

# Acidente Vascular Encefálico Hemorrágico (AVE-H)

## Parte 1

Hemorragia Subaracnóidea Primária  
(HSAP)

## Parte 2

Hemorragia Intraparenquimatosa Primária  
(HIP)

**Doutel de Andrade**

Serviço de Neurocirurgia

Hospital Municipal Salgado Filho



# Hemorragia Subaracnóide Primária (H.S.A.P.)



Serviço de Neurocirurgia  
Hospital Municipal Salgado Filho



# Definição

*Sangramento no espaço subaracnóideo,  
causado por aneurisma arterial sacular nas  
artérias do SNC e/ou seus ramos.*



# HSAP

- 16 a 18 / 100 mil hab / ano
- 1.5 M : 1 H
- 45 - 55 a (BR) / 55 - 65 a (USA)
- 30% de Mortalidade 1° ano
- 40% Morbidade 1° mês
- Lei de Drake: 5 (2:2:1)
- 20% dos HIP



# HSAP

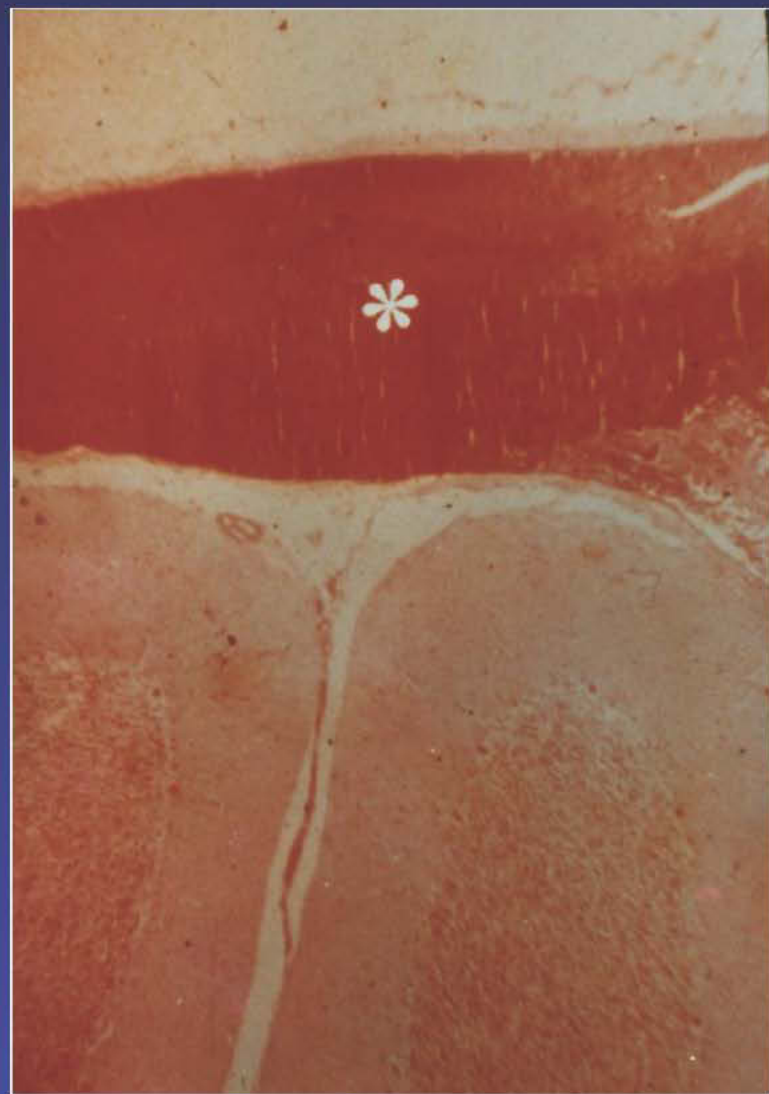
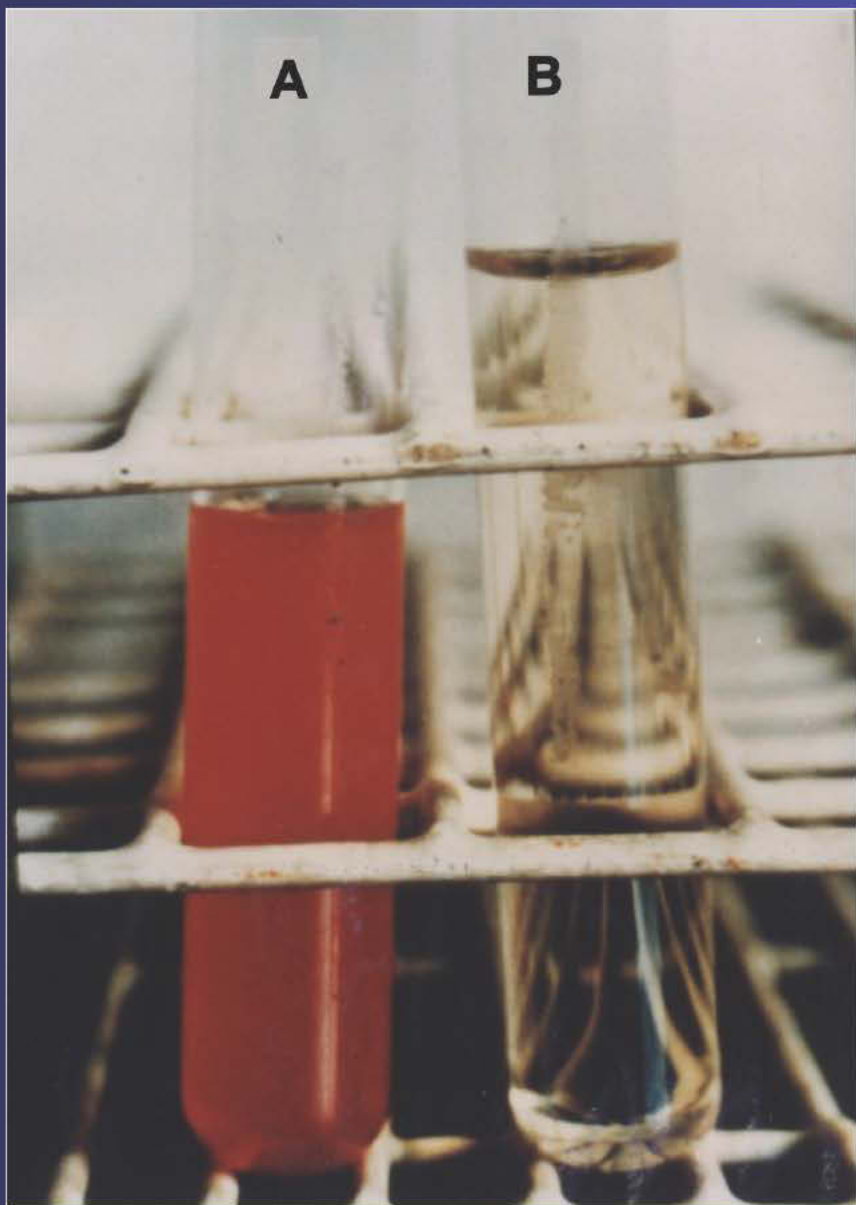
QC	Escola de Glasgow Aplicada EHSA (Hunt-Hess, Yasargil)
TC	Escola de Fisher Aneurimas $\geq 1$ cm MAVs
AGCV	Escola de Fisher / VEC Estudo morfológico da lesão

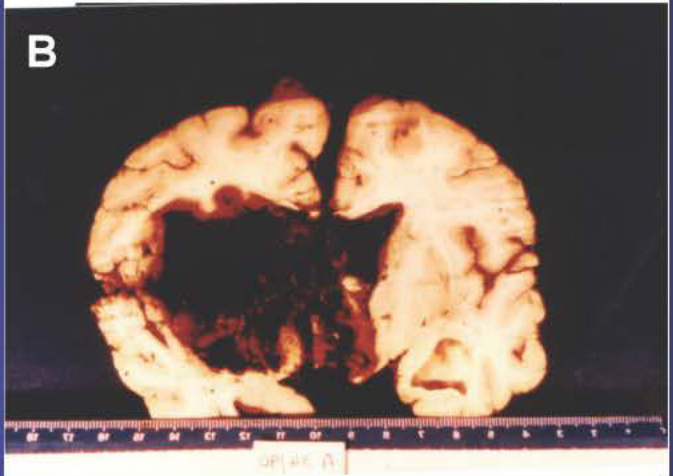
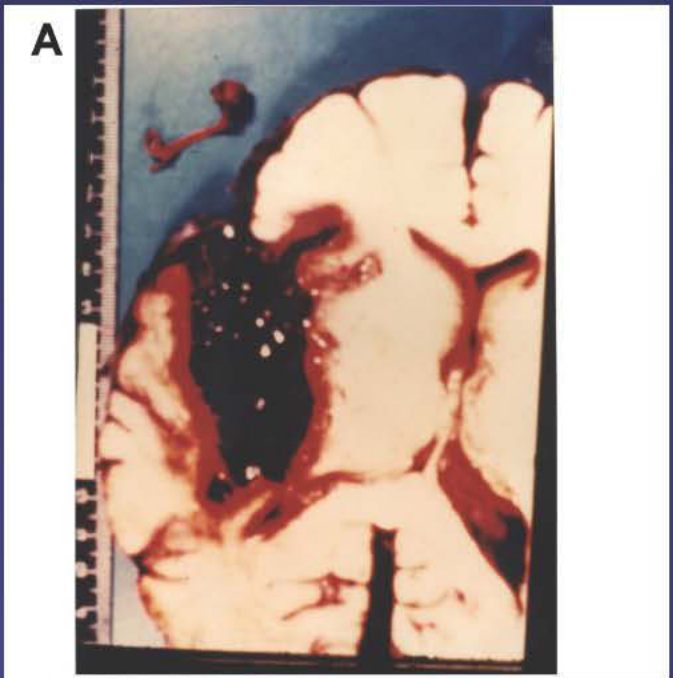


# Fatores de Risco - Geral

- Tabaco
- Alcool
- Drogas
- Angiopatia Amilóide

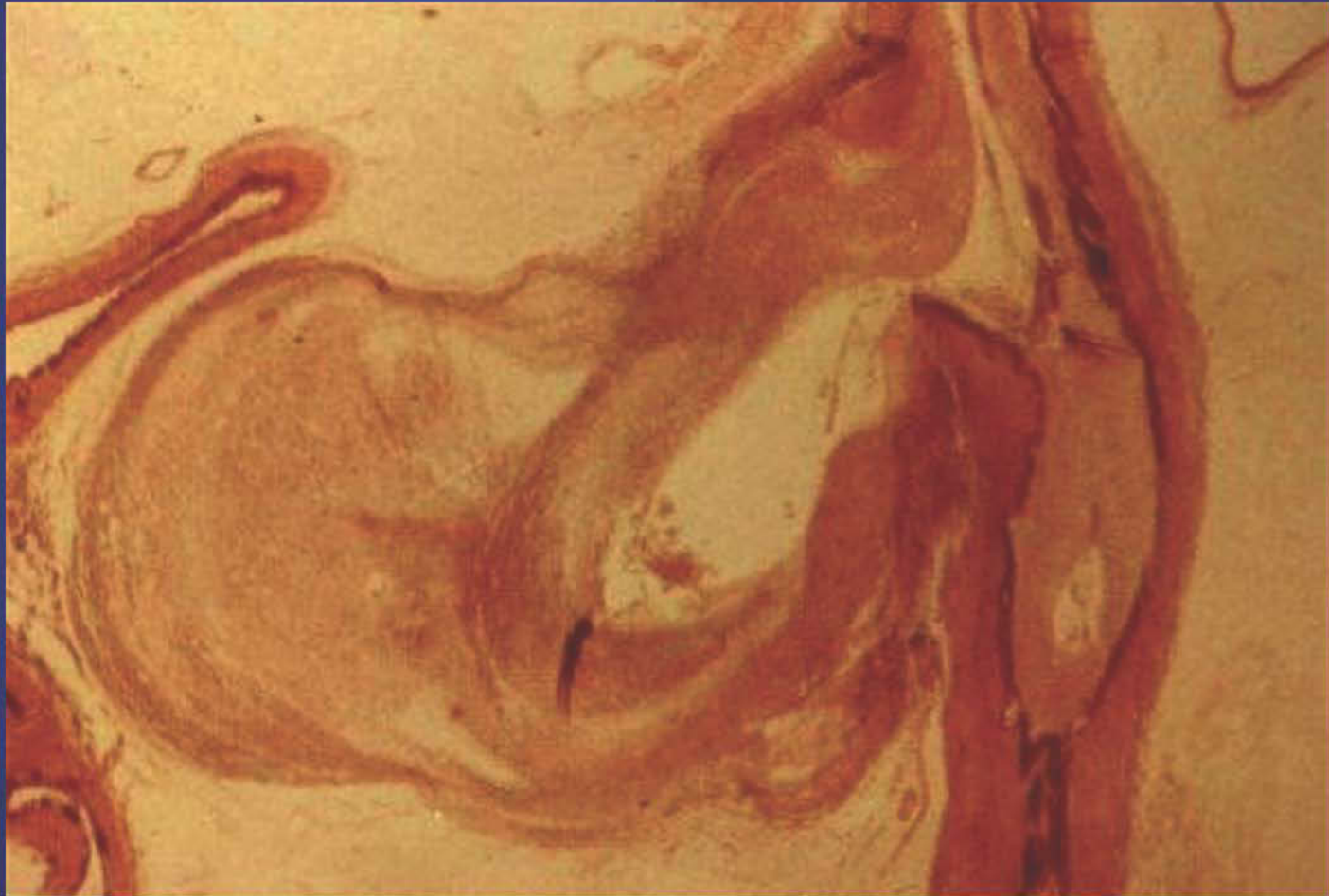








# Aneurisma - Microscopia H&E



# HERMORRAGIA SUBARACNÓIDEA - ESCALA DE YASARGIL

**Grau 0 – A - Sem Hemorragia, achado incidental.  
B - Sem hemorragia, oftalmoplegia.**

**Grau I – Cefaléia leve à moderada, rigidez nucal, lúcido.  
A - sem déficit motor  
B - déficit motor presente**

**Grau II – Cefaléia intensa, sonolência, rigidez nucal intensa.  
A - sem déficit motor  
B - déficit motor presente**

**Grau III – Comatoso.  
A - sem déficit motor  
B - déficit motor presente**

**Grau IV – Coma profundo.  
A - sem déficit motor  
B - déficit motor presente**

**Grau V – Depende de suporte vital**



# Diagnóstico Radiológico

- Tomografia Computadorizada
- Angiografia Cerebral
- Ressonância Nuclear Magnética (?)



# TC - HSAP

## FISHER e cols., revisão de INAGAWA e cols.:

**Grau I:** ausência de sangramento.

**Grau II:** leve; sangue inter-hemisférico ou em cisterna sylviana unilateral.

**Grau III:** moderado; sangue inter-hemisférico e/ou em cisterna sylviana bilateral e em cisterna supra-selar.

**Grau IV:** grave; sangue pericortical e pan-cisternal basal, com ou sem hemoventrículo e/ou hematoma intracraniano.

## MODIFICAÇÃO proposta por DAVIS e cols.:

**Grau IV:** grave; sangue peri-cortical e pan-cisternal basal.

**Grau V:** grau IV associado a hemoventrículo e/ou hematoma.

### O Grau V ainda pode ser subdividido em:

**V a** - Grau IV com hematoma intracraniano.

**V b** - Grau IV com hemoventrículo.



# AGCV - HSAP

- Vaso aferente
- Tamanho
- Lobulação
- Colo / Fundo
- Calibre dos vasos
- Lesões associadas

## Vasoespasmó (Fisher):

0 - Sem vasoespasmó.

