L'ANEURISMA NON ROTTO:
DUBBI E CERTEZZE

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I DUBBI...

Unruptured intracranial aneurysms: epidemiology, natural history, management options, and familial screening

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Natural history

There are no randomised clinical trial data that define the optimum management of an unruptured intracranial aneurysm. The available natural history studies provide both retrospective and prospective data (table 1).

	Location	Study type	Number of patients	Number of aneurysms	Follow-up (months)	Predictors of aneurysm rupture
International Study of Unruptured Intracranial Aneurysms Investigators[12,26]	North America and Europe	Retrospective	1449 untreated	1937	99·6	Aneurysm size and location
International Study of Unruptured Intracranial Aneurysms Investigators[12,26]	North America and Europe	Prospective	4060: 1692 untreated, 1917 open surgery, and 451 coiling	Untreated: 2686; long-term rupture risk after open surgery or coiling not assessed	Untreated: 49·2; long-term rupture risk after open surgery or coiling not assessed	Untreated: aneurysm size and location
Small Unruptured Aneurysm Verification Study[18]	Japan	Prospective	374	448	41	Age >50 years, aneurysm diameter ≥4 mm, hypertension, and aneurysm multiplicity
Juvela et al[25,26]	Finland	Retrospective and prospective	142	181	252	Cigarette smoking, anterior communicating artery location, and patient age (inversely)
Unruptured Cerebral Aneurysm Study[27]	Japan	Prospective	5720	2392 open surgery, 4305 without early treatment	11 660 aneurysm-years	Untreated: aneurysm size and location, and presence of daughter sac
Lee et al[28]	Korea	Prospective	7404: 5963 untreated, 1441 treated	NA	Untreated: 39·6	Untreated: older age; aneurysm characteristics were not available

NA=not available.

Table 1: Summary of large cohort studies of unruptured intracranial aneurysms

Lancet Neurology, Aprile 2014

Neurosurgery, Ottobre 2016

Understanding Rupture Risk Factors for Intracranial Aneurysms: Which Ticking Time Bomb Needs to be Defused?

cranial Aneurysms (ISUIA),[6] the shortcomings of which are well documented.[7–9] Although certain intrinsic and extrinsic factors have consistently been found to be associated with a higher risk of rupture in various studies, there is still a lack of a complete understanding of the natural history of intracranial aneurysms. In addition, in further analysis of the known risk factors, some discrepancies start to emerge. For example, although aneurysm size is a well-documented risk factor, the optimal cutoff size

Risk Analysis of Unruptured Intracranial Aneurysms

Prospective 10-Year Cohort Study

Yuichi Murayama, MD; Hiroyuki Takao, MD; Toshihiro Ishibashi, MD; Takayuki Saguchi, MD; Masaki Ebara, MD; Ichiro Yuki, MD; Hideki Arakawa, MD; Koreaki Irie, MD; Mitsuyoshi Urashima, MD, MPH; Andrew J. Molyneux, MD

Stroke, Febbraio 2016

and health risk factors. Although larger aneurysms are associated with higher risk, the size at which treatment should be recommended remains unclear. For the patients in this study, we recommended observation in small aneurysms (<5 mm) based on previous natural history studies and national guidelines.[1,5,13] Although 22 patients with aneurysms that were <5 mm had a rupture, but the incidence of rupture was still low (0.3% per year).

Our results indicated that only size, location, daughter sac, and history of SAH were independent predictors for rupture.

Multiple aneurysms, family history, smoking, and hypertension did not emerge as predictors in this study. It is known that current smoking is risk factor for rupture.

...come calcolare il rapporto rischio/beneficio del trattamento negli aneurismi non rotti??

…LE CERTEZZE (?)

