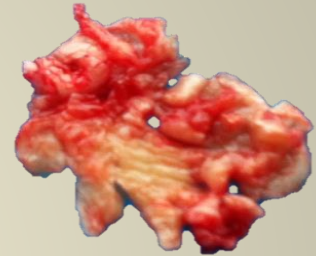


# Prognostic Factors for the Recidivism of Cholesteatoma



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Incidence, Ten-year Recidivism Rate, and Prognostic Factors for Cholesteatoma

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# Prognostic Factors for the Recidivism of Cholesteatoma

## Background

### Risk factors

- Important to identify high-risk patients
- Very few control for co-variates



**..”it’s not the weapon that kills”**



# Prognostic Factors for the Recidivism of Cholesteatoma

## Methods

- Retrospective follow-up/cohort study
- n = 147 operated for debuting cholesteatoma (2001 – 2006)
- Median follow-up time 8.5 years (range 6 - 10.92)
- Median age 16 (range 2 – 78)
- Males/females 75/72 – 1.0
  
- Kaplan-Meier time to event: Recidivism rates
- Multivariate Cox regression: Independent prognostic factors

# Prognostic Factors for the Recidivism of Cholesteatoma

## Surgery

86 % back to front mastoidectomies

- 93 % CWU – no obliteration
- 92% were distributed between three surgeons

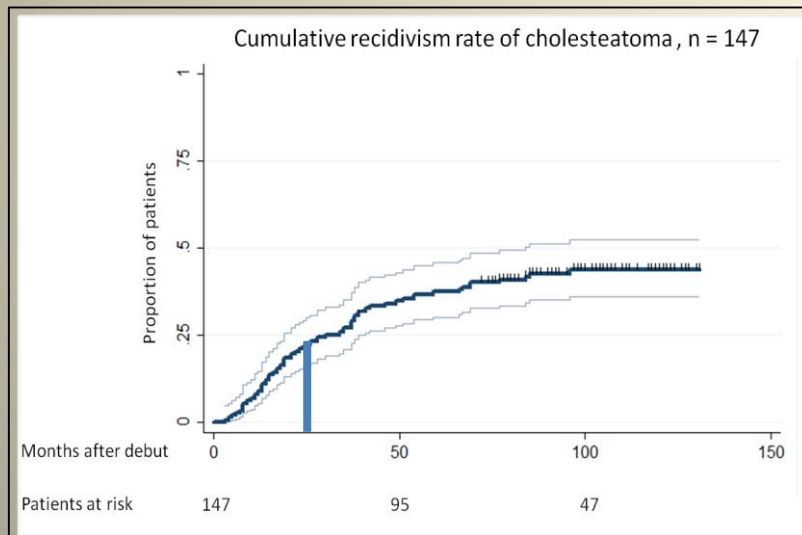
68 % one stage ossiculoplasty – autologous bone

Baseline characteristics		n = 147	
Category	Proportion	(Number)	
<b>Surgical technique</b>			
Non mastoidectomy	0.14	(21)	
Mastoidectomy	0.86	(126)	
CWU	0.93	(117)	
CWR	0.02	(2)	
CWD	0.06	(7)	
<b>Ossicular reconstruction</b>			
Non	0.28	(41)	
One stage	0.68	(100)	
excl. Stapes	0.79	(79)	
incl. Stapes	0.21	(21)	
Two stage	0.04	(6)	

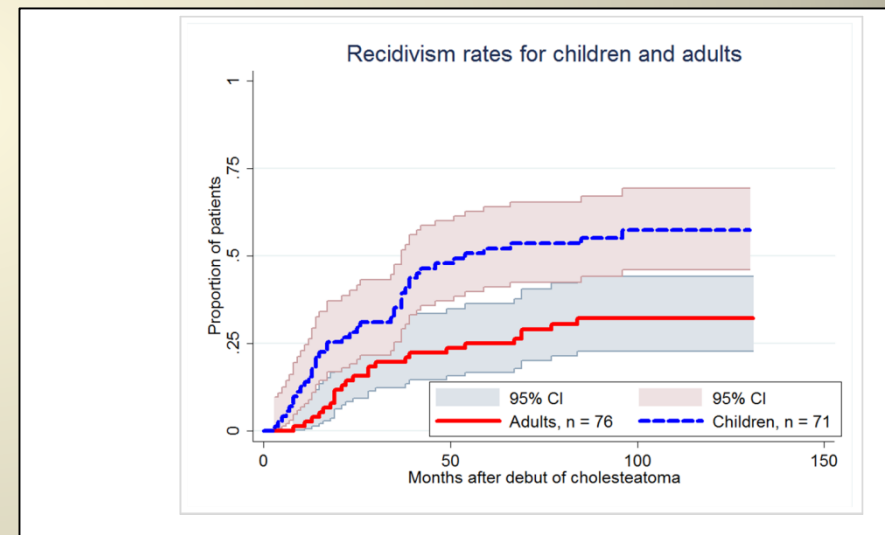
# Prognostic Factors for the Recidivism of Cholesteatoma