1+ - Focal

Calibre arterial  $\geq 1.0$  mm

2+ - Difuso,

Com enchimento periférico

Calibre arterial 0.5 a 1.0 mm

3+ - Difuso

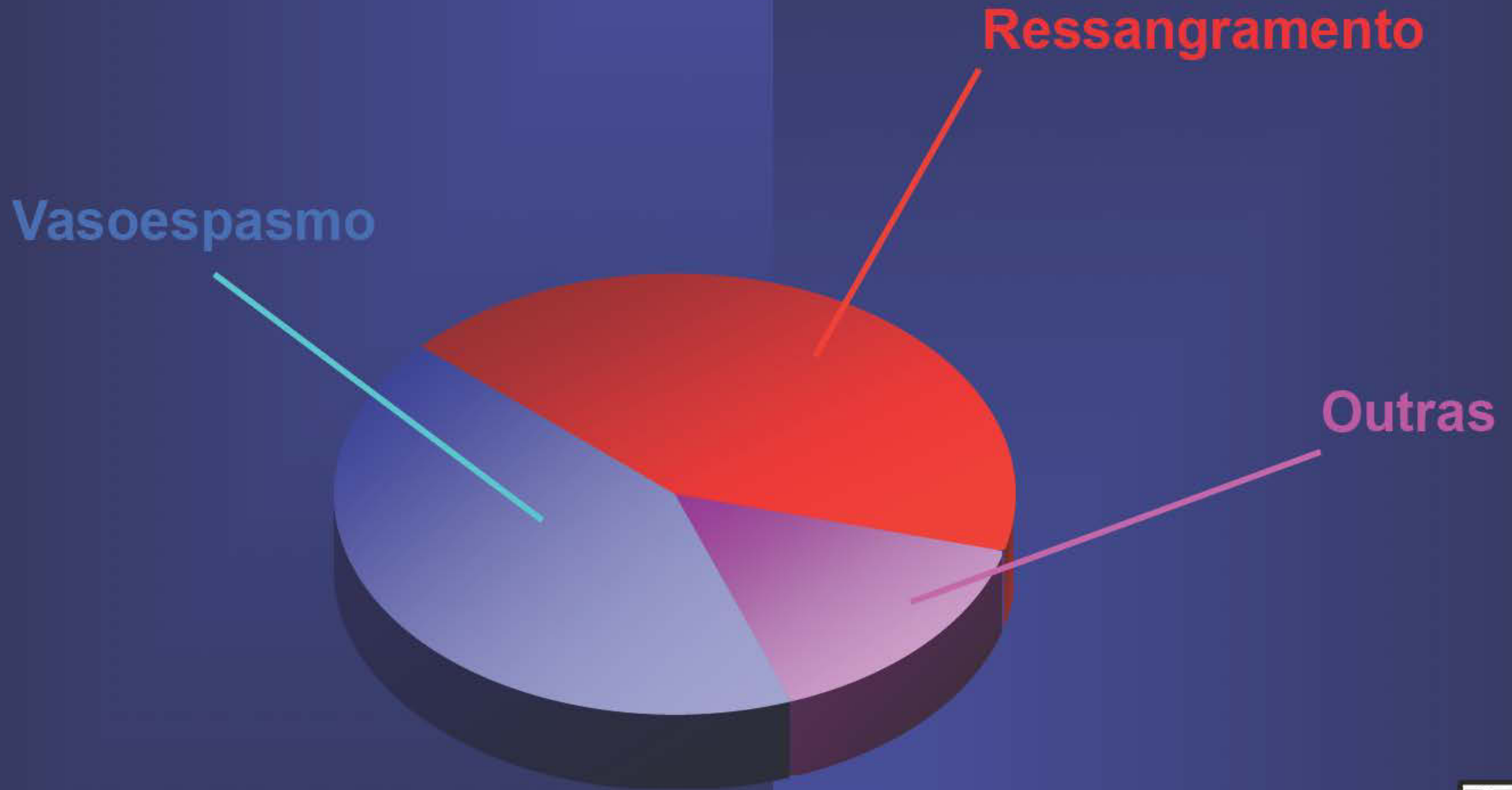
Sem enchimento periférico

Calibre arterial  $< 0.5$ mm

4+ - ausência de enchimento



# Complicações Evolutivas



**RESSANGRAMENTO X VASOESPASMO**

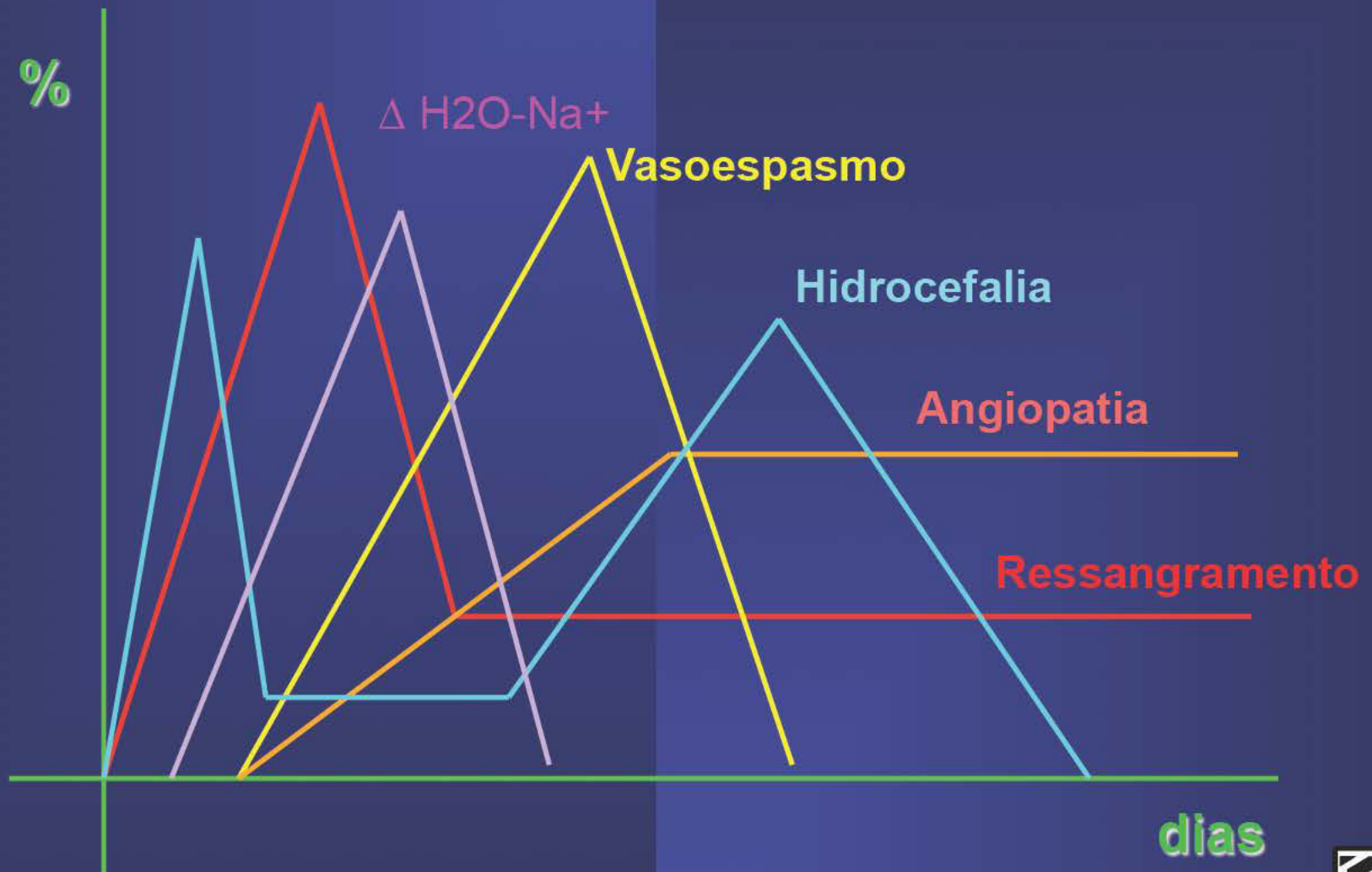
**VASOESPASMO**



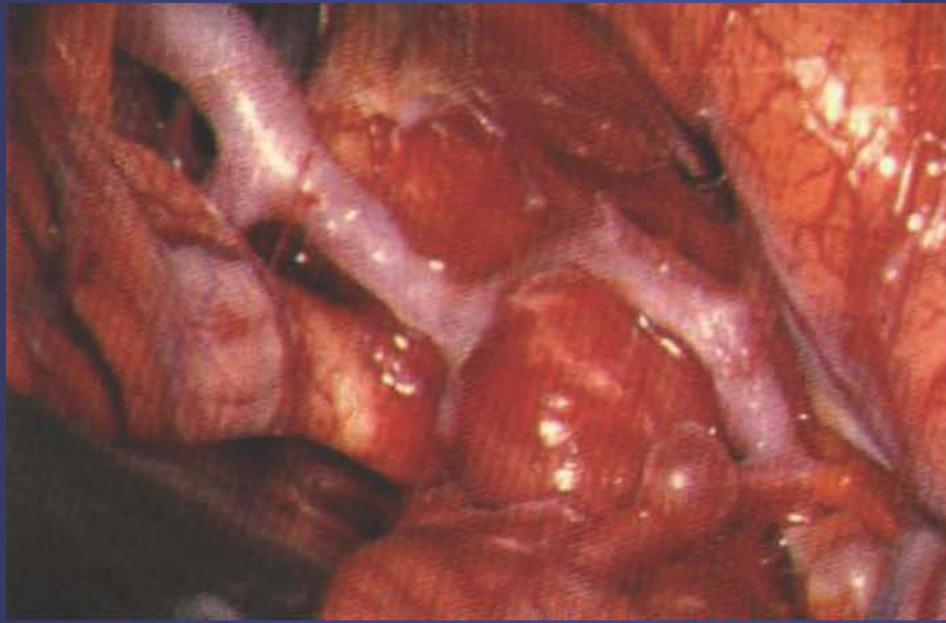
**ANGIOPATIA**

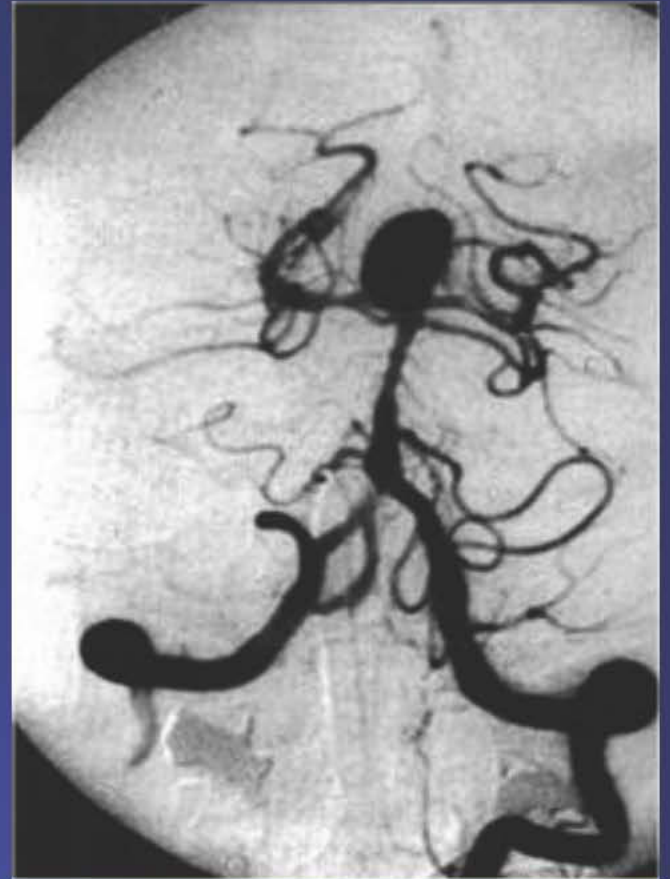
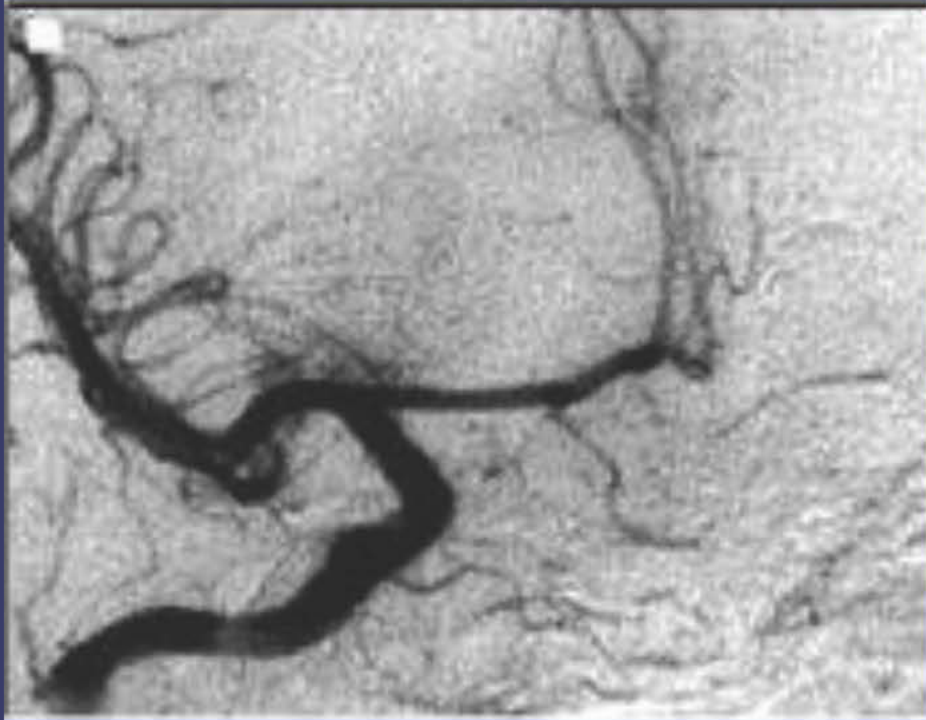