PAPER

Risk–benefit analysis of the treatment of unruptured intracranial aneurysms

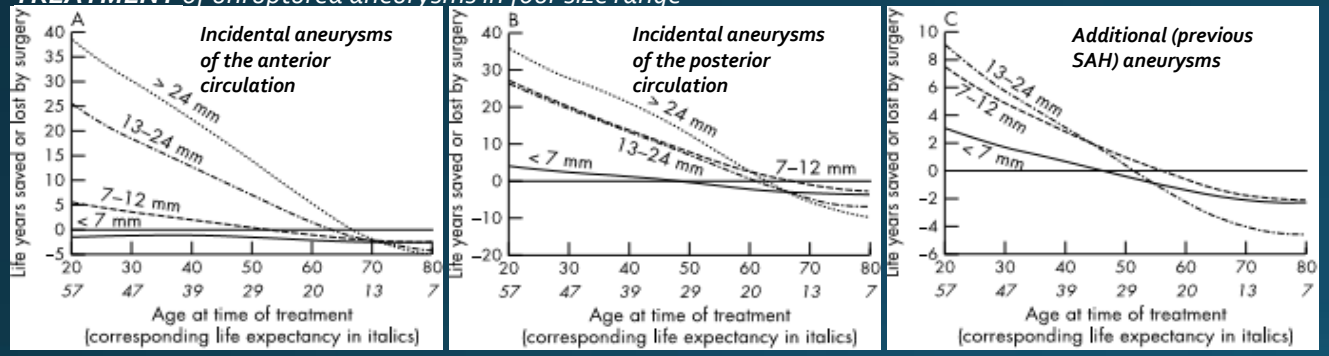
R R Vindlacheruvu, A D Mendelow, P Mitchell

J Neurol Neurosurg Psychiatry 2005;76:234–239. doi: 10.1136/jnnp.2003.031930

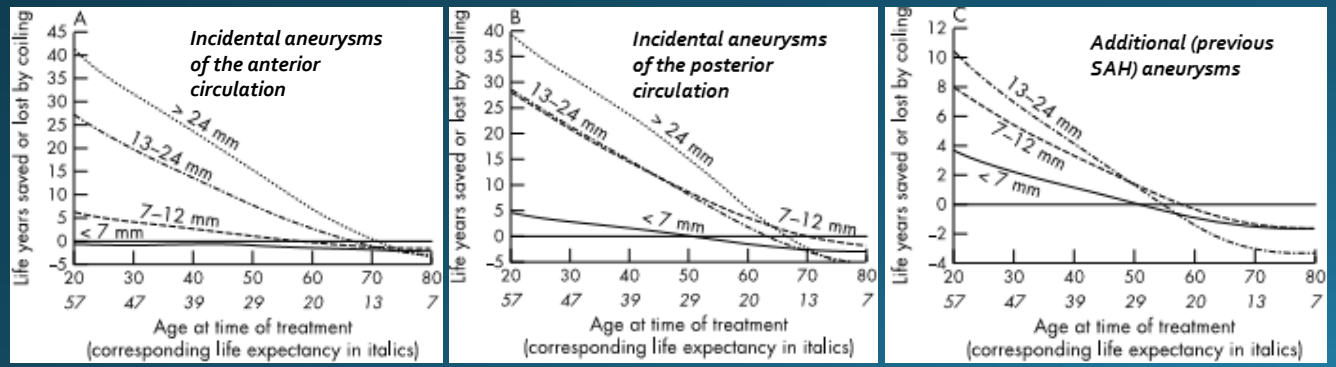
Objectives: To determine under what circumstances repair of unruptured intracranial aneurysms may be beneficial.

Methods: A life expectancy analysis of patients with unruptured aneurysms with and without repair based on prospective data from the International Study of Unruptured Intracranial Aneurysms (ISUIA).

