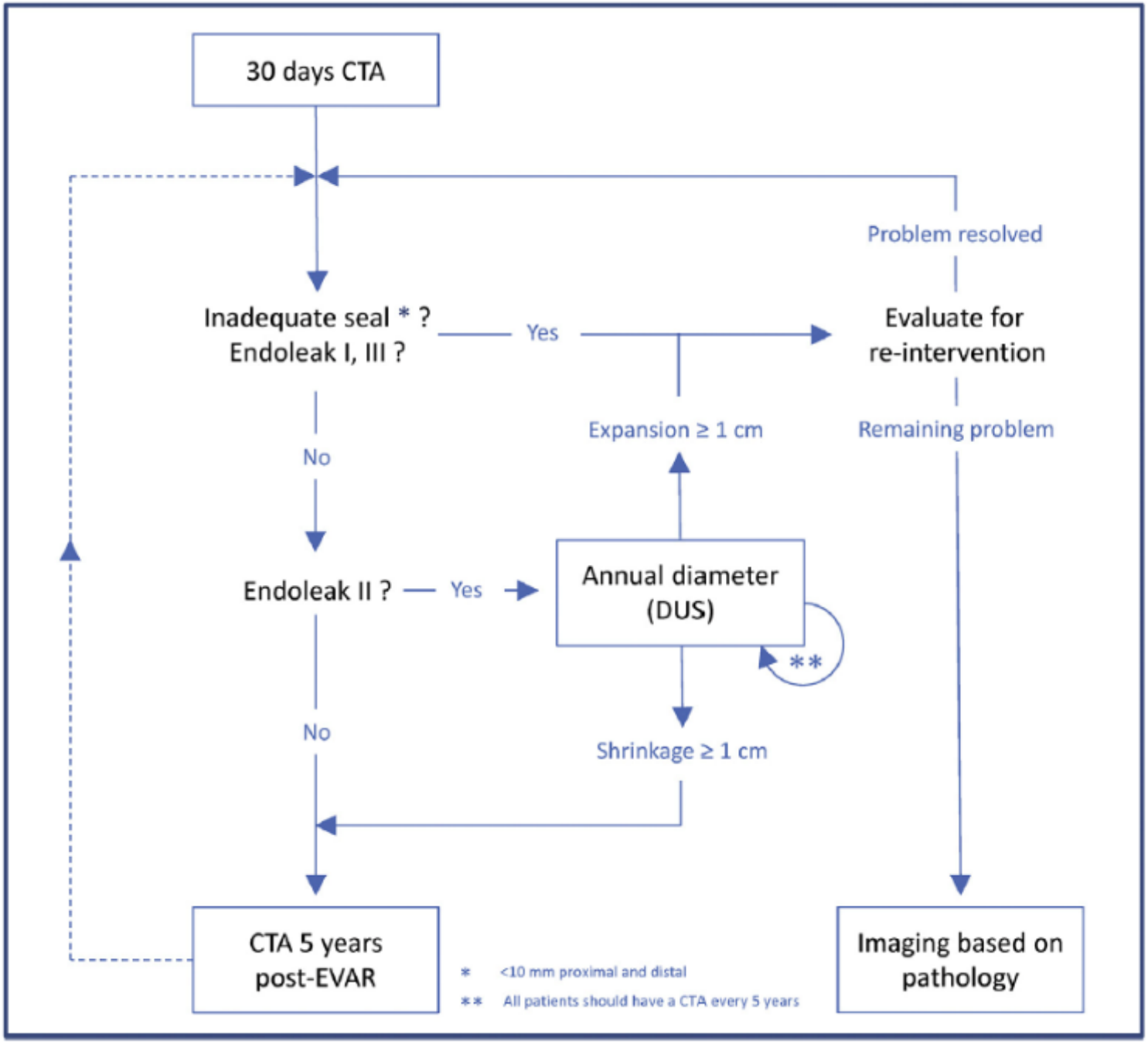
Následné sledování

- Kontroly CTA či UZ
- ATB profylaxe??
- Kontrola rizikových faktorů aterosklerózy, hypertenze, DM, ICHS