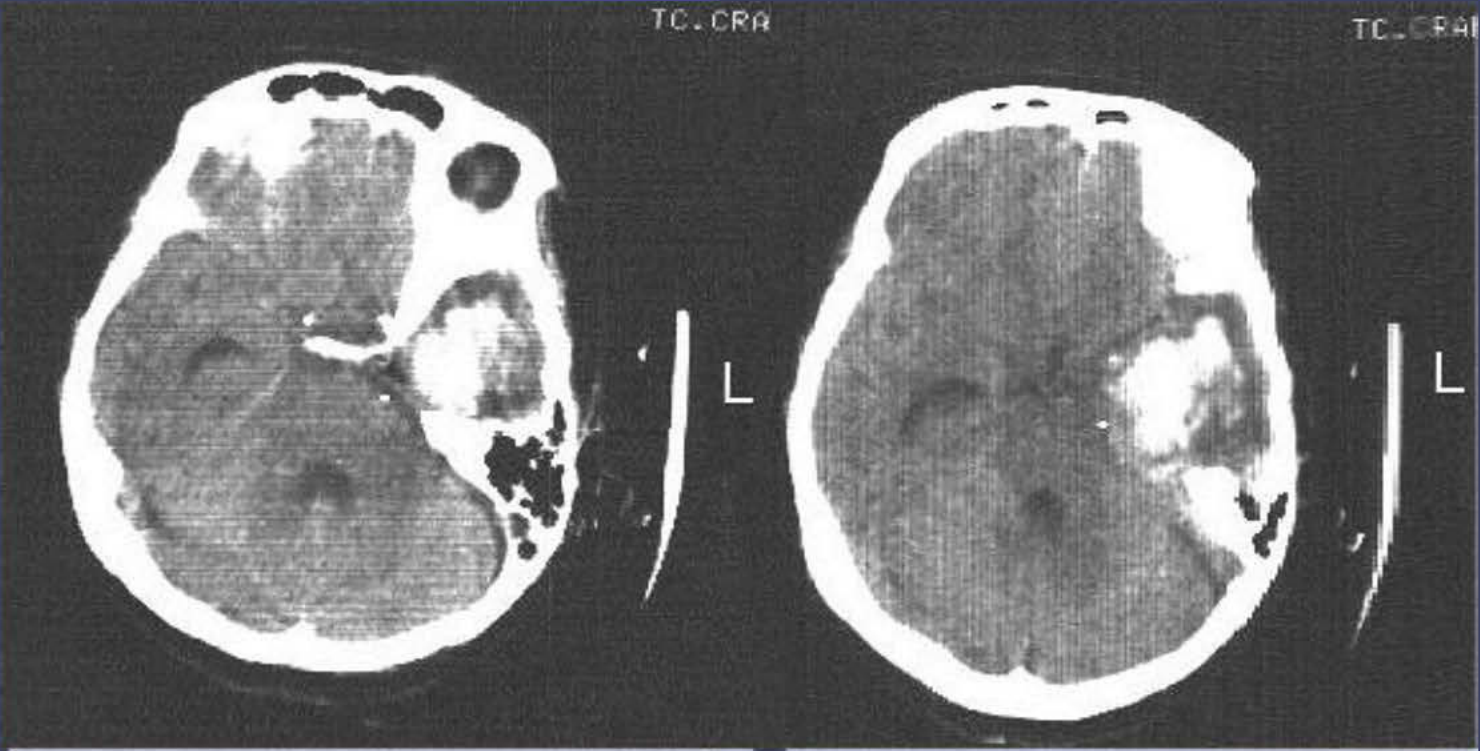
# Complicações Evolutivas

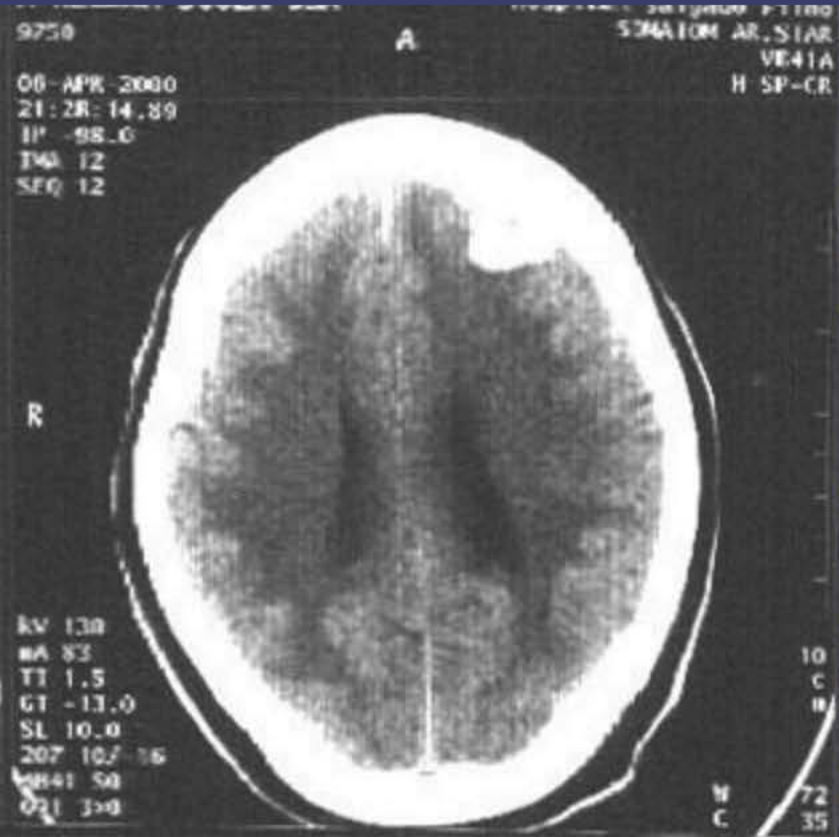






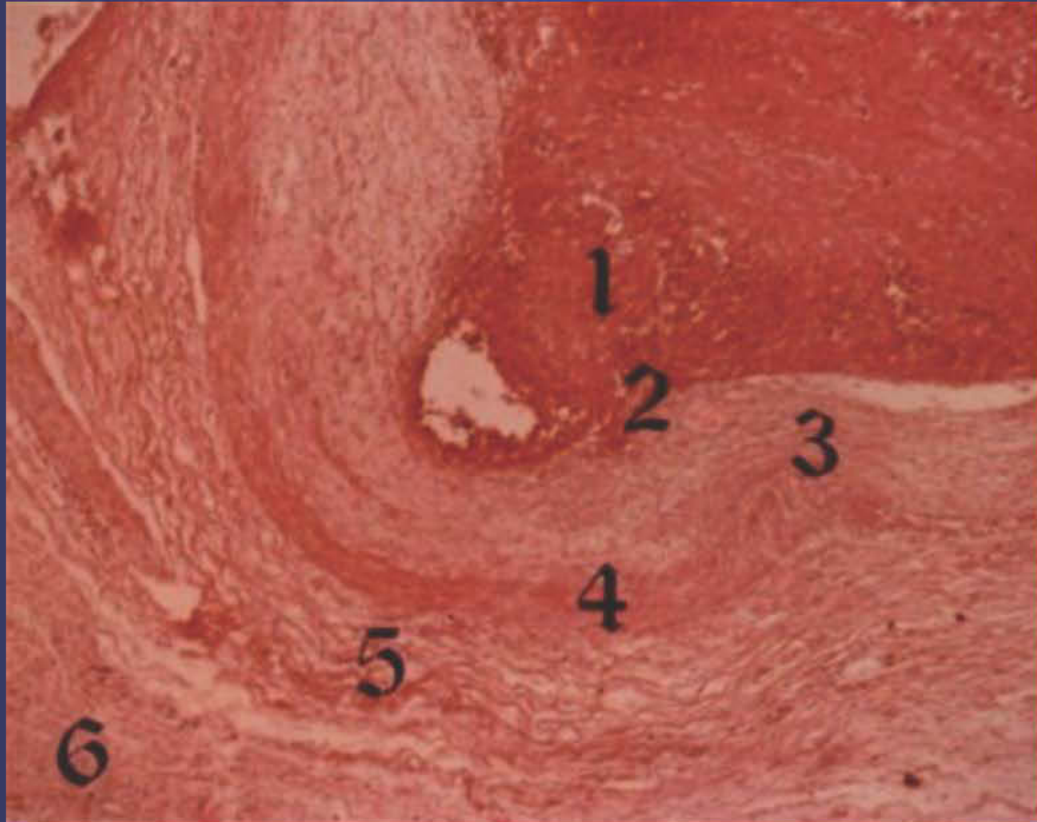




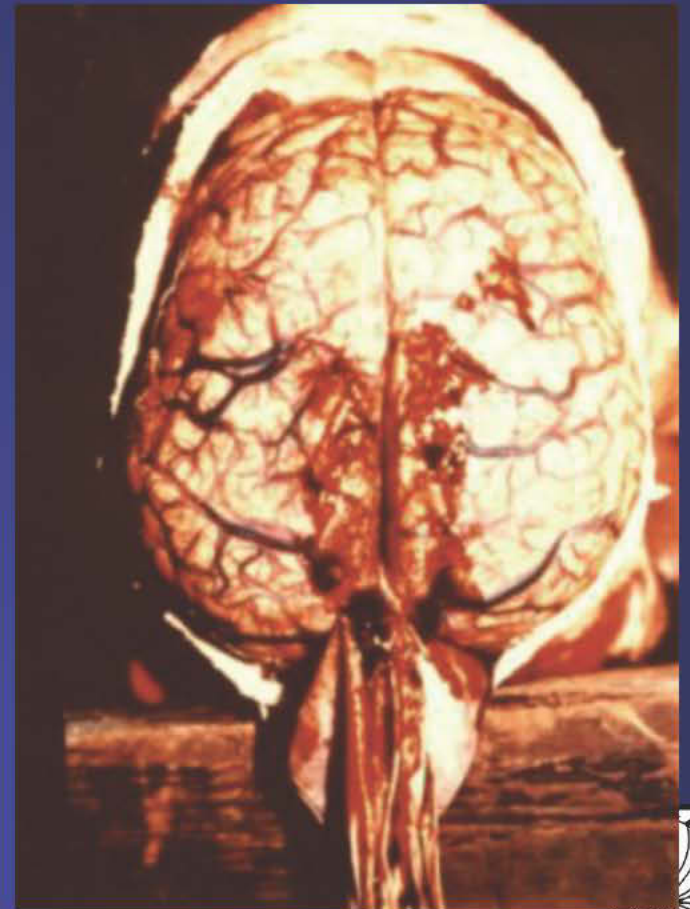


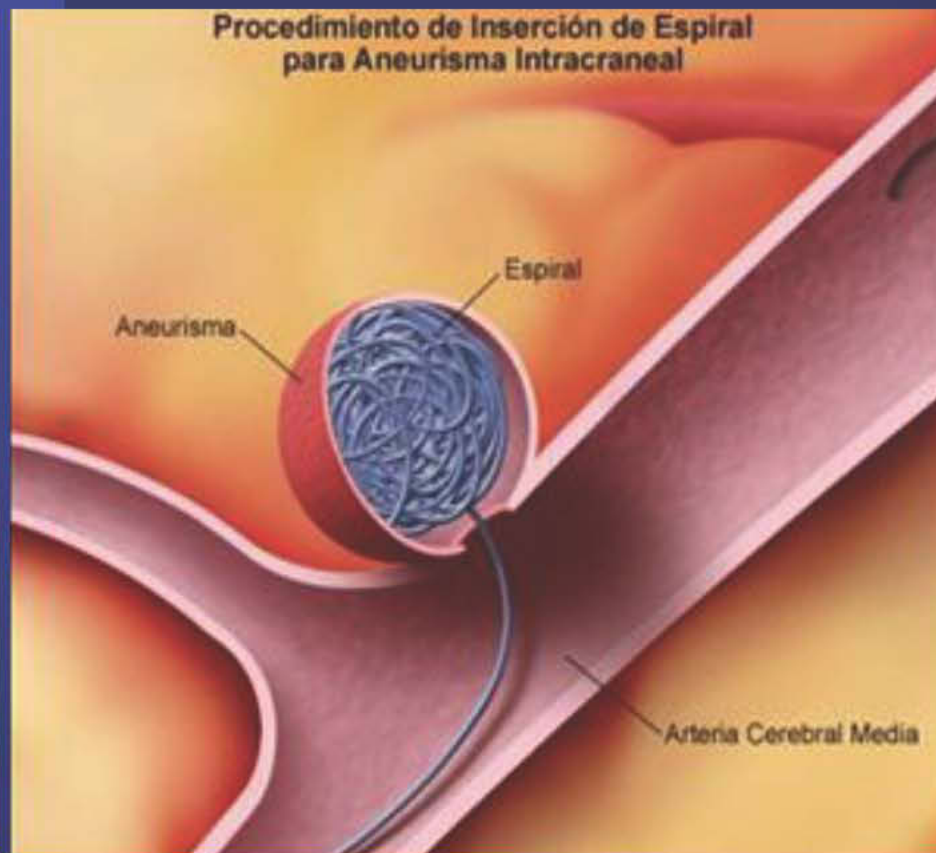
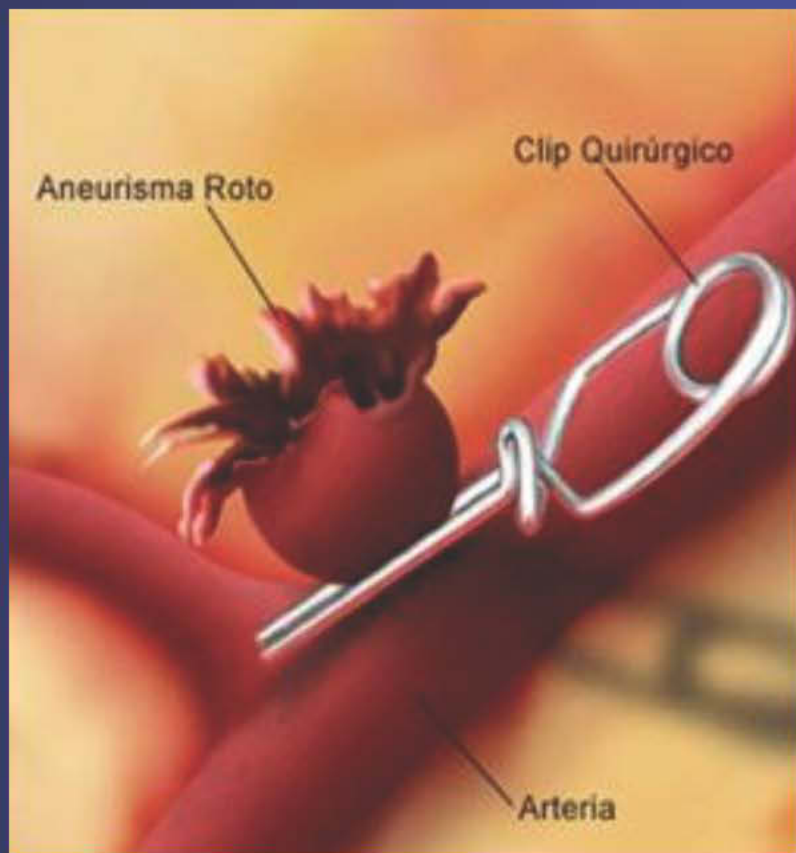


# Angiopatia da Hemorragia Subaracnóidea

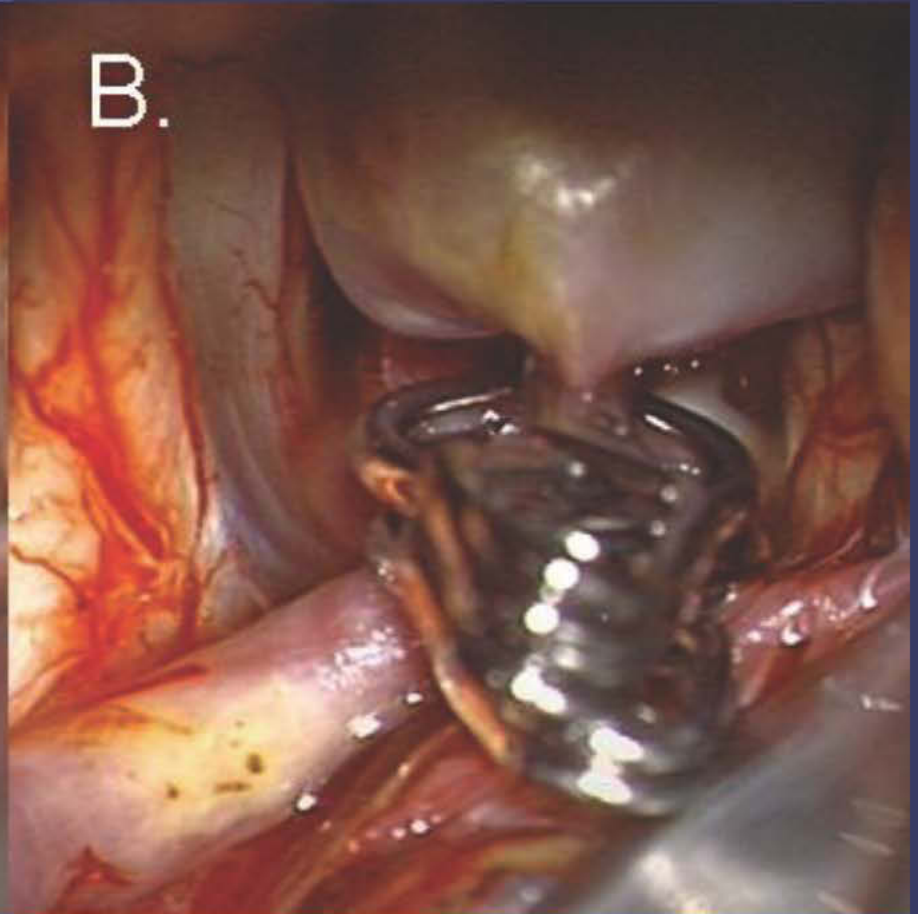
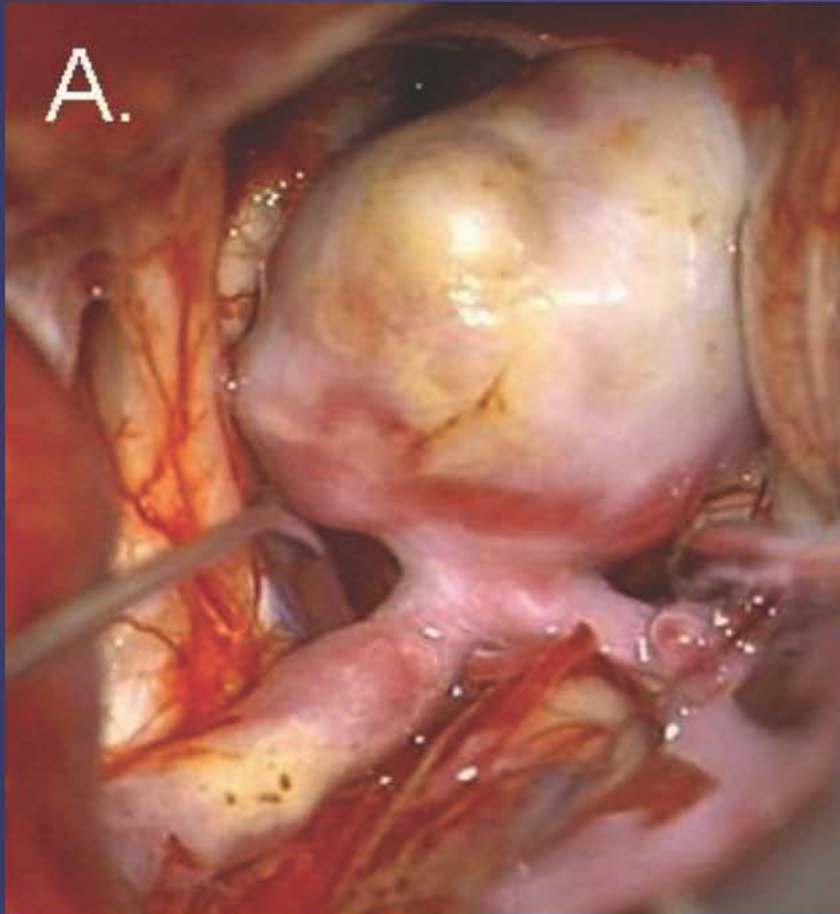


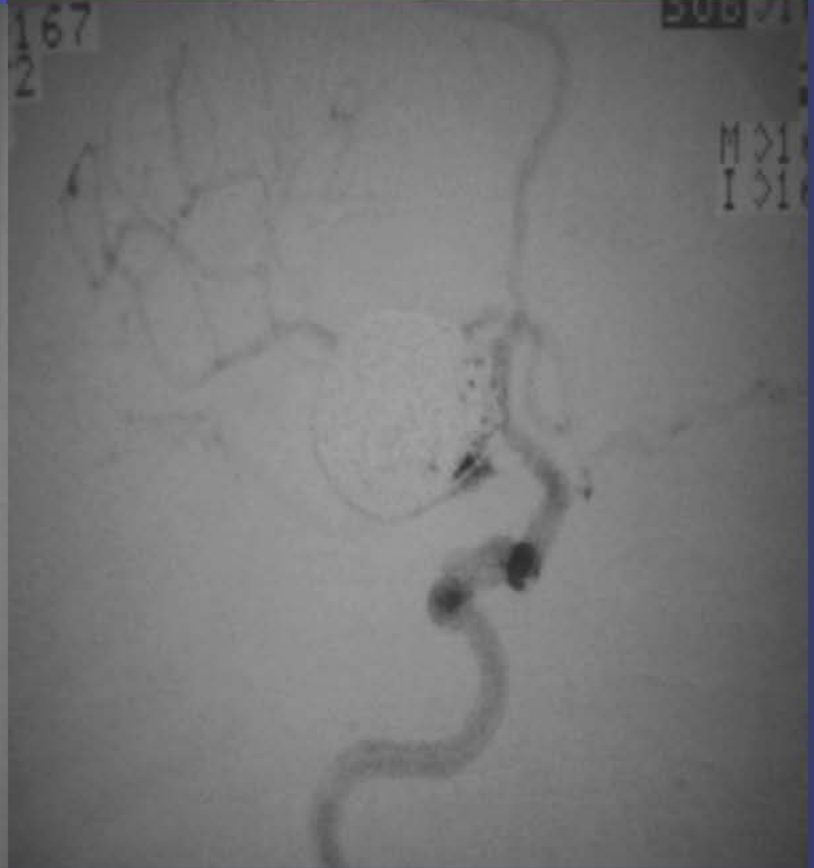
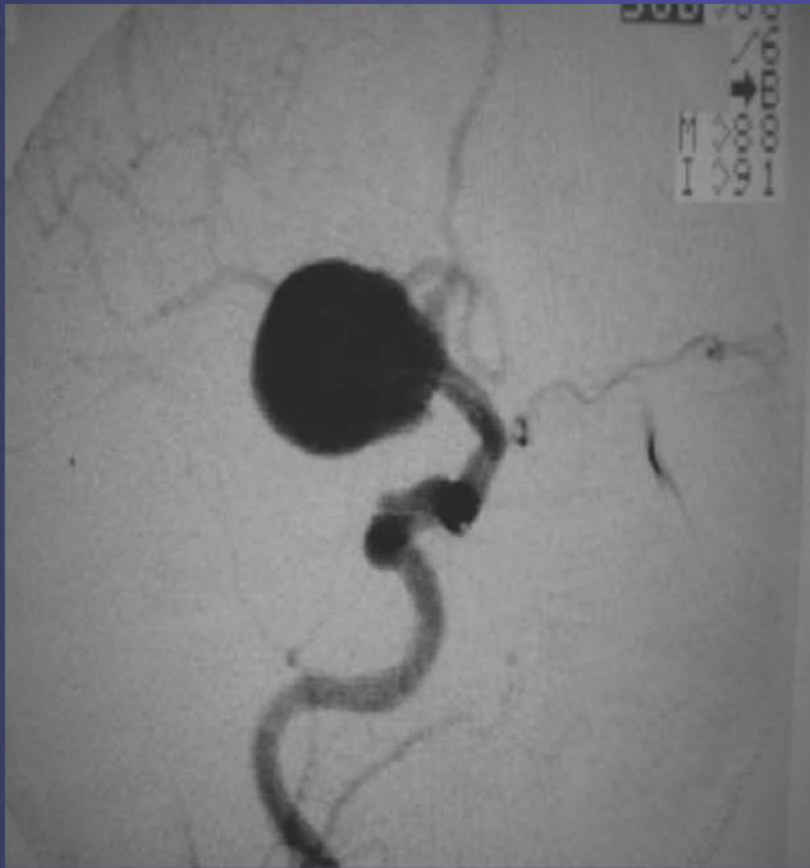
- 1 - Trombose parcial ou total
- 2 - Proliferação Endotelial
- 3 - Fragmentação da Elástica
- 4 - Necrose da Muscular
- 5 - Edema da Adventícia
- 6 - Inflamação Perivascular









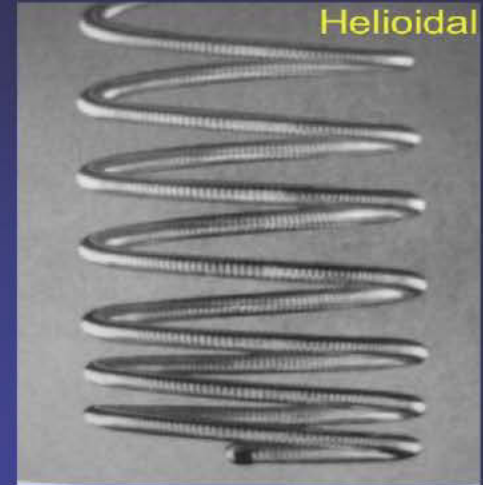
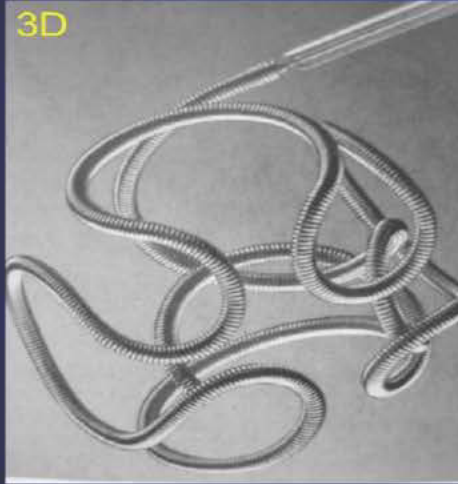
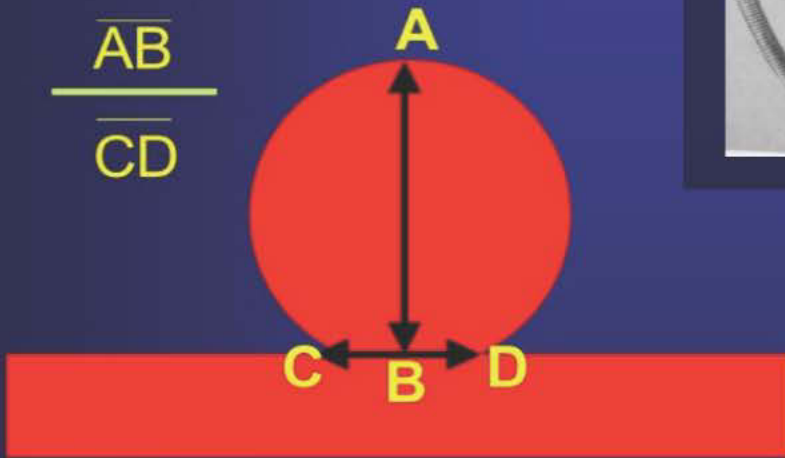


# Cirurgia x Embolização

## Micromolas de Platina

### Índice Fundo/Colo

$$\frac{\overline{AB}}{\overline{CD}}$$



**Embolização:** < Gastos Hospitalares  
< Tempo Médio e Global de Internação até 50%  
< Tempo em CTI significa < Custo / Internação  
Favorece pacientes com: Aneurismas Gigantes / Múltiplos  
Vasoespasma (Angioplastia)  
Estado clínico grave  
Doenças associadas

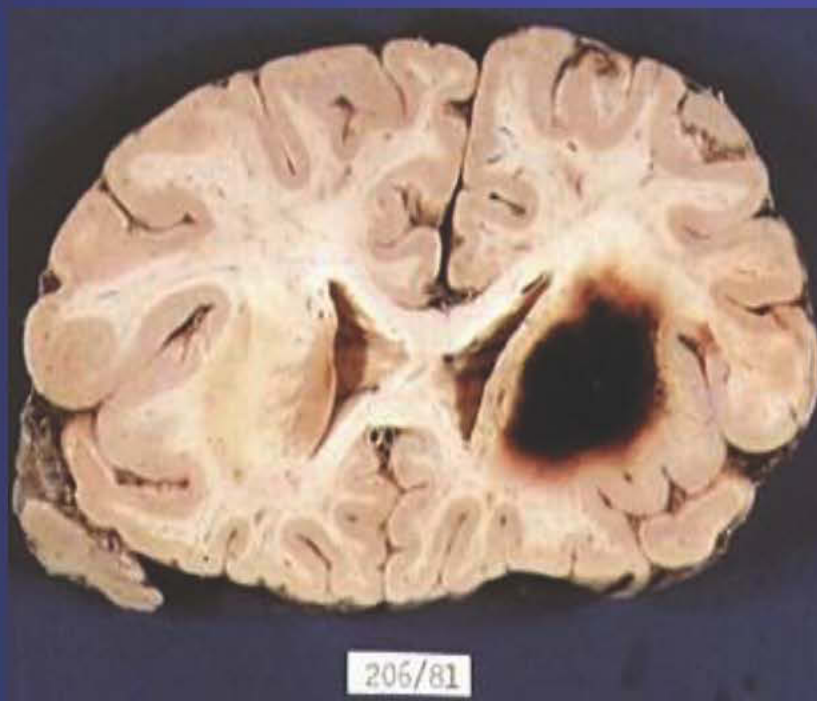
**Clipagem:**

- Hematoma (drenagem)
- Trombo intra-aneurismático
- Anatomia vascular anômala / sem acesso ao aneurisma
- Aneurisma de colo largo (Fundo/Colo < 2)
- Aneurisma de fundo raso

Os métodos se completam e não competem.



# Hemorragia Intraparenquimatosa Primária (H.I.P.)



Serviço de Neurocirurgia  
Hospital Municipal Salgado Filho



# Definição

*Sangramento intraparenquimatoso encefálico,  
(cérebro, cerebelo, tronco cerebral) com quadro  
clínico, volume e localização variáveis.*



# HIP

- 10 a 15 % de todos os AVEs  
(Isquêmicos e Hemorrágicos)
- 10% das Mortes Súbitas em nosso meio.
- Diagnostico mais preciso com TC.



# Localização

- **Profundos :**
  - *Talâmicos*
  - *Nucleares – Putamen*
    - *Globo Pálido*
    - *Caudado*
- **Lobares :** - *Frontais, Parietais, Temporais e Occipitais*
- **Fossa Posterior :** *Tronco / Cerebelo*





# Fatores de Risco - Geral

- Tabaco
- Alcool
- Drogas
- Angiopatia Amilóide



# Fatores de Risco - Superficiais

“Secundárias”

## Lobares (30%)

- Aneurismas e MAV
- Pós-TCE
- Apoplexía Tumoral
- Idiopáticas



# Fatores de Risco - Profundas

## “Secundárias”

- H.A.S. + Esforço Físico
- P.O. Cirurgias - Carótida
  - Cardíaca
  - MAV
- Trombose Seios Venosos
- Tumores Cerebrais
- Doenças Hematológicas
- Infecções do SNC



# Prevalência e Incidência

- $> 50$  a
- $H > M$
- $N > B > A > I$
- Hábitos e Vícios
- H.A.S. / D.M.
- Frio, Altitude, Urbano etc



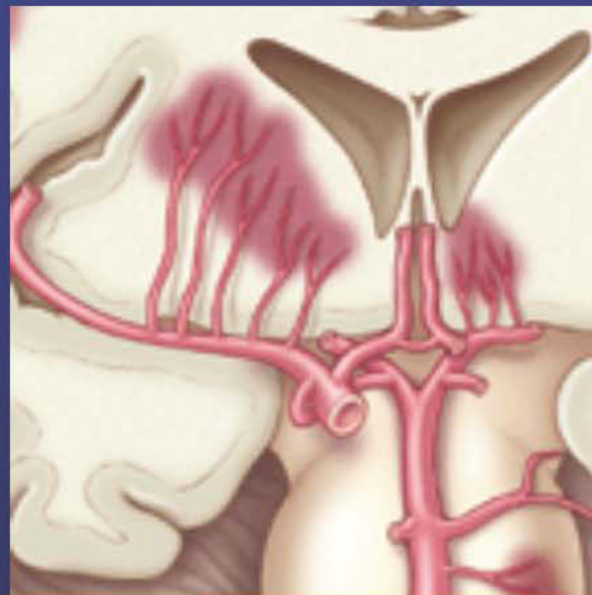
# Diagnóstico

- Tomografia Computadorizada - Padrão
- Angiografia Cerebral ( $\neq$  2<sup>os</sup>)
- Ressonância Nuclear Magnética (?)