*Expected life years lost or gained by treatment against patient age at the time of treatment for **SURGICAL TREATMENT** of unruptured aneurysms in four size range*



*Expected life years lost or gained by treatment against patient age at the time of treatment for **ENDOVASCULAR EMBOLISATION** of unruptured aneurysms in four size ranges*



METHOD

The age specific annual risk of death was taken for the population as a whole from the 2001 census mortality statistics of the total population of the UK.[4] The risk posed by an unruptured aneurysm was estimated by correcting the bleed rate for the favourable recovery rate from SAH. When added, the resulting total annual risk was used to calculate the remaining life expectancy of individuals harbouring unruptured aneurysms. The life expectancy of those undergoing surgery was calculated by adjusting the life expectancy of the normal population for operative risks. The result was compared with the untreated case to calculate expected life years saved or lost by operating. Further details of the mathematical method are given in the appendix. The annual rupture rates used are given in table 1 and are derived from observations over a maximum period of six years.[3]

DISCUSSION

The present calculations are based on three statistics: the life expectancy of the normal population, the risks posed by untreated unruptured aneurysms, and the poor outcome rate of procedures to repair unruptured aneurysms. None of these values are known exactly.

CONCLUSIONS:

- *In patients with incidental anterior circulation aneurysms under 7 mm in diameter repairing the aneurysm brings a slight reduction in life expectancy at all ages (do not treat).*
- *In all patients with additional aneurysm and those with incidental aneurysms 7 mm or more in diameter or of the posterior circulation, life years are gained by repair up to the age of 45–65 (treat).*

Neurology. 2015 Sep 8;85(10):881-9. doi: 10.1212/WNL.0000000000001891. Epub 2015 Aug 14.

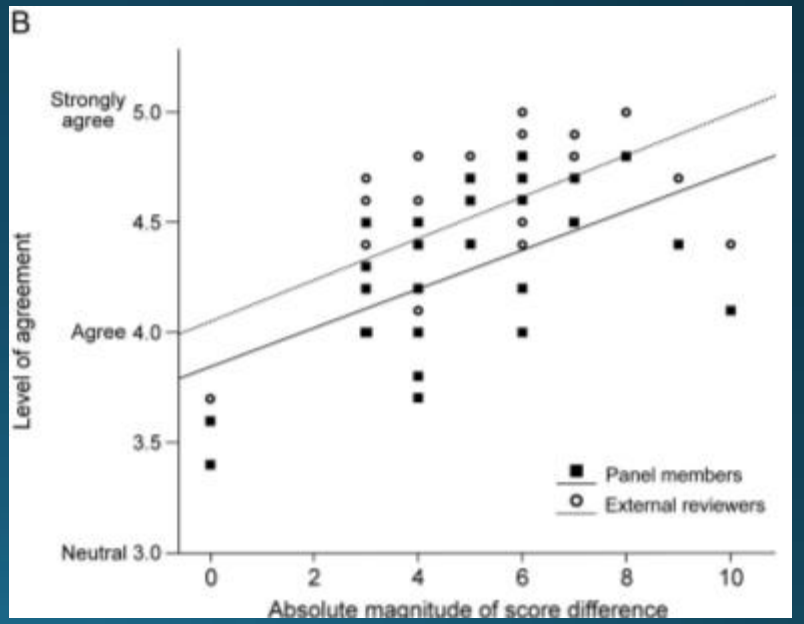
The unruptured intracranial aneurysm treatment score: a multidisciplinary consensus.

Etminan N[1], Brown RD Jr[2], Beseoglu K[2], Juvela S[2], Raymond J[2], Morita A[2], Torner JC[2], Derdeyn CP[2], Raabe A[2], Mocco J[2], Korja M[2], Abdulazim A[2], Amin-Hanjani S[2], Al-Shahi Salman R[2], Barrow DL[2], Bederson J[2], Bonafe A[2], Dumont AS[2], Fiorella DJ[2], Gruber A[2], Hankey GJ[2], Hasan DM[2], Hoh BL[2], Jabbour P[2], Kasuya H[2], Kelly ME[2], Kirkpatrick PJ[2], Knuckey N[2], Koivisto T[2], Krings T[2], Lawton MT[2], Marotta TR[2], Mayer SA[2], Mee E[2], Pereira VM[2], Molyneux A[2], Morgan MK[2], Mori K[2], Murayama Y[2], Nagahiro S[2], Nakayama N[2], Niemelä M[2], Ogilvy CS[2], Pierot L[2], Rabinstein AA[2], Roos YB[2], Rinne J[2], Rosenwasser RH[2], Ronkainen A[2], Schaller K[2], Seifert V[2], Solomon RA[2], Spears J[2], Steiger HJ[2], Vergouwen MD[2], Wanke I[2], Wermer MJ[2], Wong GK[2], Wong JH[2], Zipfel GJ[2], Connolly ES Jr[2], Steinmetz H[2], Lanzino G[2], Pasqualin A[2], Rüfenacht D[2], Vajkoczy P[2], McDougall C[2], Hänggi D[2], LeRoux P[2], Rinkel GJ[2], Macdonald RL[2].