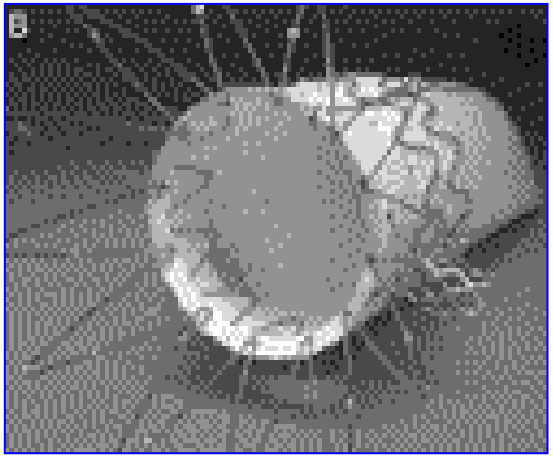
Recommendation 80	Class	Level	References
In patients with previous abdominal aortic aneurysm repair routine use of antibiotic prophylaxis in conjunction with dental or other surgical procedures for prevention of graft infection is not recommended.	III	C	[26,263,504]

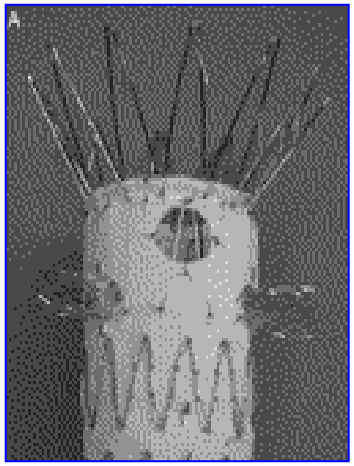
- ATB profylaxe doporučena pouze u drenáže infekčních ložisek a imuno kompromitovaných pacientů

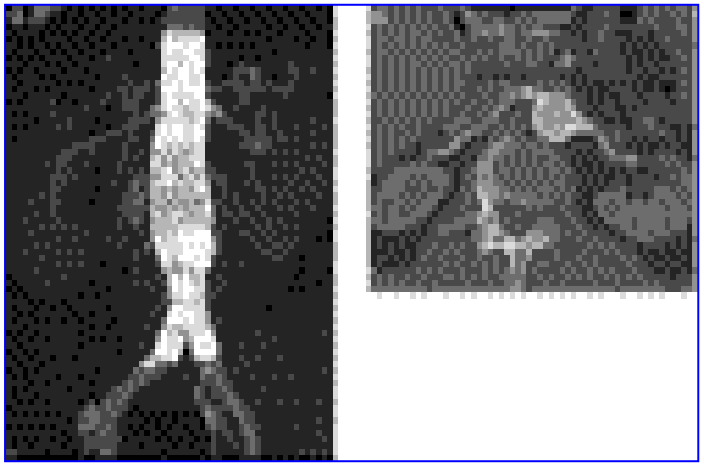
Recommendation 75	Class	Level	References
In all patients after abdominal aortic aneurysm repair, cardiovascular risk management, with blood pressure and lipid control as well as antiplatelet therapy, is recommended.	I	B	[2,184,262,340, 343,534,584, 790]


30 days CTA
Problem resolved
Inadequate seal * ?
Endoleak I, III ?
Yes
Evaluate for
re-intervention
Expansion ≥ 1 cm
Remaining problem
No
Endoleak II ?
Yes
Annual diameter
(DUS)
**
No
Shrinkage ≥ 1 cm
CTA 5 years
post-EVAR
Imaging based on
pathology
* <10 mm proximal and distal
** All patients should have a CTA every 5 years

Fenestrované grafty + Chimney







Recommendation 96	Class	Level	References
In complex endovascular repair of juxtarenal abdominal aortic aneurysm, endovascular repair with fenestrated stent grafts should be considered the preferred treatment option when feasible.	IIa	C	[568]

Rupturované břišní aneurysma - rAAA

Cochrane Library

Cochrane Database of Systematic Reviews

Endovascular treatment for ruptured abdominal aortic aneurysm (Review)