# HEMATOMA INTRACEREBRAL PRIMÁRIO (HICP)

Sangramento primário no cérebro, exclui-se deste conceito cerebelo e tronco cerebral.



# HICP

13 -15 casos / 100.000 hab / ano

35 - 50% morre 1º mês após o ictus

37.000 a 5.400 morrem / ano / EUA

**Considerar apenas os supra-tentoriais**



# HICP

- Fatores do HICP

- Fatores Gerais

- Fator Terapêutico

- Q.C. (G.C.S.)

- Topografia

- Volume

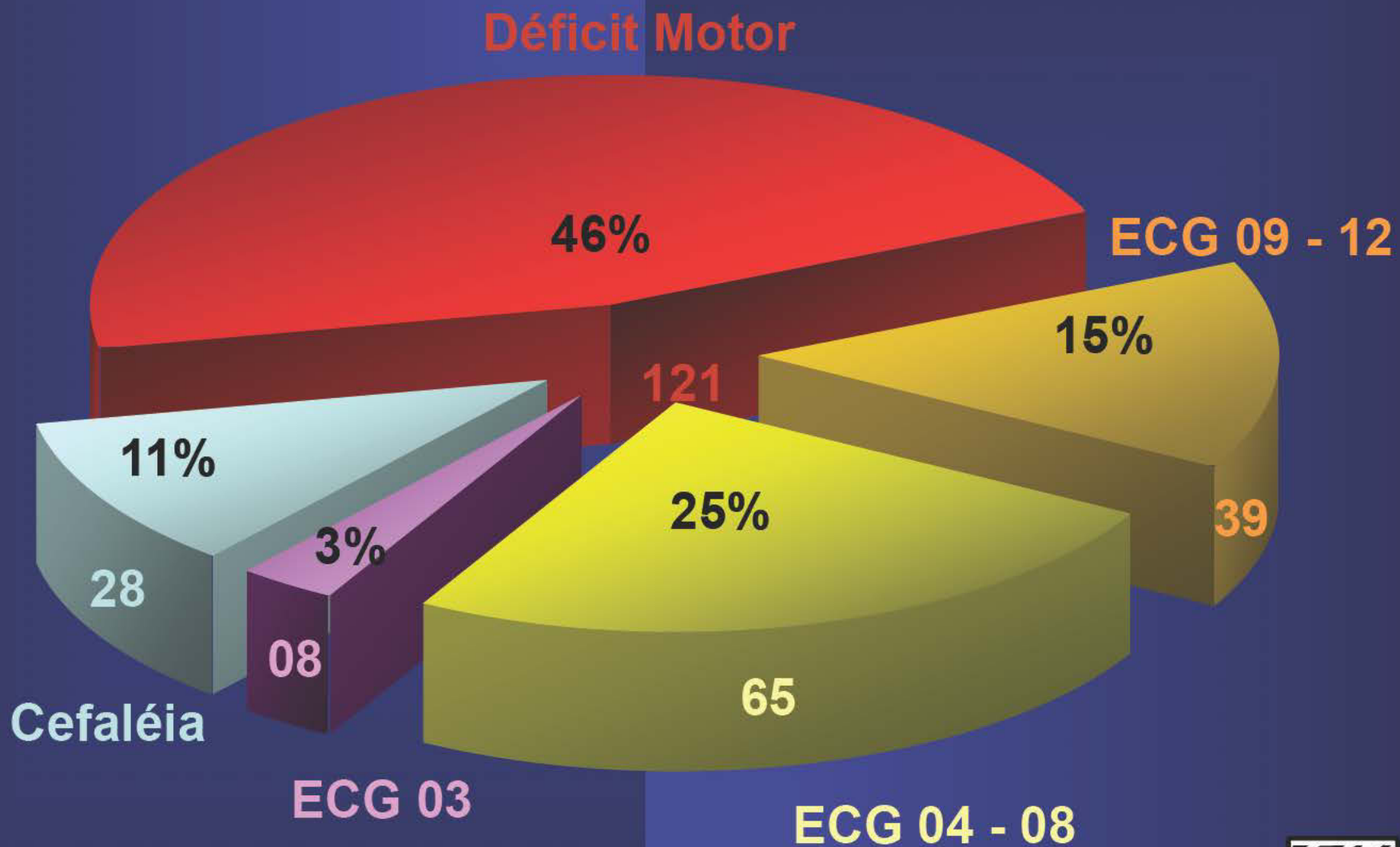
- Idade

- Momento

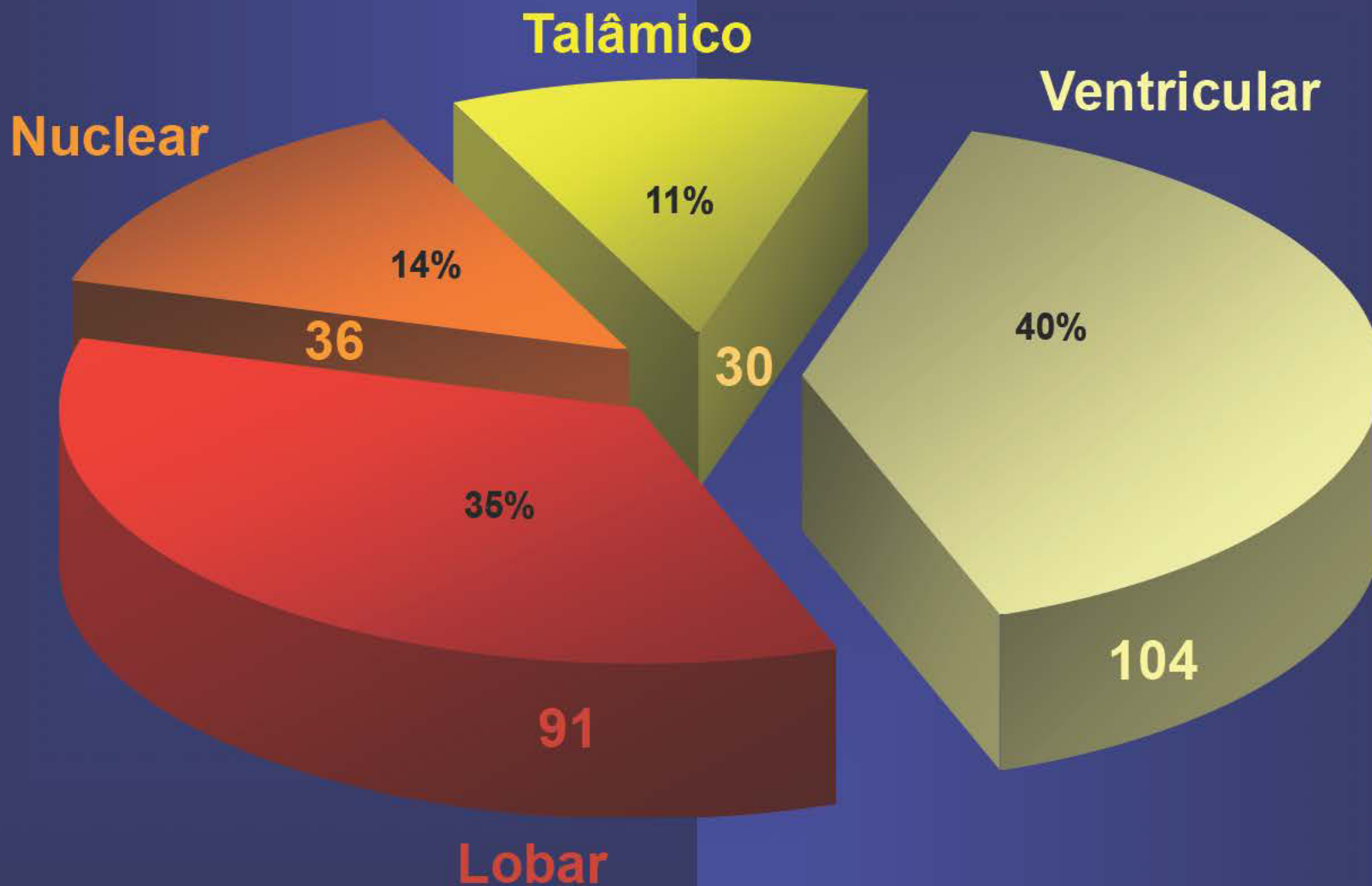




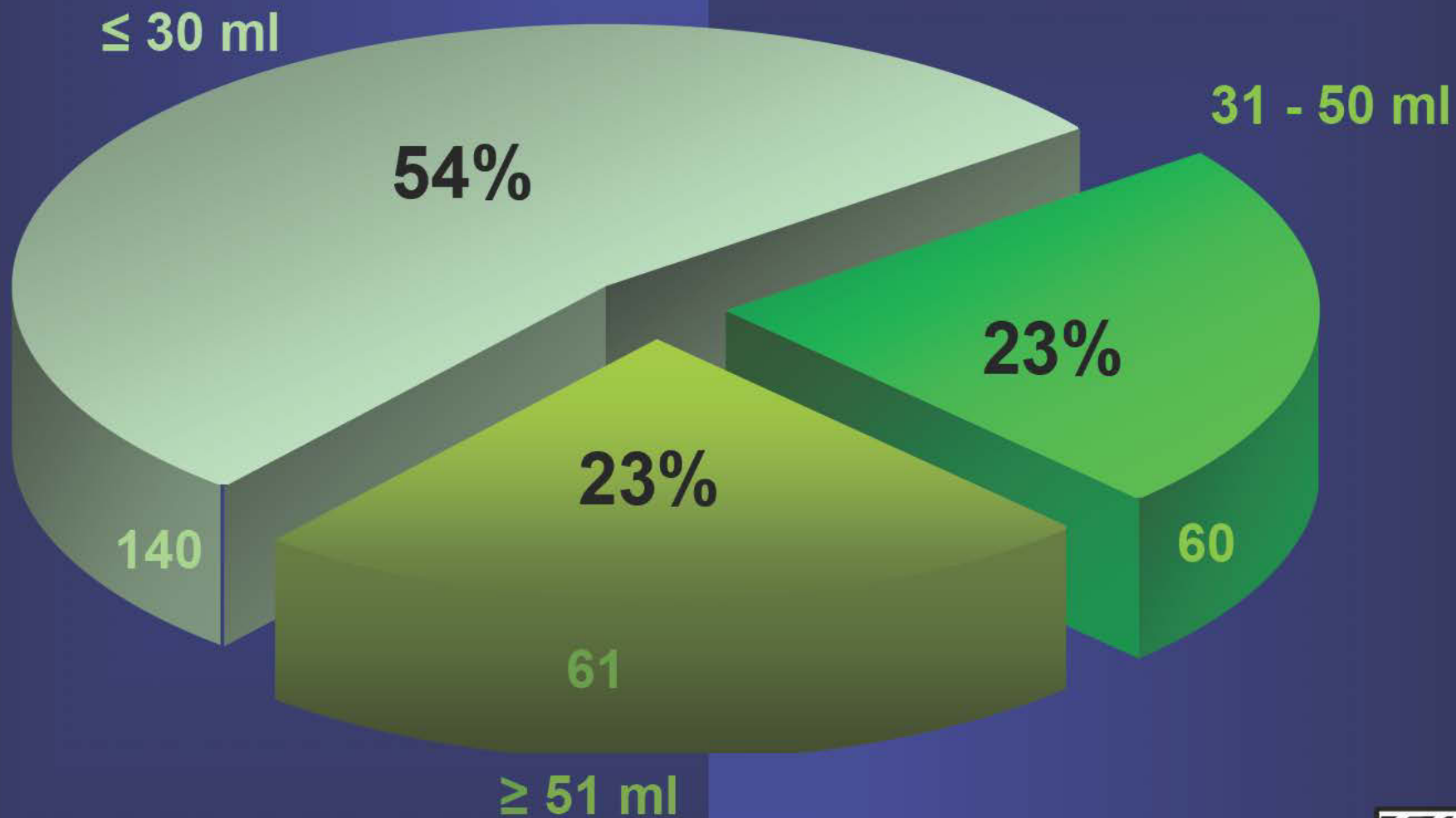
# Quadro Clínico



# Topografia



# Volume



# Topografia X Quadro Clínico

**HICP sem Hemoventrículo**

**Déficit motor**

**HICP com Hemoventrículo**

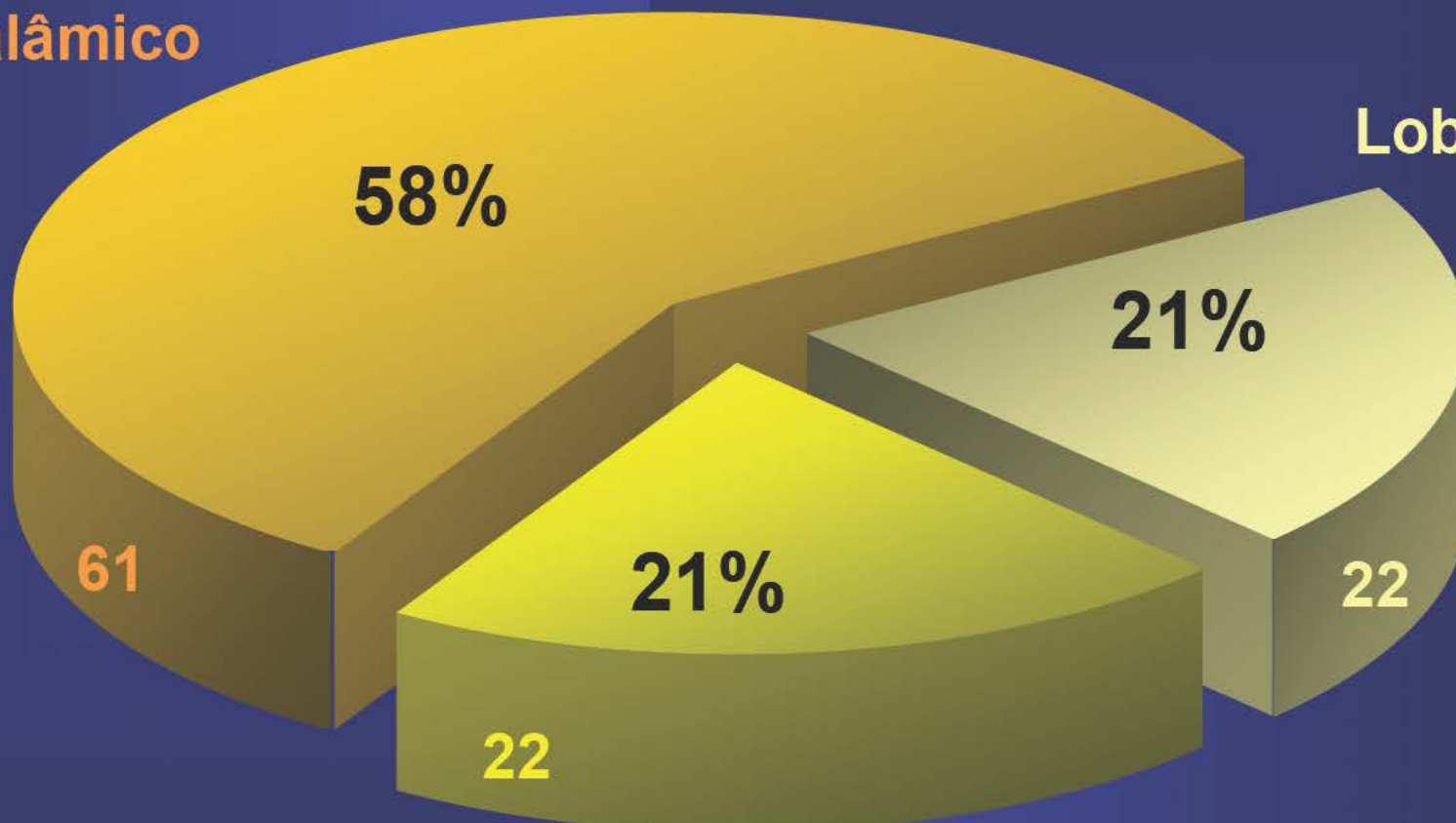