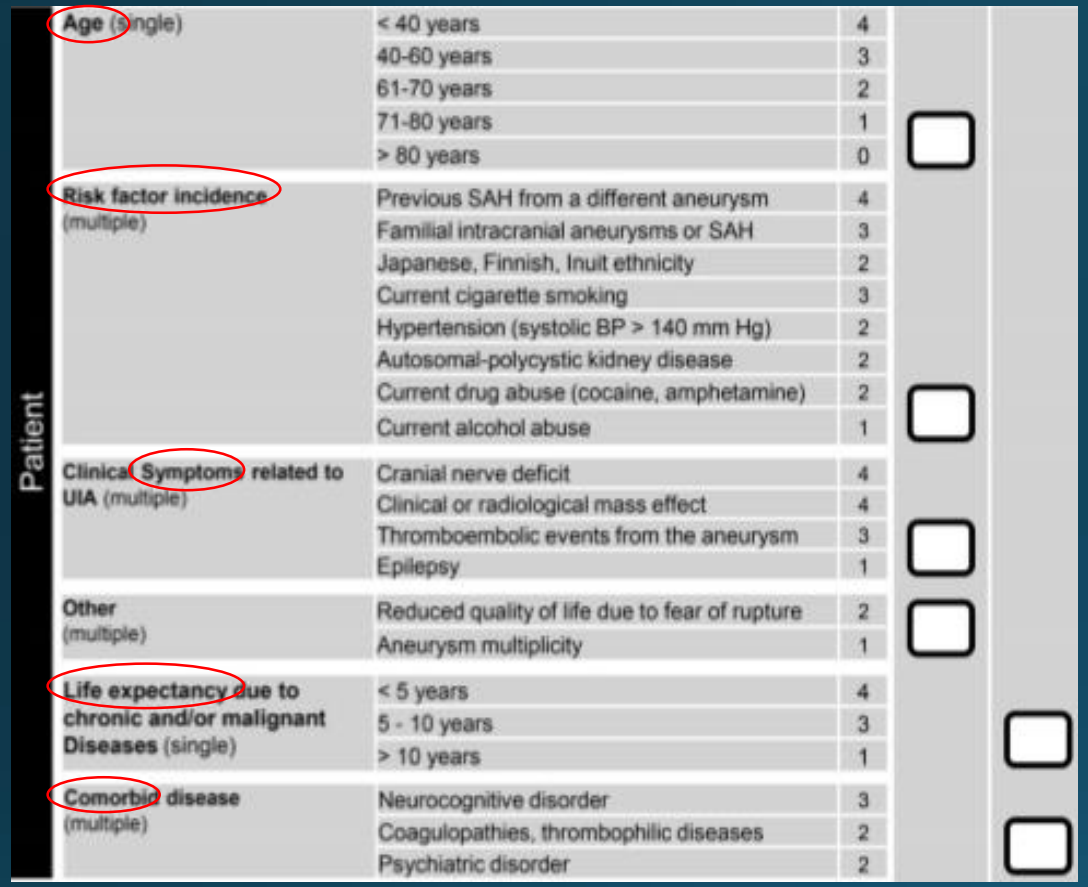
Unruptured intracranial aneurysms (UIAs) are prevalent in 3% of the adult population and are increasingly detected due to more frequent cranial imaging.[1,2] Previous cohort studies found that only a small proportion of UIAs rupture, causing subarachnoid hemorrhage (SAH) with a significant case fatality rate.[3–9] Although partially biased by selection of specific subgroups of UIAs, these studies found that especially small UIAs generally have a low risk of rupture. However, because small UIAs are so highly prevalent, most instances of SAH are caused by rupture of small aneurysms, but it remains unclear which small UIAs are prone to rupture so that preventive treatment could be considered. Case-control studies have suggested factors (e.g., UIA morphology, family history, smoking, or hypertension) that may increase the risk of UIA rupture, but uncertainties remain.[10–13] This is further complicated by the fact that there are only a few established risk factors for complications during aneurysm repair (e.g., patient age), even though numerous factors have been suggested.[14,15]