Badger S, Forster R, Blair PH, Ellis P, Kee F, Harkin DW

Main results

We included four randomised controlled trials in this review. A total of 868 participants with a clinical or radiological diagnosis of RAAA were randomised to receive either eEVAR or open surgical repair. Overall risk of bias was low, but we considered one study that performed randomisation in blocks by week and performed no allocation concealment and no blinding to be at high risk of selection bias. Another study did not adequately report random sequence generation, putting it at risk of selection bias, and two studies were underpowered. There was no clear evidence to support a difference between the two interventions for 30-day (or in-hospital) mortality (OR 0.88, 95% CI 0.66 to 1.16; moderate-quality evidence). There were a total of 44 endoleak events in 128 participants from three studies (low-quality evidence). Thirty-day complication outcomes (myocardial infarction, stroke, composite cardiac complications, renal complications, severe bowel ischaemia, spinal cord ischaemia, reoperation, amputation, and respiratory failure) were reported in between one and three studies, therefore we were unable to draw a robust conclusion. We downgraded the quality of the evidence for myocardial infarction, renal complications, and respiratory failure due to imprecision, inconsistency, and risk of bias. Odds ratios for complications outcomes were OR 2.38 (95% CI 0.34 to 16.53; 139 participants; 2 studies; low-quality evidence) for myocardial infarction; OR 1.07 (95% CI 0.21 to 5.42; 255 participants; 3 studies; low-quality evidence) for renal complications; and OR 3.62 (95% CI 0.14 to 95.78; 32 participants; 1 study; low-quality evidence) for respiratory failure. There was low-quality evidence of a reduction in bowel ischaemia in the eEVAR treatment group, but very few events were reported (OR 0.37, 95% CI 0.14 to 0.94), and we downgraded the evidence due to imprecision and risk of bias. Six-month and one-year outcomes were evaluated in three studies, but only results from a single study could be used for each outcome, which showed no clear evidence of a difference between the interventions. We rated six-month mortality evidence as of moderate quality due to imprecision (OR 0.89, 95% CI 0.40 to 1.98; 116 participants).

Authors' conclusions

The conclusions of this review are currently limited by the paucity of data. We found from the data available moderate-quality evidence suggesting there is no difference in 30-day mortality between eEVAR and open repair. Not enough information was provided for complications for us to make a well-informed conclusion, although it is possible that eEVAR is associated with a reduction in bowel ischaemia. Long-term data were lacking for both survival and late complications. More high-quality randomised controlled trials comparing eEVAR and open repair for the treatment of RAAA are needed to better understand if one method is superior to the other, or if there is no difference between the methods on relevant outcomes.

Recommendation 74	Class	Level	References
In patients with ruptured abdominal aortic aneurysm and suitable anatomy, endovascular repair is recommended as a first option.	I	B	[288,289,669]

Koho indikovat k léčbě rAAA??

- Pacient bez známek irreversibilního hemorrhagického šoku anatomicky schůdný k EVAR – EVAR ve vaskulárním centru schopném 24hodinové emergentní implantace AAA
- Pacient bez známek irreversibilního hemorrhagického šoku anatomicky neschůdný k EVAR – otevřená operace ve vaskulárním centru schopném 24hodinové emergentní otevřené operace AAA
- Pacient ve stadiu irreversibilního šoku – konzervativní postup??

Recommendation 70	Class	Level	References
Selection of patients with ruptured abdominal aortic aneurysm for palliation based entirely on scoring systems or solely on advanced age is not recommended.	III	B	[4,59,128,147, 322,367,436, 586,621,625, 671,675,689, 715,747,748]

Shrnutí

Ve střednědobém sledování není průkaz benefitu chirurgického či endovaskulárního řešení AAA menších než 5cm(US a UK Small Aneurysm Trial, CAESAR, PIVOTAL study)

Shrnutí

Z jakékoliv léčby AAA profitují co se týče mortality a morbidity spojené s aneurysmatem především nízce rizikoví pacienti s aneurysmatem nad 5-5,5cm

Shrnutí

- Statisticky významně lepší 30 denní mortalita EVAR oproti chirurgickému řešení u pacientů schůdných k oběma metodám
- Identické výsledky EVAR a chirurgického řešení po již po 12 měsících(DREAM, EVAR 1, OVER, ACE)
- EVAR zatíženo větším počtem re-intervencí a vyšší cenou

Recommendation 60	Class	Level	References
In most patients with suitable anatomy and reasonable life expectancy, endovascular abdominal aortic aneurysm repair should be considered as the preferred treatment modality.	IIa	B	[48,70,71,78, 100,192,193, 194,237,270, 385,386,387, 401,447,541, 545,558,563, 577,698,709, 710,779]

Recommendation 61	Class	Level	References
In patients with long life expectancy, open abdominal aortic aneurysm repair should be considered as the preferred treatment modality.	IIa	B	[50,70,71,237, 385,386,387, 541,545,558, 563]

Shrnutí

U vysoce rizikových pacientů neschopných chirurgického řešení je střednědobá mortalita pacientů léčených konzervativně a EVAR stejná a to i co se týče mortality spojené s aneurysmatem(EVAR 2)

Děkuji za pozornost!