**Distúrbios da consciência**



# H.I.C.P. com Hemoventrículo (40%)

Talâmico

Lobar



61

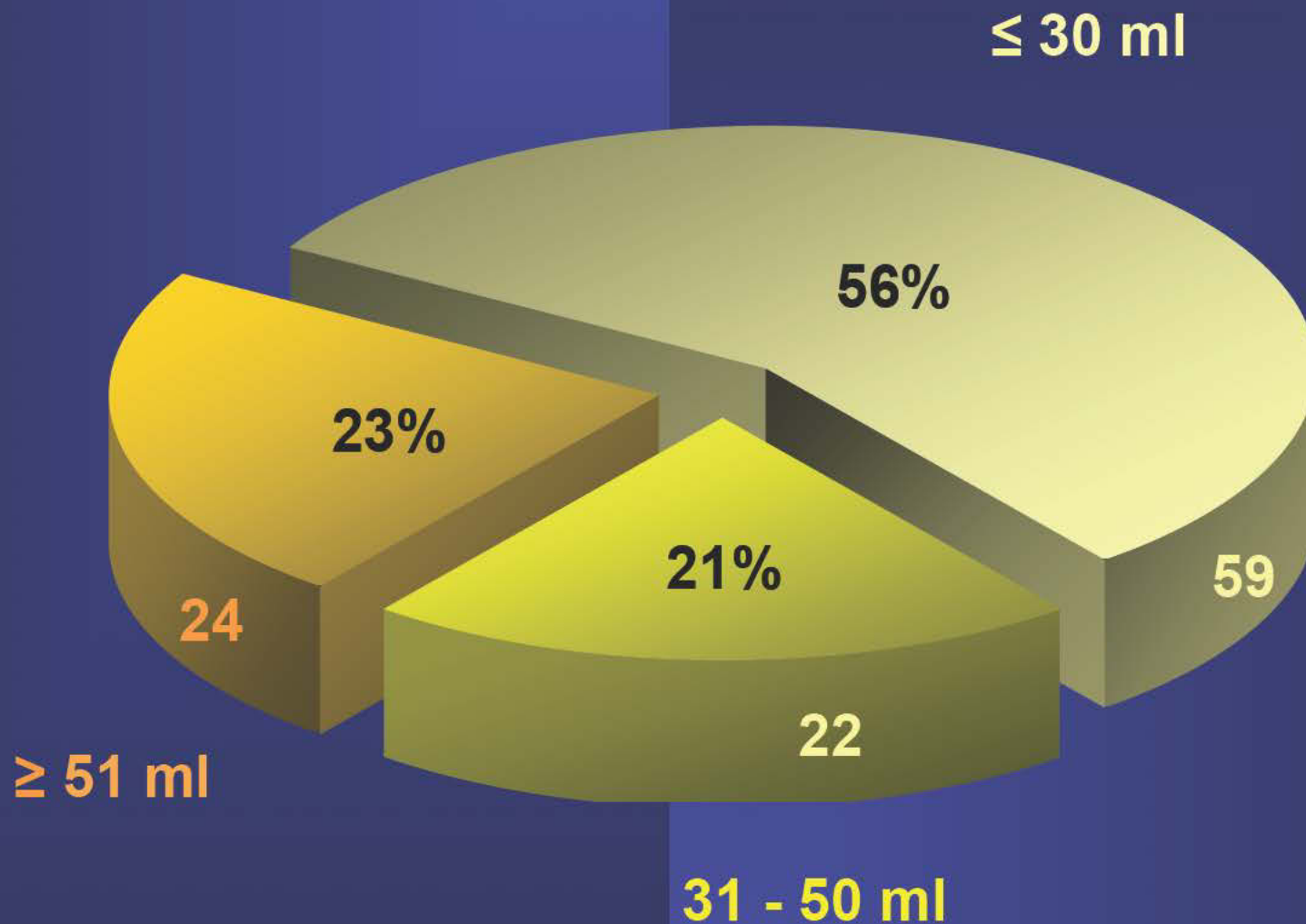
22

22

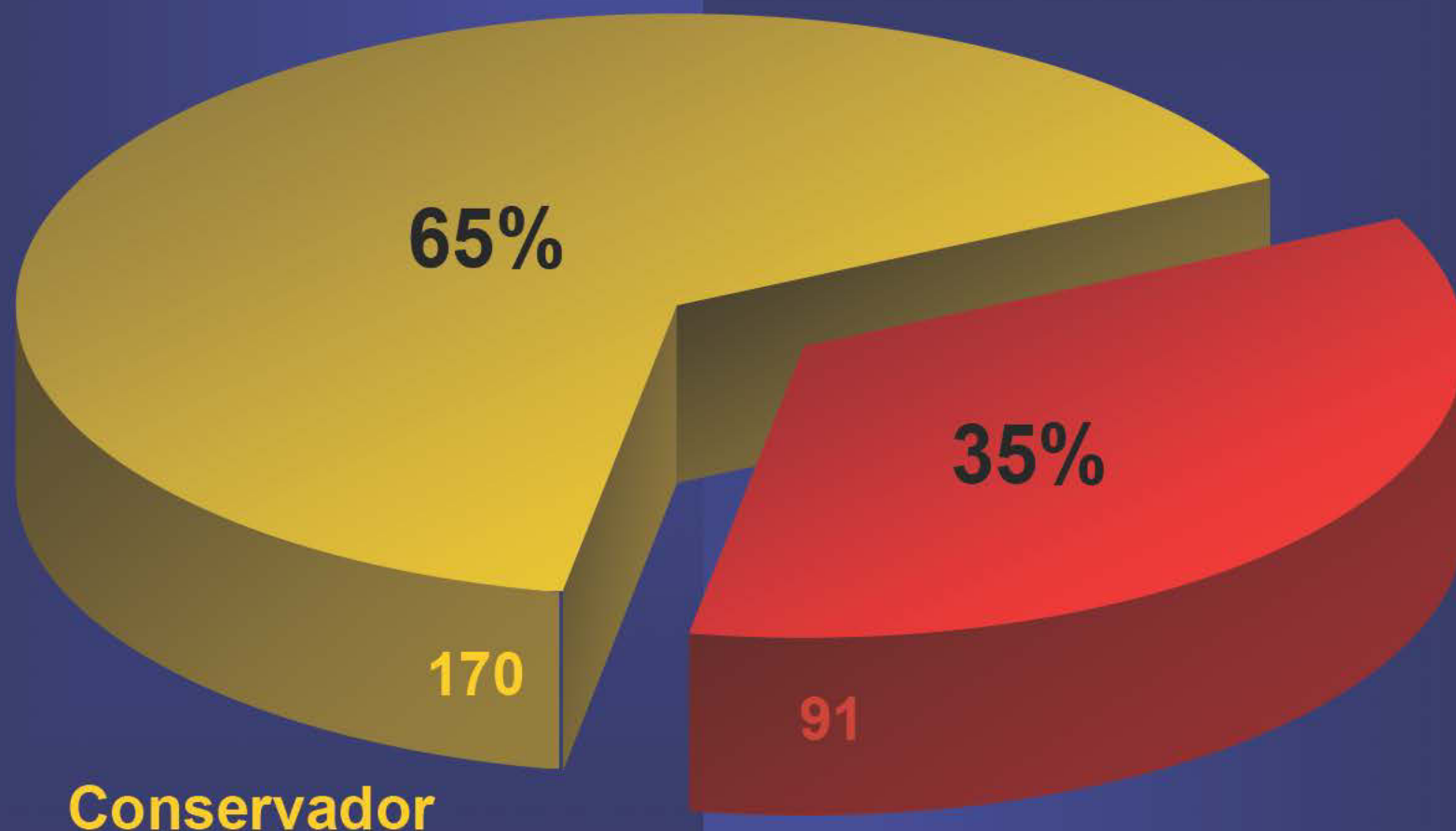
Nuclear



# H.I.C.P. com Hemoventrículo (40%)



# Tratamento

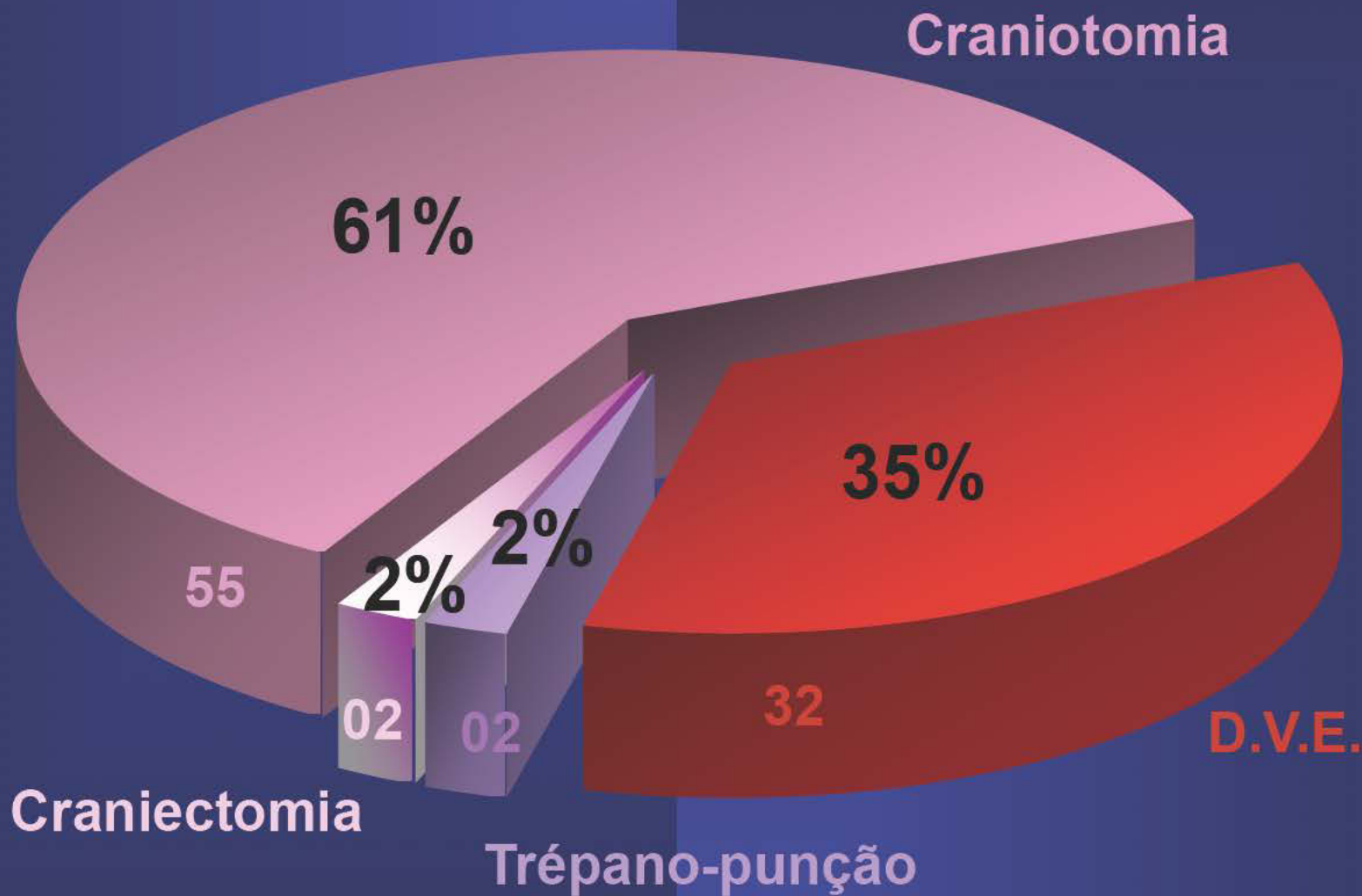


Conservador

Cirúrgico

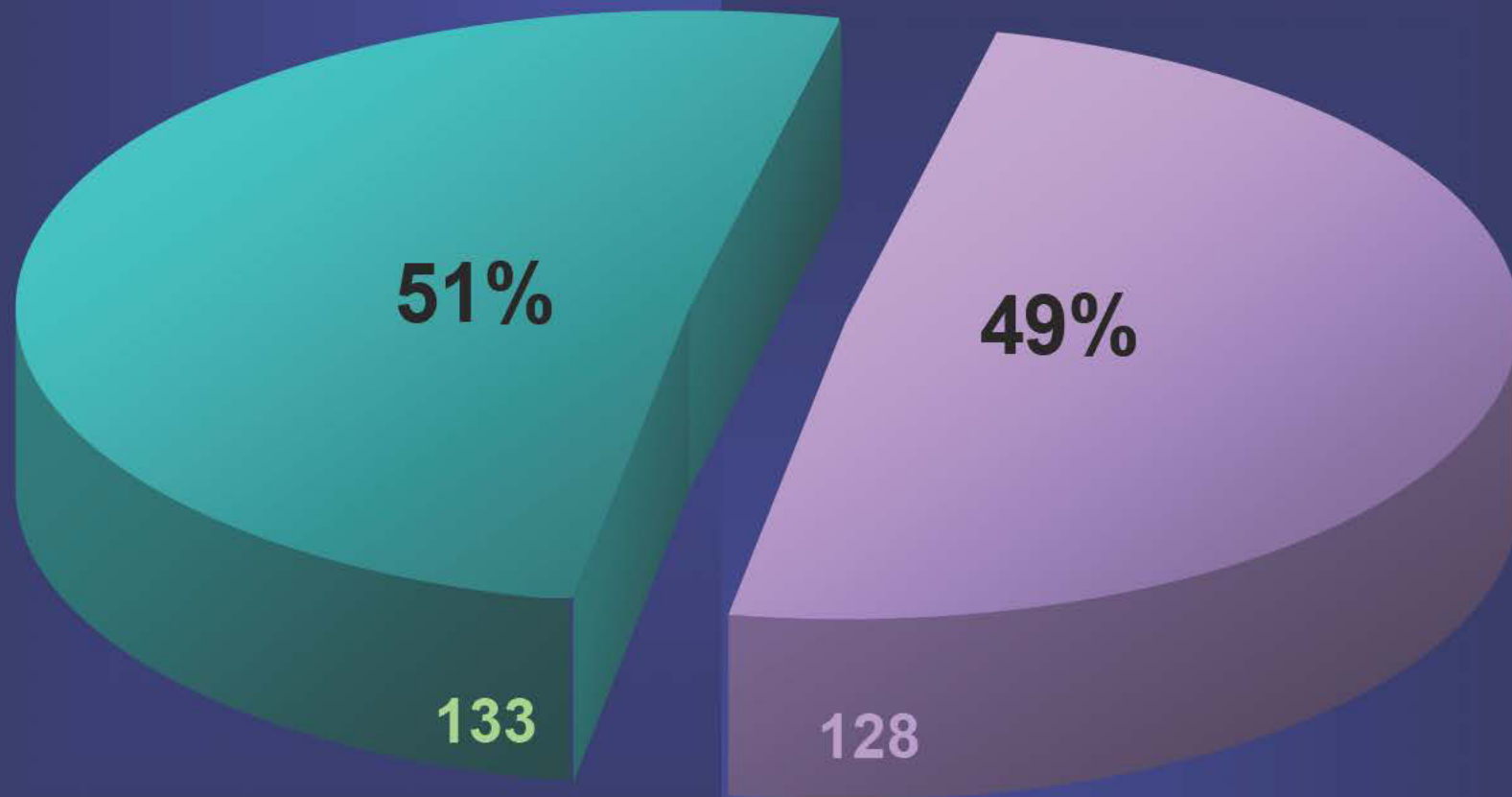


# Tratamento Cirúrgico





# Evolução



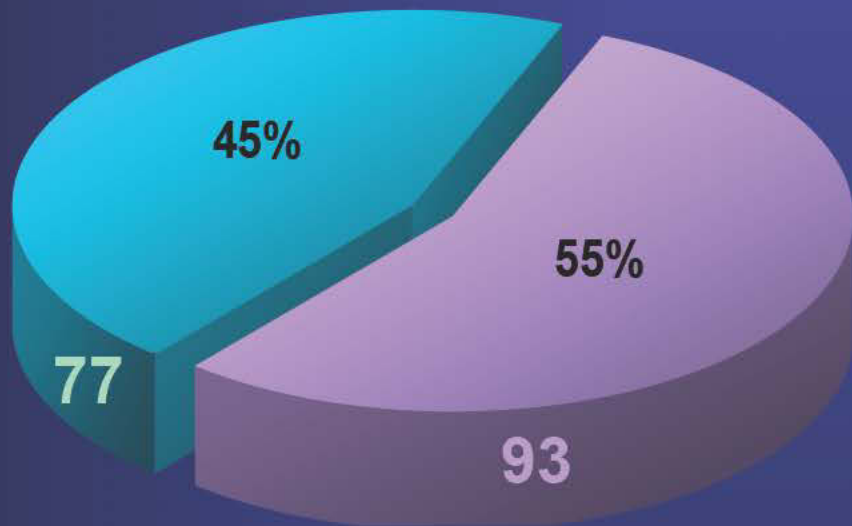
**Sobrevida**

**Óbito**

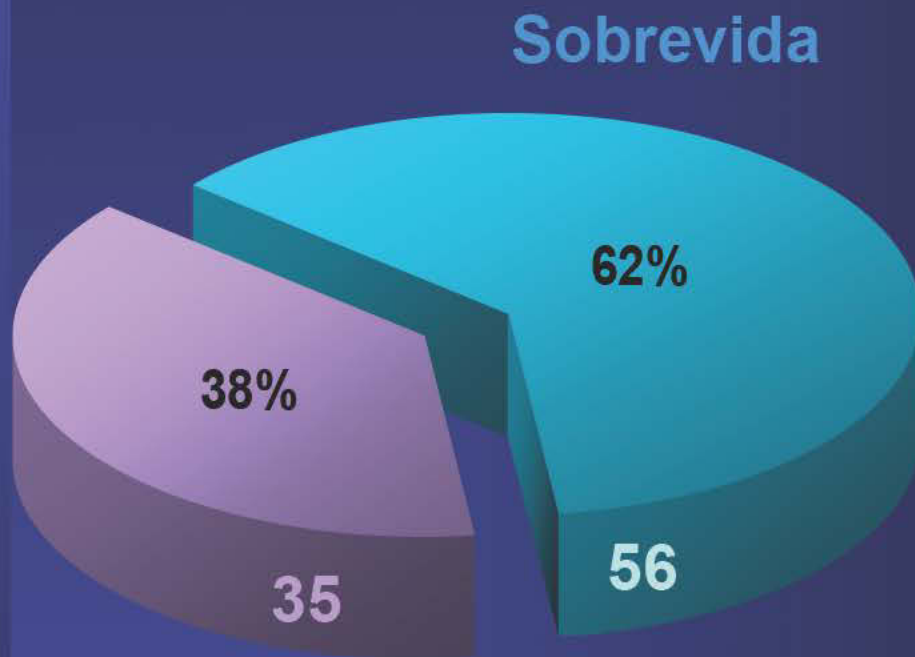


# Tratamento X Evolução

Conservador



Cirúrgico

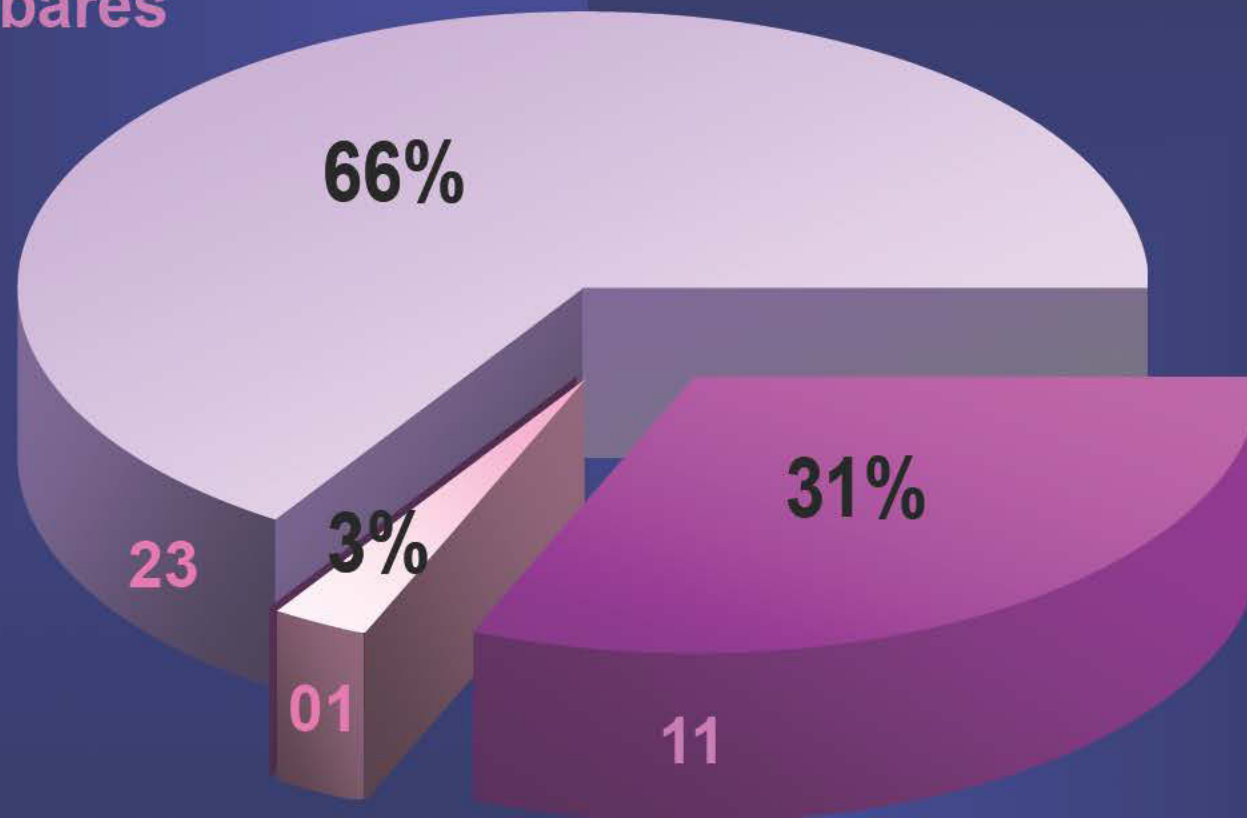


Sobrevivida x Óbito



# Óbitos Cirúrgicos

Lobares



Nucleares

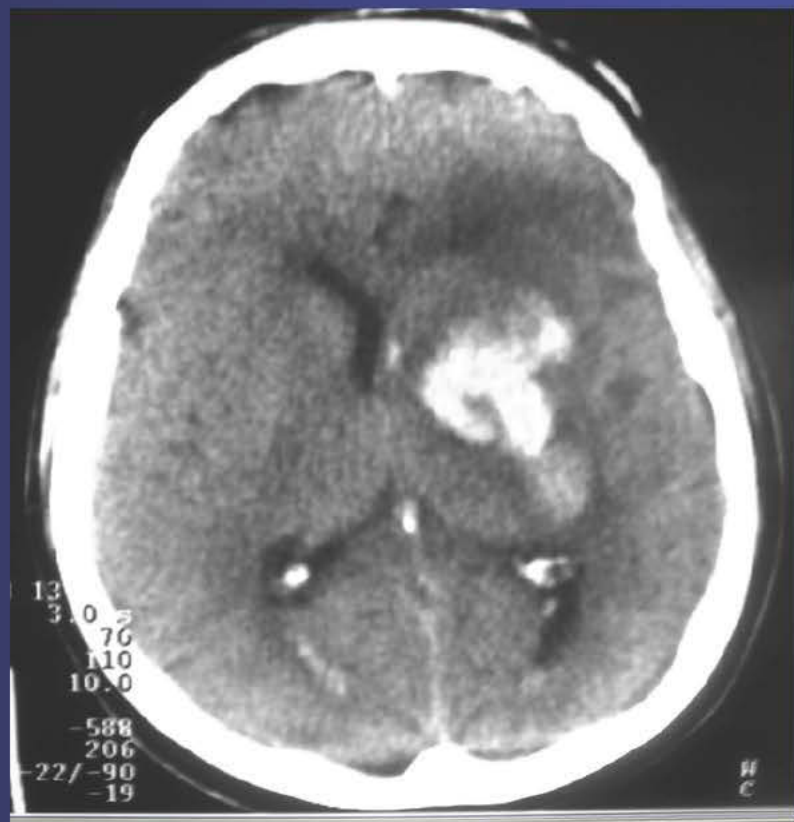
Ventriculares



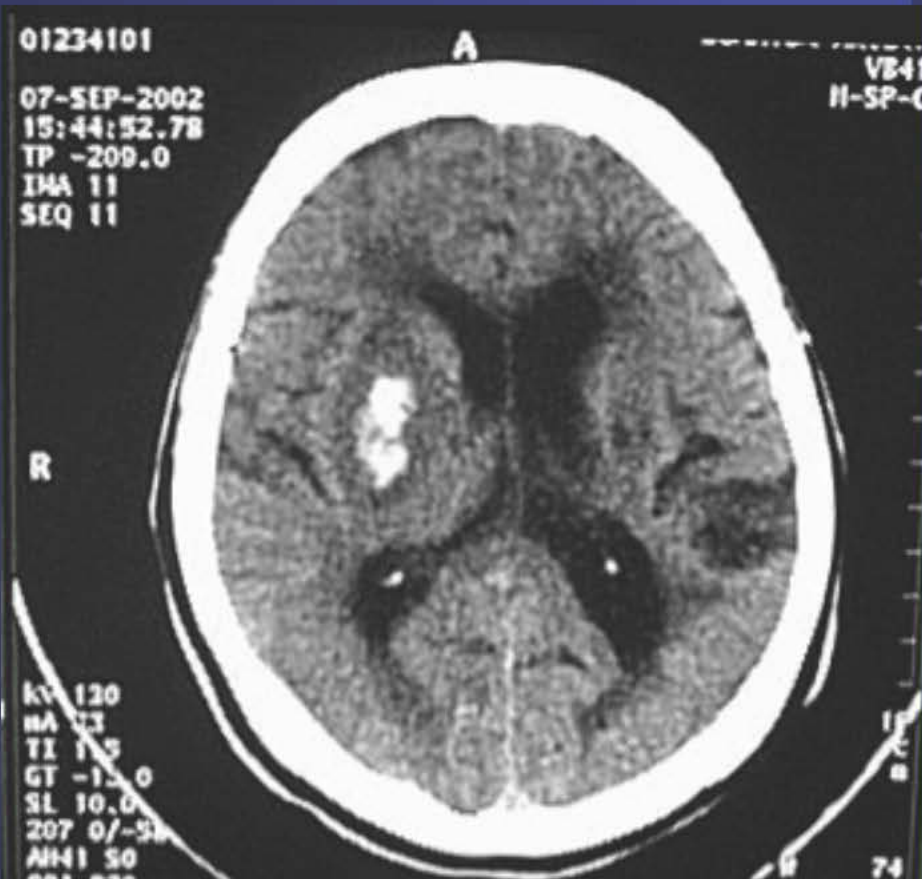
# Como Tratar ?