- *The UIATS was developed partially based on data but also using consensus among specialists in the field.*
- *It accounts for many different factors that often influence clinical decisions but that were not well studied in previous observational studies, e.g., young age or long life expectancy, coexistent modifiable or non modifiable risk factors, coexistent morbidities, morphologic UIA features, or relevance of clinical symptoms related to UIAs*
- *Constitutes a comparison between the risk of rupture vs the risks of treatment in that particular patients; this is what clinicians do in daily practice.*

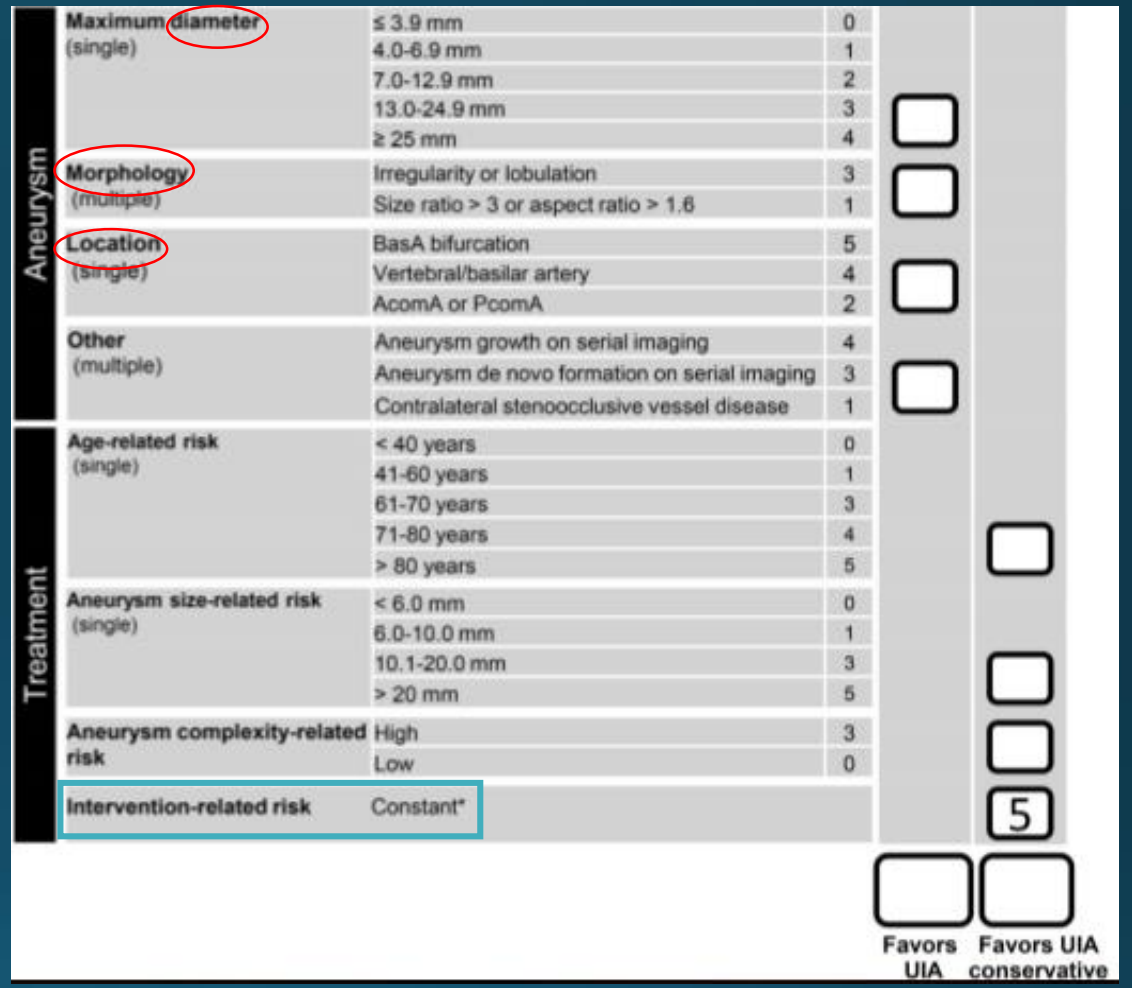
- *An international multidisciplinary (neurosurgery, neuroradiology, neurology, clinical epidemiology) group of 69 specialists develop and validate the UIAT*
- *Delphi consensus.*