## Recidivism rates

Five- and ten-year rates



Overall                      0.38                      0.44



Children                      0.52                      0.57  
 Adults                      0.25                      0.32

# Prognostic Factors for the Recidivism of Cholesteatoma

## Prognostic factors for recidivism

n = 147 , 64 events

Univariate log-rank tests  
for correlation with recidivism

p < 0.25	Covariate	p -value
➔	Age below 15 years	0.002
➔	Male gender	0.11
	Chol. limited to tymp.cavity	0.41
➔	Chol. In the mastoid	0.01
	Mastoidectomy	0.73
➔	Ossicular erosion, all	0.03
	Malleus	0.8
➔	Stapes	0.01
➔	Incus	0.04
➔	Additional bone involvement (ABI), all	0.04
	ABI Iatrogenic	0.63
➔	ABI Spontaneous	0.06
	Ossiculoplasty	0.58
	Attic type	0.31
	Sinus type	1.17
	Tensa type	0.42
➔	Operator (surgeon)	0.02

Multivariate cox regression analysis of independent predictors  
Stratified by operator

➔ Combined hazard ratio ≈ 14

Eustachian tube function, ear history?...

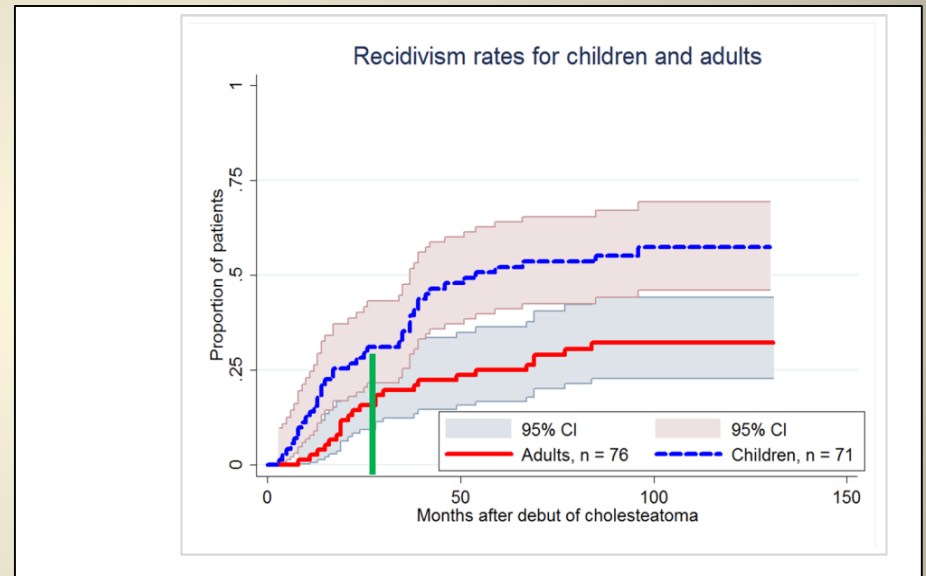
# Prognostic Factors for the Recidivism of Cholesteatoma

## Age HR 2.2

- Conservative surgery (residual)?
- ET-function (recurrence)?
- Immune system
- Growth potential/aggressiveness

Not due to:

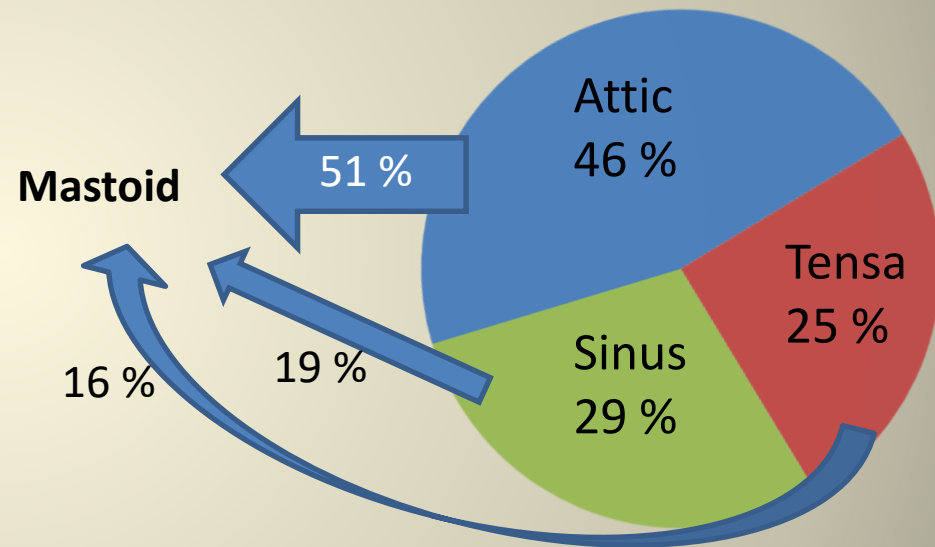
Univariate log-rank tests for correlation with recidivism	
Covariate	p-value
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Attic type	0.31
Sinus type	1.17
Tensa type	0.42
Operator (surgeon)	0.02



## Prognostic Factors for the Recidivism of Cholesteatoma

### Mastoid localization HR 1.7

- 1/3 of debuting cholesteatomas
- Growth potential?
- Size?
- Access route/mastoid pneumatization
- Residual/recurrent?