- Tratamento Clínico
- Tratamento Cirúrgico



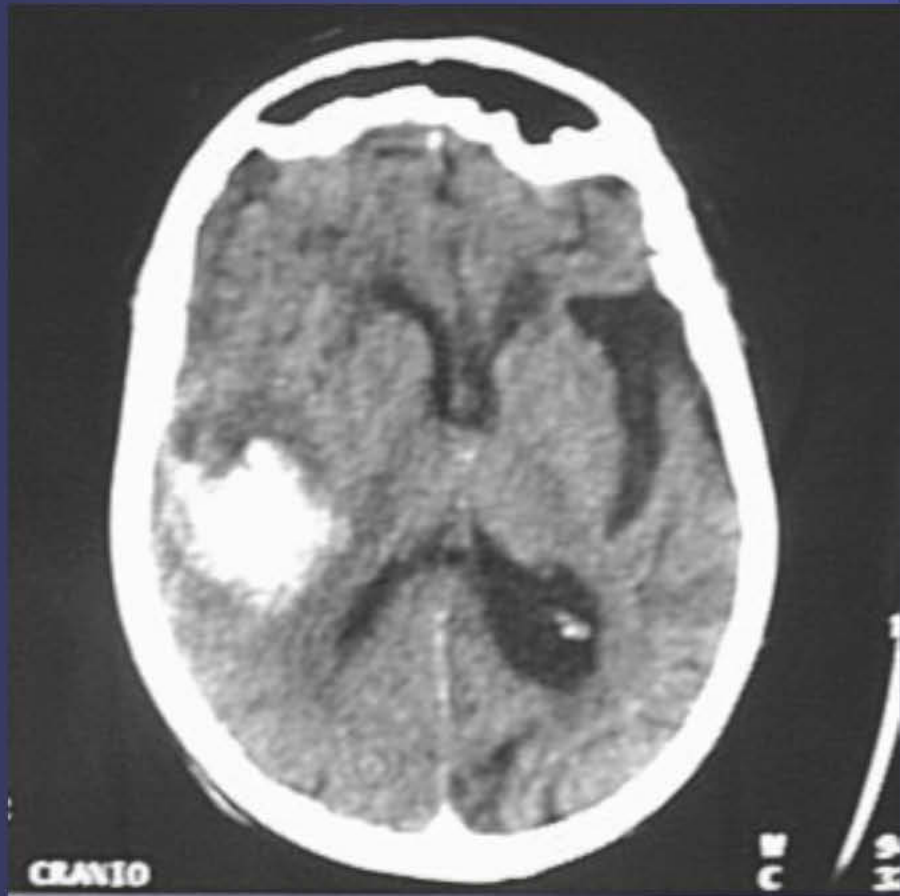


## Talâmico

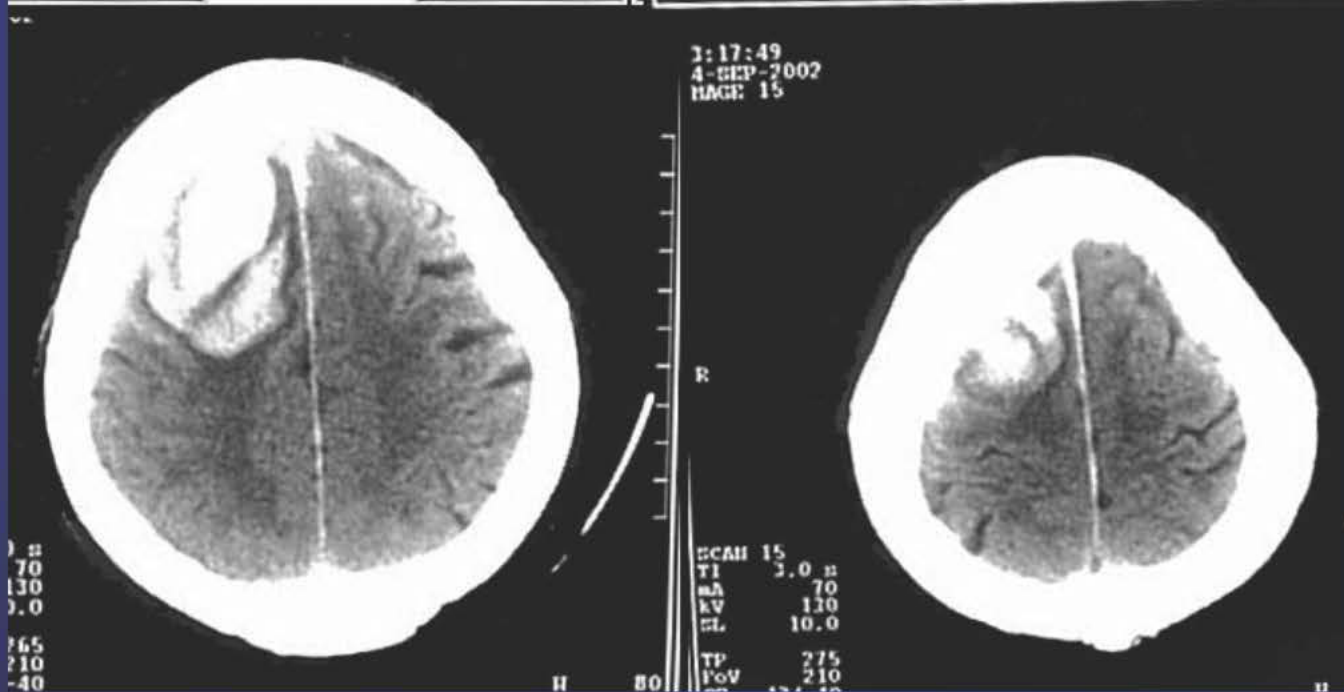
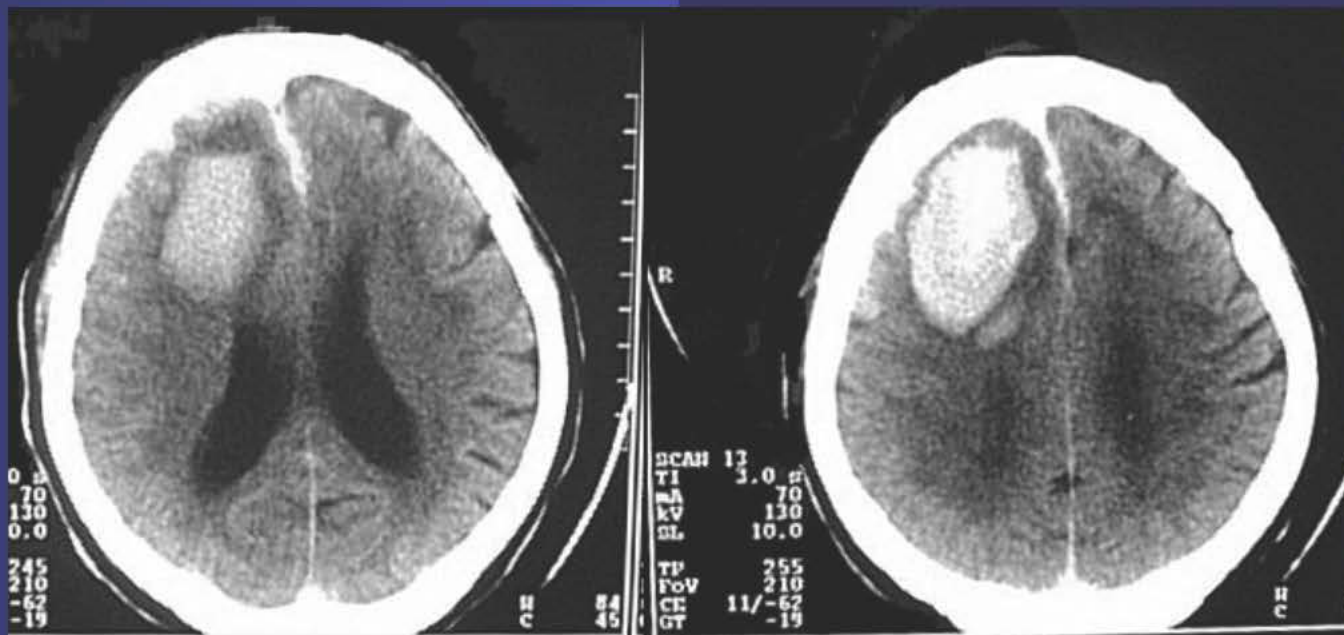


**Nuclear**





**Lobar**







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NEUROSURGERY  
CLINICS  
OF NORTH  
AMERICA

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Neurosurg Clin N Am 13 (2002) 339–347

# Medical versus surgical therapy for spontaneous intracranial hemorrhage

Kenneth M. Little, MD, Michael J. Alexander, MD\*

*Division of Neurosurgery, Duke University Medical Center, PO Box 3807, Durham, NC 27710, USA*



Tálamo - Conservador

Nuclear - Piorou com cirurgia

Lobar - Cirurgia (Volume)

Ventricular - Cirurgia (DVE)



# HICP

Quadro Clínico proporcional à gravidade e pior prognóstico

Conservador

↑ ECG < 7 ≈ ECG 11 - 13 ↓

↓ ECG 7 - 10 ↑

Cirurgia



# Idade

> 60 anos

- **dobro mortalidade cirúrgica**  
(lobares e ventriculares)



# HICP

$\leq 30$  ml - Conservador

31 - 60 ml ?

$\geq 60$ ml - Cirurgia



# HICP

Talâmicos e Nucleares + HIC

**Craniotomia**

**Descompressiva**



## Treatment recommendations

Based strictly on the results of these studies, surgery does not seem beneficial for patients with basal ganglia or thalamic ICH. Surgery may be most beneficial when reserved for patients with subcortical ICH who are less than 60 years of age without a profoundly impaired level of consciousness at presentation. Given the considerable variability in methodology and numbers of subjects (ie, statistical power), these observations and implied guidelines should not be considered definitive.



J Neurosurg 97:531–536, 2002

# Prediction of death in patients with primary intracerebral hemorrhage: a prospective study of a defined population

**OLA G. NILSSON, M.D., PH.D., ARNE LINDGREN, M.D., PH.D.,  
LENNART BRANDT, M.D., PH.D., AND HANS SÄVELAND, M.D., PH.D.**

*Departments of Neurosurgery and Neurology, Lund University Hospital, Lund, Sweden*





# HICP

13 -15 casos / 100.000 hab / ano

35 - 50% morre 1º mês após o ictus

POR QUÊ ?



# HICP

**341 casos - média de 74 a.**

**12 centros médicos**

**T.A. 1.140.000 pessoas**

**Sobrevida 30 dias e 12 meses**



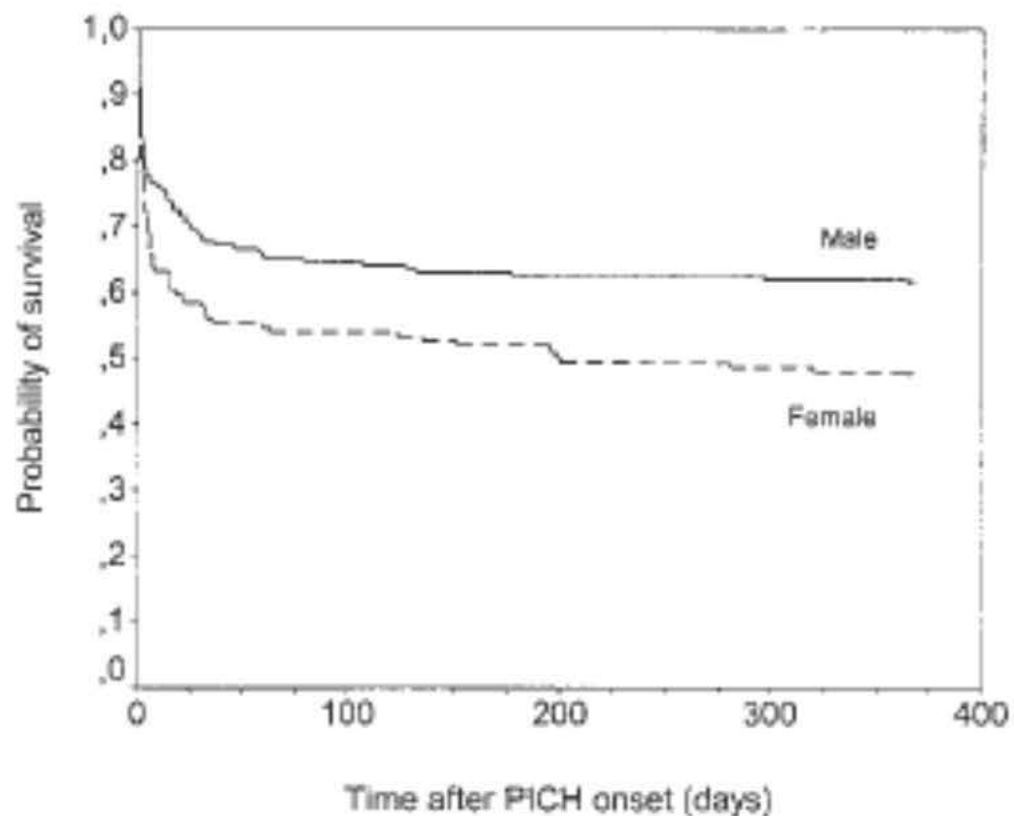


FIG. 1. One-year survival probability curves for male and female patients calculated using Kaplan–Meier analysis.

# HICP

**M > H - Incidência - 1.50:1.00**

**H > M - Sobrevida - 1.25:1.00**

**Negros > Brancos > Asiáticos - Incidência**

**Asiáticos > Brancos > Negros - Sobrevida**



# Predictors of death in patients with primary ICH

TABLE 1

*Mortality rate related to CT findings: hematoma site and volume and VE*

Variable	Total No. of Patients	Dead at 30 Days		Dead at 1 Yr	
		No. of Patients (%)	p Value*	No. of Patients (%)	p Value*
hematoma site			0.001		0.006
lobar	176	68 (39)		83 (47)	
central	121	36 (30)		49 (40)	
cerebellar	29	8 (28)		8 (28)	
brainstem	15	12 (80)		12 (80)	
hematoma vol (cm <sup>3</sup> )			<0.001		<0.001
<30	206	39 (19)		61 (30)	
30-60	46	17 (37)		19 (41)	
>60	43	31 (72)		33 (77)	
VE			<0.001		<0.001
present	78	50 (64)		57 (73)	
absent	263	74 (28)		95 (36)	

\* Univariate chi-square tests.



TABLE 2

*Mortality rate related to clinical characteristics: patient age and sex, level of consciousness, and presence of risk factors*

Variable	Total No. of Patients	Dead at 30 Days		Dead at 1 Yr	
		No. of Patients (%)	p Value*	No. of Patients (%)	p Value*
age (yrs)			0.025		0.001
0-54	49	11 (22)		12 (24)	
55-74	128	43 (34)		43 (34)	
$\geq 75$	164	70 (43)		88 (54)	
sex			0.048		0.014
male	189	60 (32)		73 (39)	
female	152	64 (42)		79 (52)	
level of consciousness <sup>†</sup>			<0.001		<0.001
alert (14-15)	148	10 (7)		24 (16)	
drowsy (8-13)	100	34 (34)		46 (46)	
comatose (3-7)	64	53 (83)		55 (86)	
hypertension			0.114		0.07
present	124	37 (30)		46 (37)	
absent	217	81 (37)		100 (46)	
diabetes mellitus			0.633		0.85
present	33	13 (40)		15 (45)	
absent	308	107 (35)		133 (43)	
previous stroke			0.651		0.53
present	63	21 (33)		30 (48)	
absent	278	100 (36)		119 (43)	
heart disease			<0.001		0.001
present	92	47 (51)		54 (59)	
absent	249	74 (30)		95 (38)	
anticoagulation therapy			0.018		0.092
present	40	21 (52)		24 (60)	
absent	301	98 (32)		124 (41)	
antiplatelet therapy			0.679		0.246
present	74	28 (38)		37 (50)	
absent	264	93 (35)		112 (42)	

\* Univariate chi-square tests.

<sup>†</sup> GCS score provided for each level.



# HICP

**Mortalidade**

**Não influenciam:**

**HAS isolada**

**Diabetes**

**Tabagismo**

**AC / AAP**

**AINH**



TABLE 3

*Independent predictors of 30-day mortality rate according to stepwise logistic regression analysis*

Variable	OR	95% CI	p Value
level of consciousness (GCS score)			
alert (14–15)	1		
drowsy (8–13)	5.2	2.3–11.6	<0.001
comatose (3–7)	42	15.6–113.3	<0.001
hematoma vol (cm <sup>3</sup> )			
<30	1		
30–60	1.3	0.6–3.2	0.48
>60	3.6	1.5–9	0.005
heart disease			
absent	1		
present	2.4	1.2–5	0.01



TABLE 4

*Independent predictors of mortality rate during the 1-year follow up according to Cox regression analysis*

Variable	HR	95% CI	p Value
level of consciousness (GCS score)			
alert (14–15)	1		
drowsy (8–13)	3.6	2.1–6.1	<0.001
comatose (3–7)	15.2	8.8–26.3	<0.001
age group (yrs)			
0–54	1		
55–74	1.9	0.9–3.9	0.08
≥75	3.3	1.6–6.9	0.001
hematoma site			
lobar	1		
central	1.2	0.8–1.8	0.49
cerebellar	0.4	0.2–1.2	0.12
brainstem	5	2.1–11.9	<0.001

## Conclusions

The present prospective study provides insight concerning predictors of death after primary ICH given a population-based perspective. Knowledge of such prognostic factors is imperative in clinical decision making for an individual patient and in designing trials and new treatment strategies for patients with primary ICH. Apart from a patient's level of consciousness on admission, hematoma volume and location, and patient age, which have been previously reported as independent predictors of death in more selected patient, the present study also identified a history of heart disease as a significant determinant of the 30-day mortality rate.