UIATs



Patient	**Age** (single)	< 40 years	4		
		40-60 years	3		
		61-70 years	2		
		71-80 years	1	☐	
		> 80 years	0		
	Risk factor incidence (multiple)	Previous SAH from a different aneurysm	4		
		Familial intracranial aneurysms or SAH	3		
		Japanese, Finnish, Inuit ethnicity	2		
		Current cigarette smoking	3		
		Hypertension (systolic BP > 140 mm Hg)	2		
		Autosomal-polycystic kidney disease	2		
		Current drug abuse (cocaine, amphetamine)	2	☐	
		Current alcohol abuse	1		
	Clinical Symptoms related to UIA (multiple)	Cranial nerve deficit	4		
		Clinical or radiological mass effect	4		
		Thromboembolic events from the aneurysm	3	☐	
		Epilepsy	1		
	Other (multiple)	Reduced quality of life due to fear of rupture	2	☐	
		Aneurysm multiplicity	1		
	Life expectancy due to chronic and/or malignant Diseases (single)	< 5 years	4		
		5 - 10 years	3		☐
		> 10 years	1		
	Comorbid disease (multiple)	Neurocognitive disorder	3		
		Coagulopathies, thrombophilic diseases	2		☐
		Psychiatric disorder	2		



Aneurysm	**Maximum diameter** (single)	≤ 3.9 mm	0		
		4.0-6.9 mm	1		
		7.0-12.9 mm	2		
		13.0-24.9 mm	3	☐	
		≥ 25 mm	4		
	Morphology (multiple)	Irregularity or lobulation	3	☐	
		Size ratio > 3 or aspect ratio > 1.6	1		
	Location (single)	BasA bifurcation	5		
		Vertebral/basilar artery	4	☐	
		AcomA or PcomA	2		
	Other (multiple)	Aneurysm growth on serial imaging	4		
		Aneurysm de novo formation on serial imaging	3	☐	
		Contralateral stenoocclusive vessel disease	1		
Treatment	**Age-related risk** (single)	< 40 years	0		
		41-60 years	1		
		61-70 years	3		
		71-80 years	4		☐
		> 80 years	5		
	Aneurysm size-related risk (single)	< 6.0 mm	0		
		6.0-10.0 mm	1		
		10.1-20.0 mm	3		☐
		> 20 mm	5		
	Aneurysm complexity-related risk	High	3		☐
		Low	0		
	Intervention-related risk	Constant*			5
				☐	☐
				Favors UIA	Favors UIA conservative

- *Somma di tutti i punti "a favore" e "contro" il trattamento, questo porterà a 2 valori numerici: uno a favore del trattamento dell'aneurisma (chirurgico o endovascolare), uno a favore del trattamento conservativo.*
- *Nei casi in cui la differenza tra questi 2 valori numerici sia ≥ 3 verrà indicato il tipo di management consigliato.*
- *Nei casi in cui la differenza dei due valori numerici sia ≤ 2 la raccomandazione è "non definitive" per cui entrambe le opzioni terapeutiche possono essere percorribili.*
- *Nei casi di aneurismi multipli ogni singolo aneurisma deve essere valutato separatamente.*