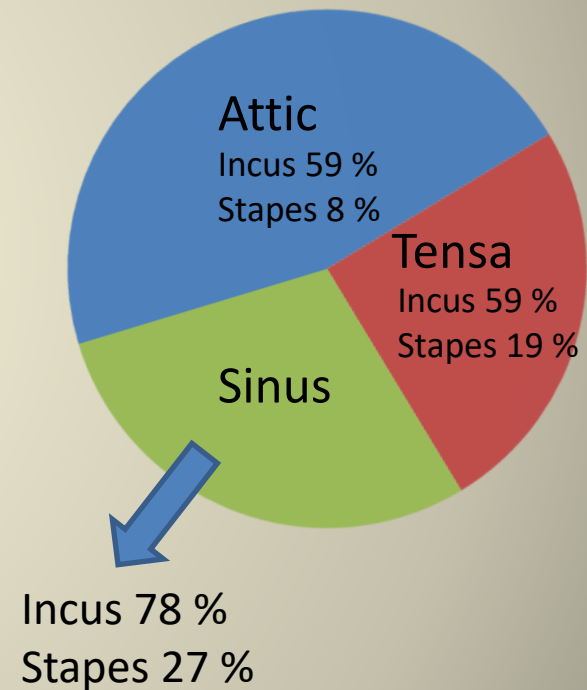


## Prognostic Factors for the Recidivism of Cholesteatoma

### Ossicular erosion

Incus HR 1.90, Stapes HR 1.94

- Over all  $\approx 70\%$  of cholesteatoma cases
- Incus 65 %
- Stapes 16 %
- Degree of erosion matters
- Difficult areas?
- Not one-stage autologous ossiculoplasty
- Molecular pathology..



# Prognostic factors for recidivism

## Conclusions

Age

Mastoid

Stapes

Incus



HR = 14

Males?

Surgeon!..



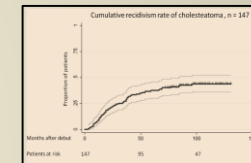
Baseline characteristics n = 147			
Category	Proportion		(Number)
	of all	of subgroup	
<b>Gender</b>			
Males	0.51		(75)
Females	0.49		(72)
<b>Age</b>			
Median	16		
Range	2 - 78		
Children (< 15 years)	0.48		(71)
Adults (≥ 15 years)	0.52		(76)
<b>Type/site of appearance</b>			
Specified			(131)
Attic	0.45		(59)
Sinus	0.28		(37)
Tensa	0.24		(32)
Congenital	0.02		(3)
Unspecified			(16)
<b>Ossicular erosions</b>			
Absent	0.33		(49)
Present	0.67		(98)
Malleus	0.22		(22)
Incus	0.96		(94)
Stapes	0.29		(28)
<b>Surgical technique</b>			
Non mastoidectomy	0.14		(21)
Mastoidectomy	0.86		(126)
CWU	0.93		(117)
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Relation of site of appearance with localization and ossicular erosion								
	Sinus		Attic		Tensa		Total	
<b>Total:</b>	0.29	(37)	0.46	(59)	0.25	(32)	0.34	(43)
<b>Locations involved:</b>			p-value		p-value			
Tympanic cavity only	0.43	(16)	<u>0.002</u>	0.14	(8)	<u>0.000</u>	0.59	(19)
Epitymp., antrum +/- Tymp.c	0.38	(14)	0.83	0.36	(21)	0.35	0.25	(8)
Mastoid process +/-other	0.19	(7)	0.002	0.51	(30)	0.001	0.16	(5)
<b>Ossicular erosion:</b>								
All	0.78	(29)	0.12	0.63	(37)	0.82	0.66	(21)
<b>Specific ossicles:</b>								
Incus	0.78	(29)	0.08	0.59	(35)	1.0	0.59	(19)
Malleus	0.11	(4)	0.18	0.22	(13)	<u>0.003</u>	0	(0)
Stapes	0.27	(10)	<u>0.02</u>	0.08	(5)	0.19	0.19	(6)

## Recidivism rates

0.38 five year

0.44 ten year



## Prognostic factors

Age

Mastoid involvement

Ossicular erosion

- Incus
- Stapes

Multivariate Cox regression analysis of independent prognostic factors				
Stratified by operator				
Independent covariates	Hazard ratio	Pz	95% Conf. Interval	
Age below 15 years	2.22	0.002	1.33	3.71
Chol. in the mastoid	2.71	0.04	1.03	2.84
Erosion of Stapes	1.94	0.02	1.09	3.45
Erosion of Incus	1.90	0.04	1.03	3.51
No. of subjects	147		Prob > chi2 0.0000	
No. of recurrences	64		LR=102(4) 25.35	
No significance after controlling for covariates above				
Male gender	1.51	0.12	0.90	2.53
Additional bone involt., all	0.96	0.9	0.52	1.76