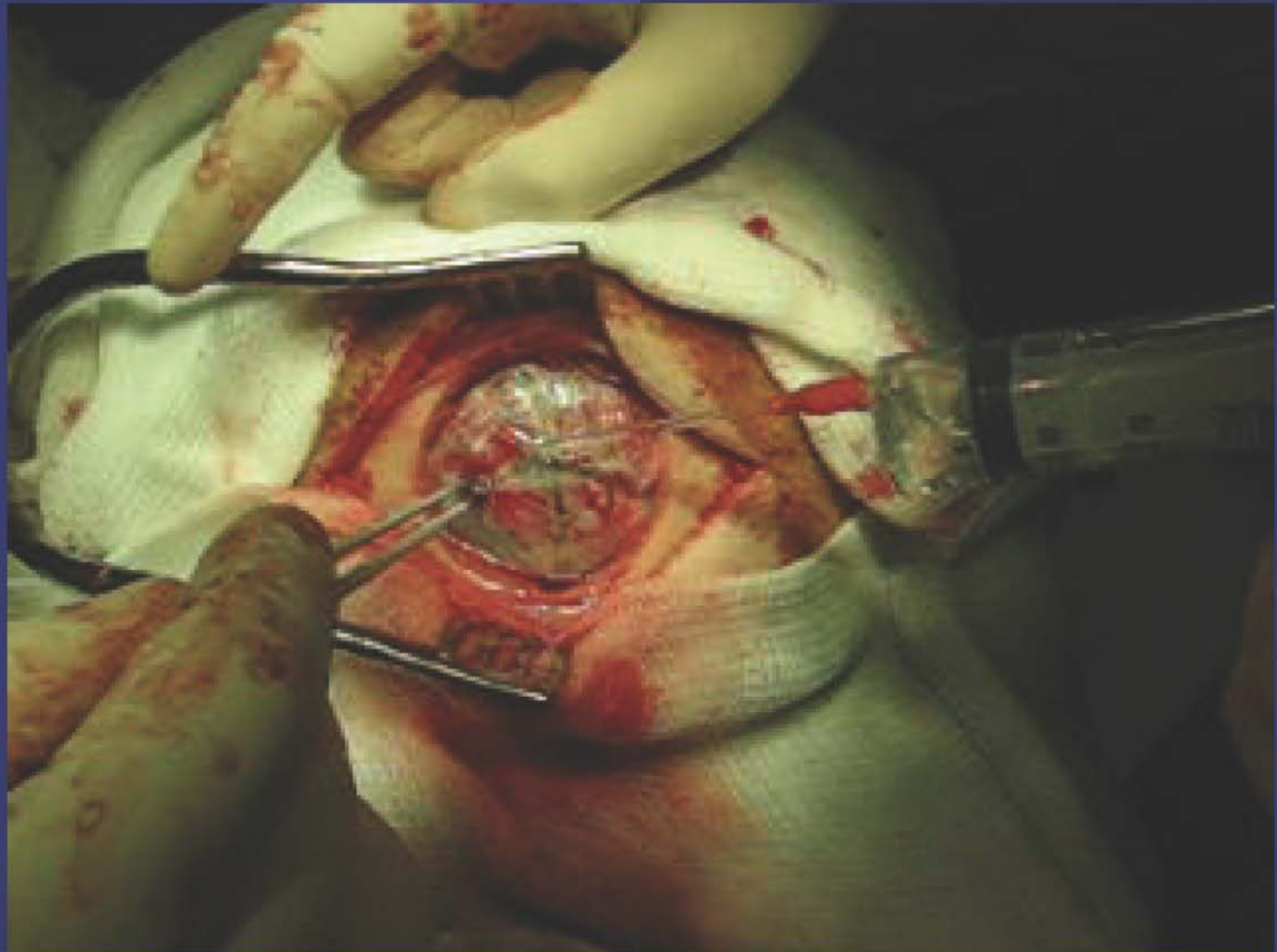
# Tratamento Cirúrgico

- Volume  $\geq 31$  ml
- PIC  $> 25$  mmHg, Piora Clínica
- Grandes Lobares ( $\geq 50$  ml)
- PIC  $\geq 25$  mmHg persistente, apesar do tratamento
- Localização Favorável

Lobares  $>$  Nucleares  $>$  Talâmicos



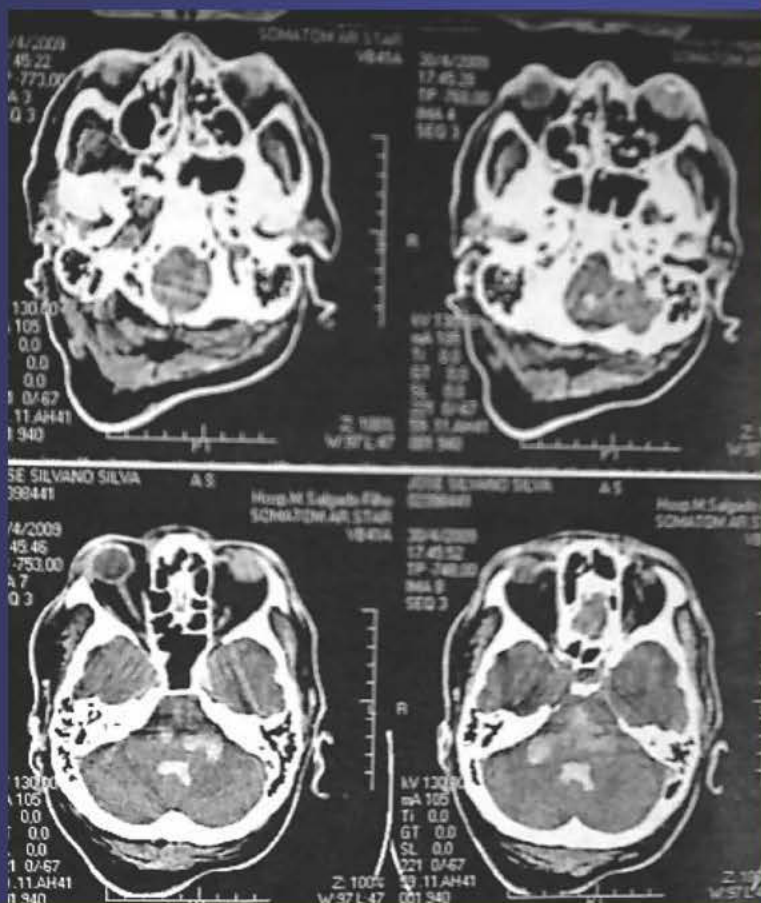




# Hematomas Primários de Fossa Posterior (HPFP)

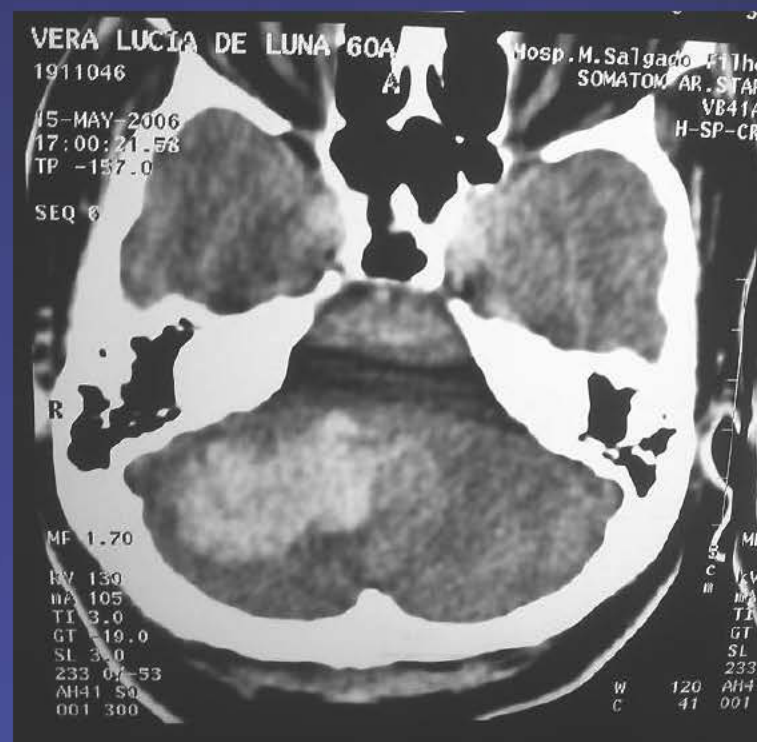
Tronco Cerebral

Mesencéfalo / Ponte



Cerebello

Hemisfério / N. Denteado



# Hemorragias Cerebelares - Histórico

- SEDILLOT, J. 1813
- BROWN - SÉCQUARD, C.E., 1858
- CHILDS, T., 1858
- MICHAEL, J.C., 1932
- MITCHELL, N & ANGRIST, A., 1942
- GUILLAUME, J. & SIGWALD, J., 1943
- GUILLAUME, J. ROGÉ, R., JANNY, P. 1949
- HUANG, Y.P., WOLF, B.S., OKUDERA, T. 1966
- FREEMAN, R.E. et al. 1973
- SYPERT, G.W, 1985



# Quadro Clínico

- **Agudo**

**H.I.C.  
Coma**

- **Subagudo**

**Cefaléia intensa  
Déficit motor  
Paralisia N. Craniano**

- **Crônico**

**Síndromes Cerebelares  
Hidrocefalia**





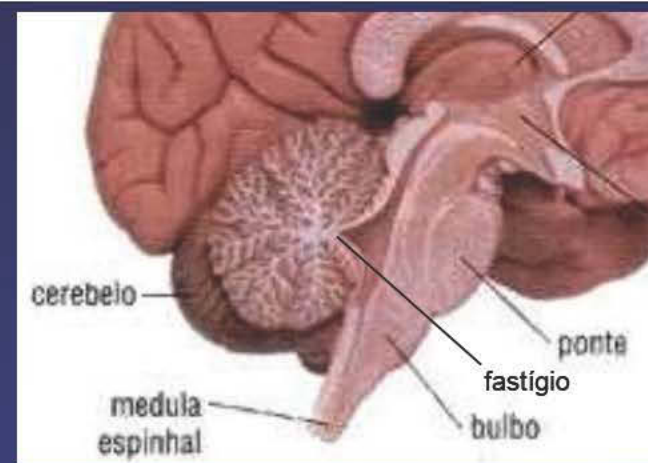
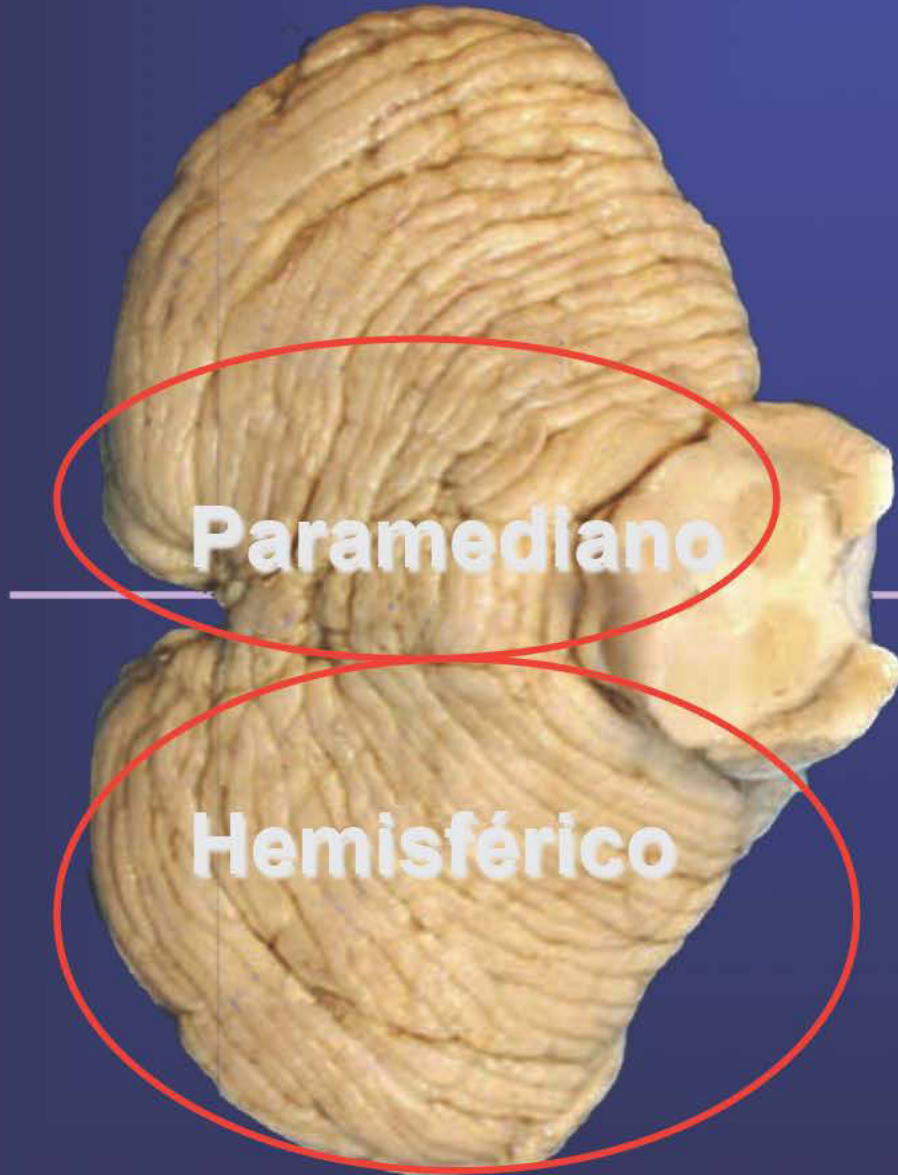
# Volume

$< 30$  ml - Conservador ?

$\geq 30$  ml - Craniectomia



# Topografia



**Supra**

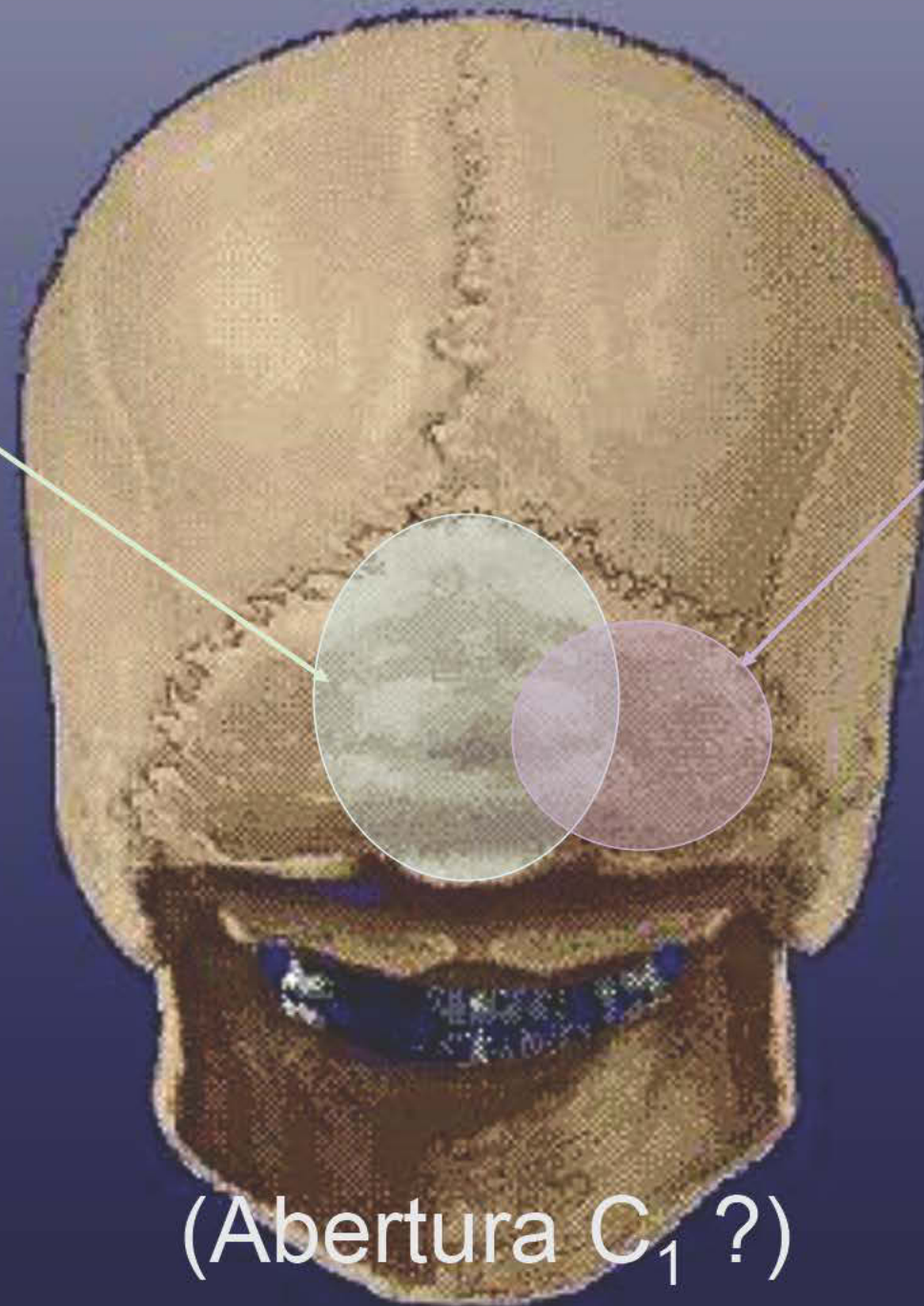
**fastigial**

**Infra**

# Acesso

Mediano

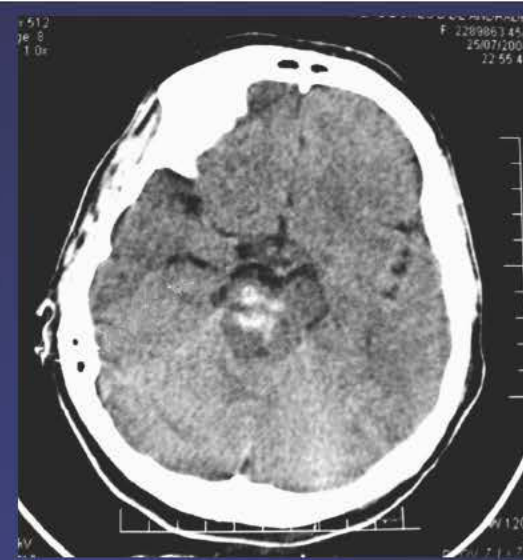
Lateral



(Abertura C<sub>1</sub> ?)

# Hemorragias de Tronco Cerebral

- Mais graves
- Precoce deteriora ção neurológica



Agudas:

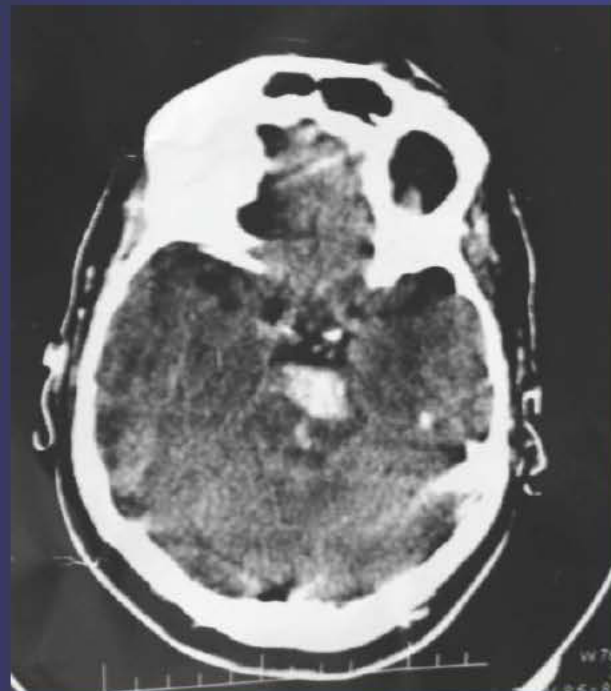
Coma

Hemovertrículo

Hidrocefalia

Subagudas:

Síndromes Alternas



# Tratamento Cirúrgico

- Fossa Posterior

  - $\geq 4$  cm

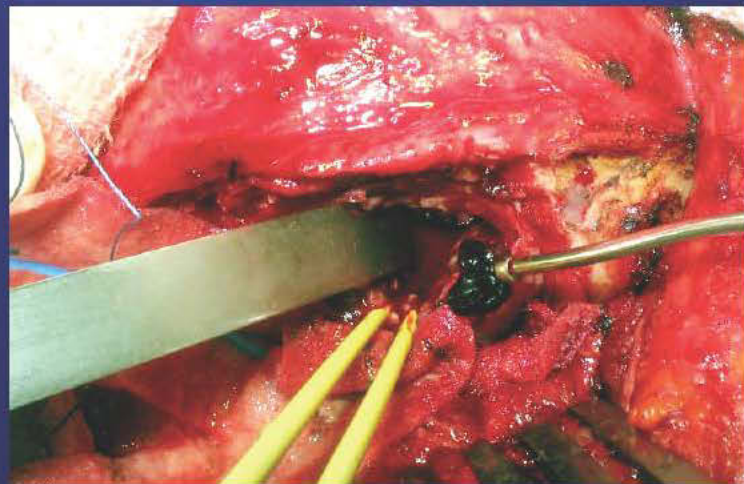
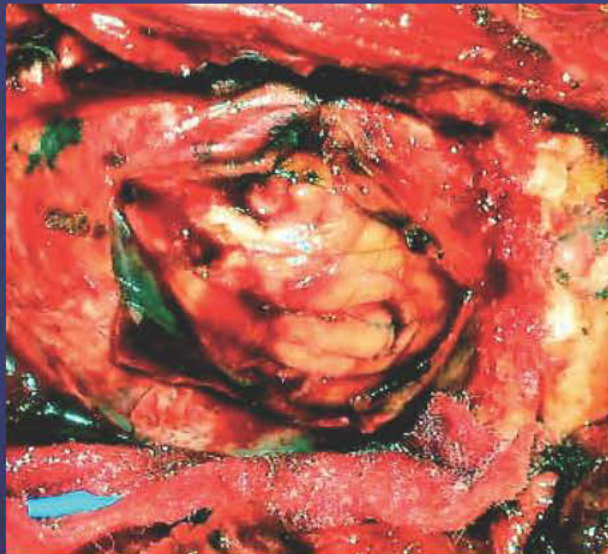
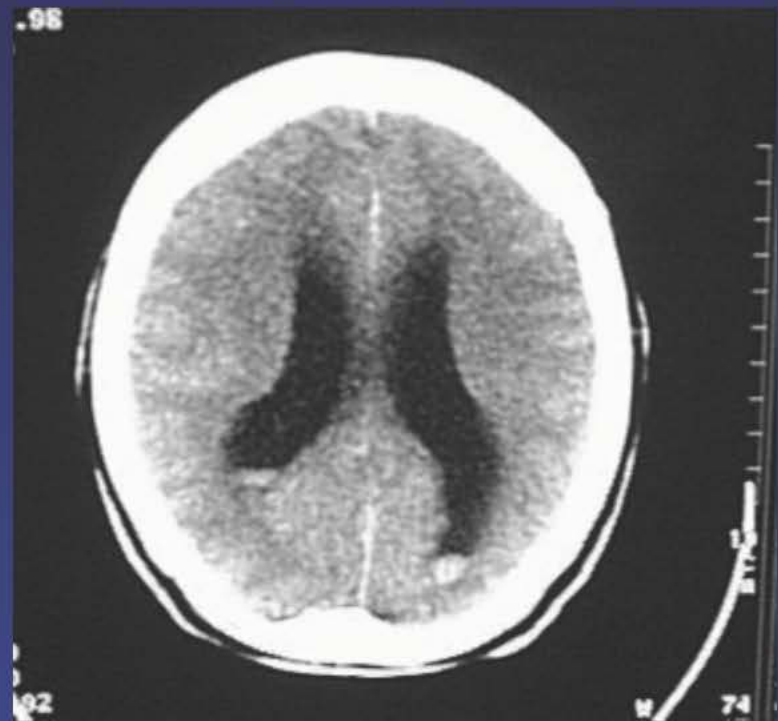
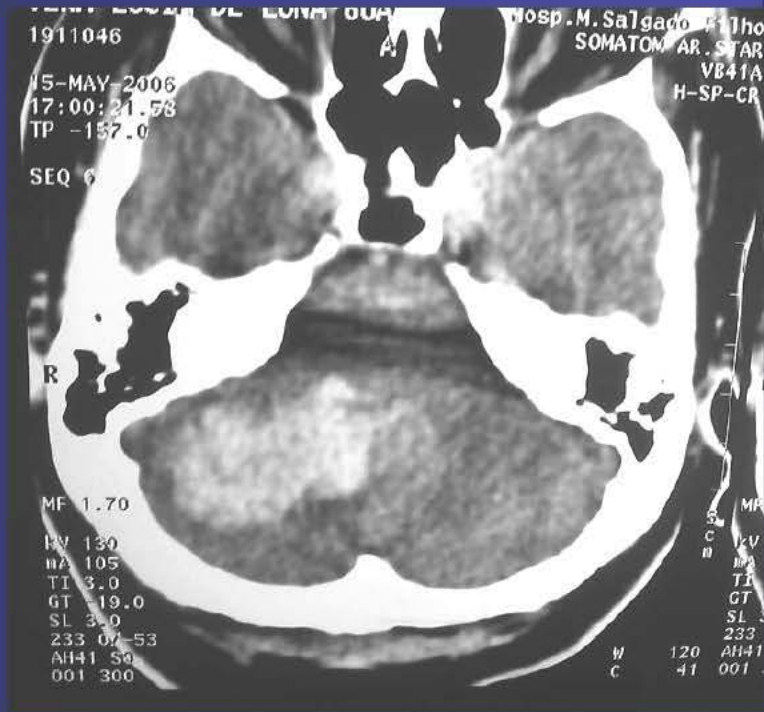
  - $\geq 15$  ml

  - E. Glasgow  $< 13$

- Hemoventrículo + Hidrocefalia Aguda = D.V.E.

- Idade  $\Leftrightarrow$  Resultado Cirúrgico





# H.I.P. - Complicações Evolutivas

- Hipertensão Intracraniana

Hematoma

Edema / Tumefação

- Hidrocefalia Aguda

Direta - Hemoventrículo

Indireta - Compressão



# Craniectomy Descompresiva

Bullock, M.R.; Chesnut, R. et al. Neurosurg. 58 (3) Supp: 25 - 57, 2006





# Decisão:

- Clínica
- Tomográfica



# Decisão

- Clínica

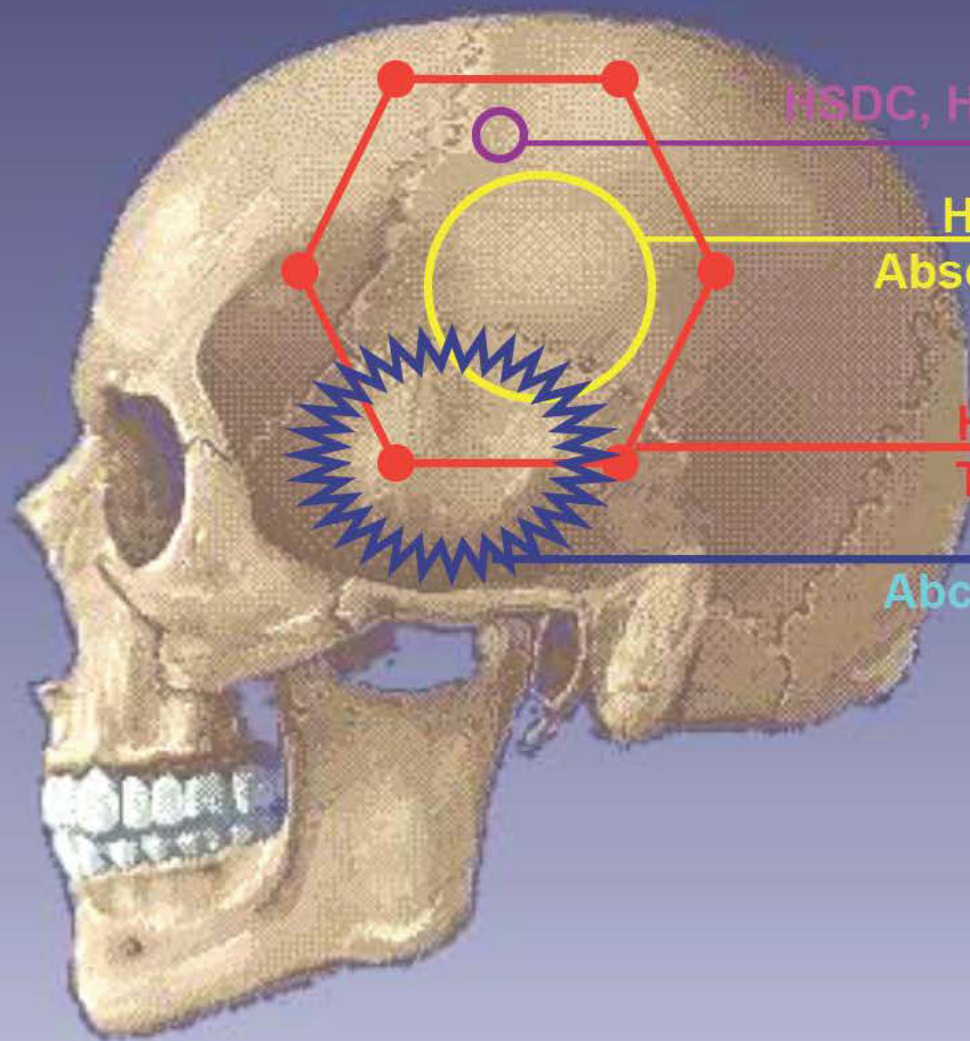
- Q.C. (G.C.S.)
- S. H. I. C.
- Q.C. Geral

- Tomográfica

- Consistência
- Extensão
- Tipo de Lesão

- Cirúrgica

- Consistência
- Extensão
- Protusão



HSDC, Higroma, Biopsia

HED, HSDC, HICP,  
Abscesso, Empiema,  
Tumor

HICP, HSDA, PAF,  
Tumor, Descomp.

HICP, HED,  
Abcessos, Empiema

# Craniectomia Descompressiva

- Primária: A cirurgia proposta contém a C.D.
- Secundária: A cirurgia evoluiu para C.D.
- Terciária: P.O. evolui necessitando de uma C.D.

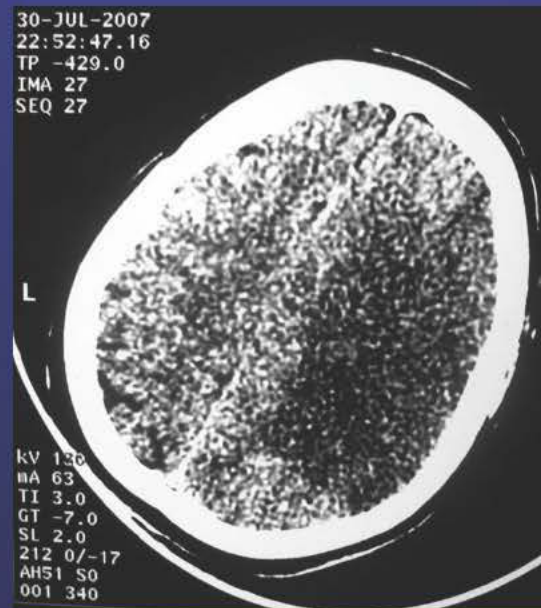
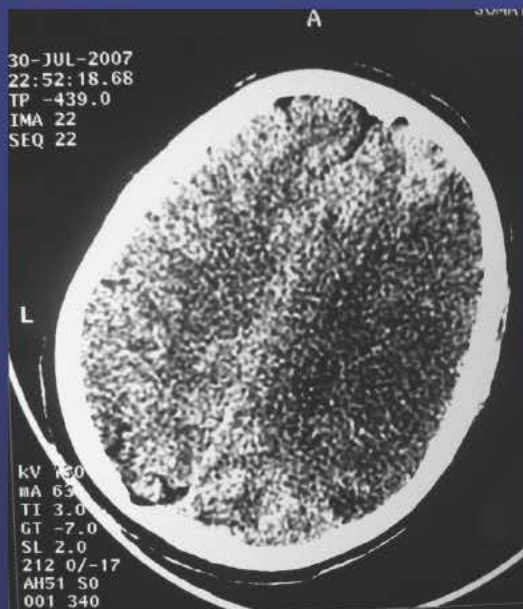
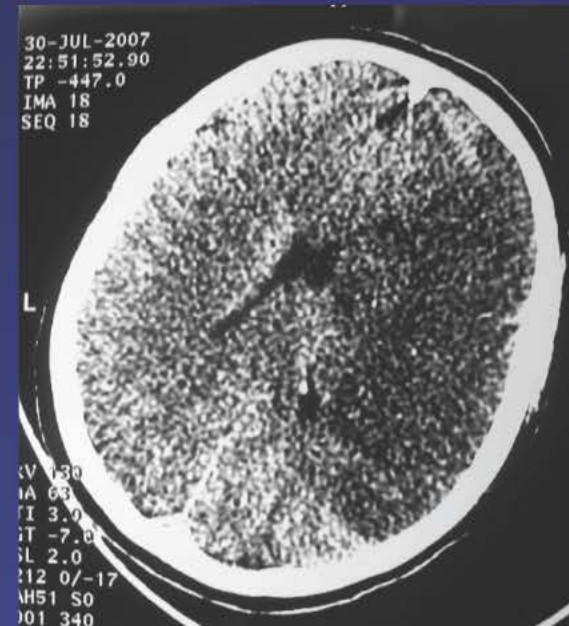
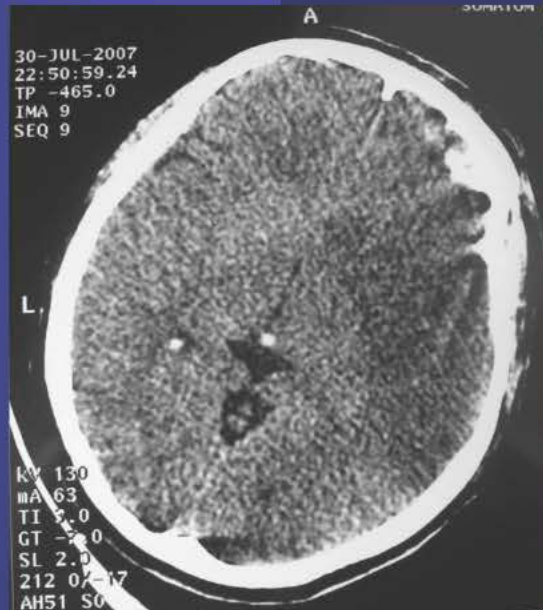


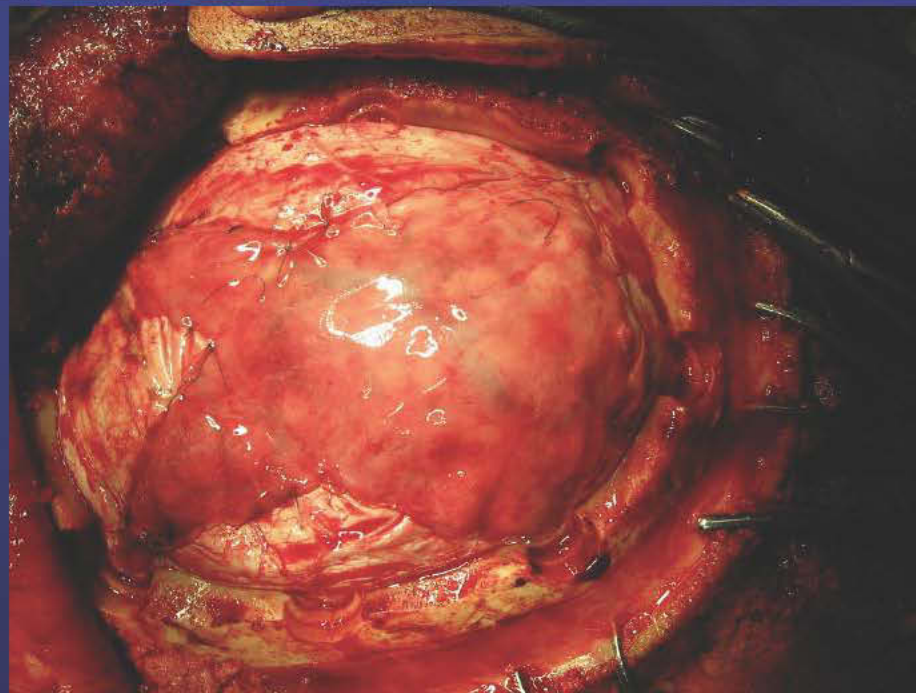
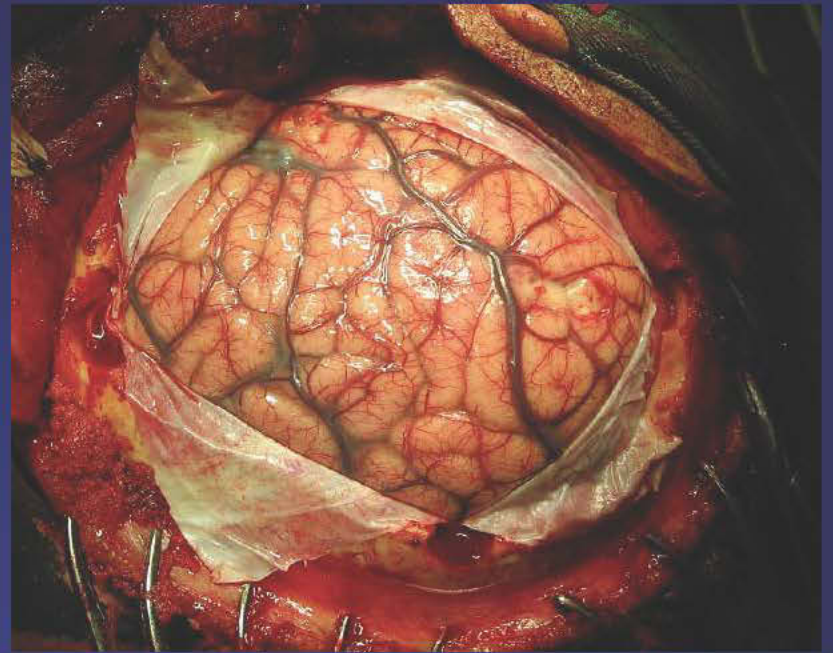
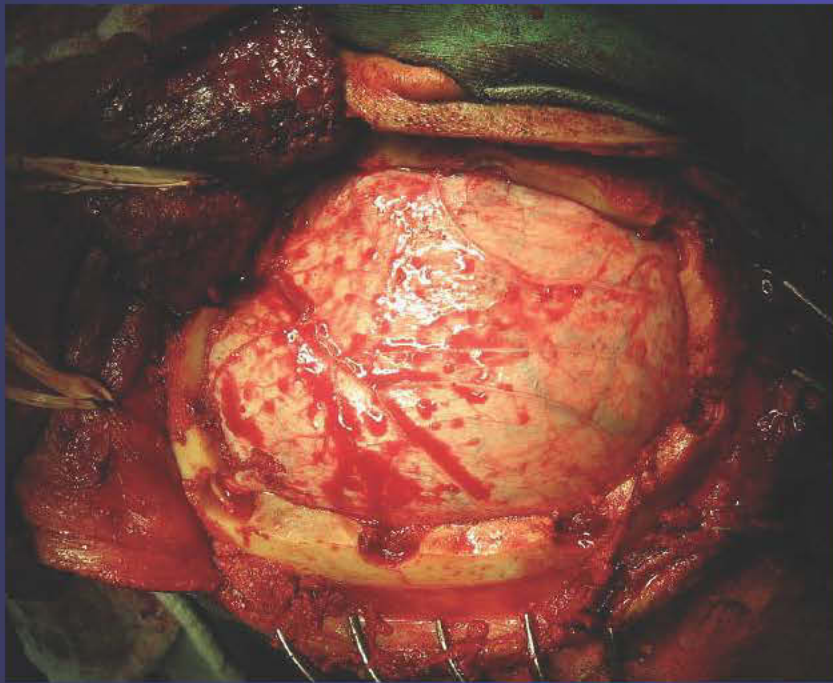
# Principais Indicações

- Tumefação cerebral traumática
- Isquemia cerebral com H.I.C.
- Tumores com edema e H.I.C. / H.C.E.

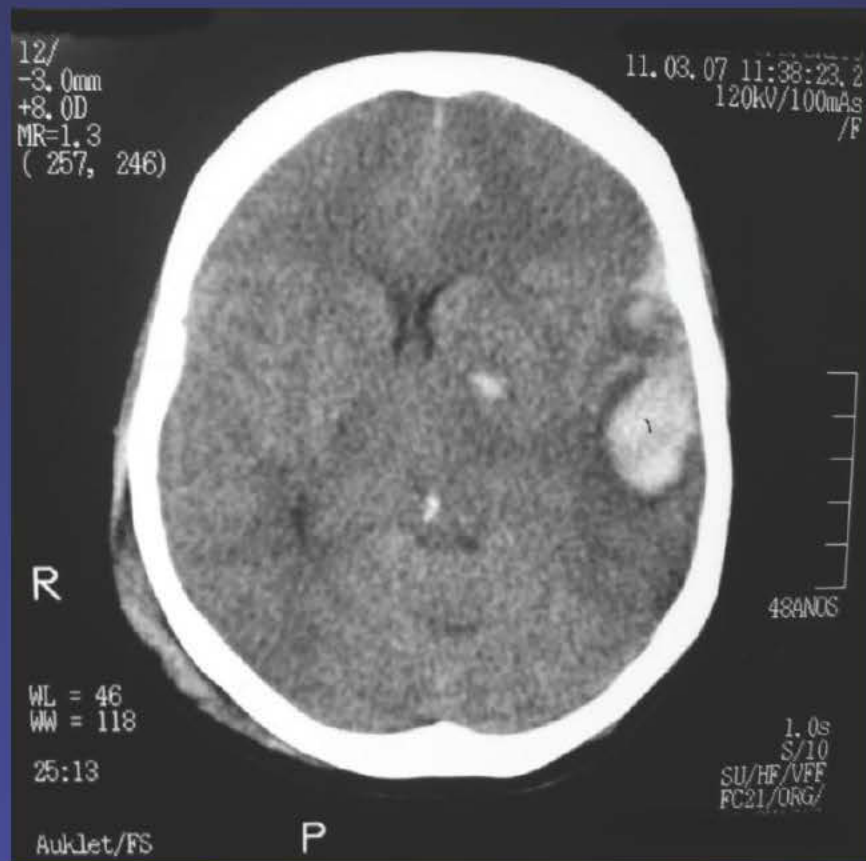


# C.D. "Primária"



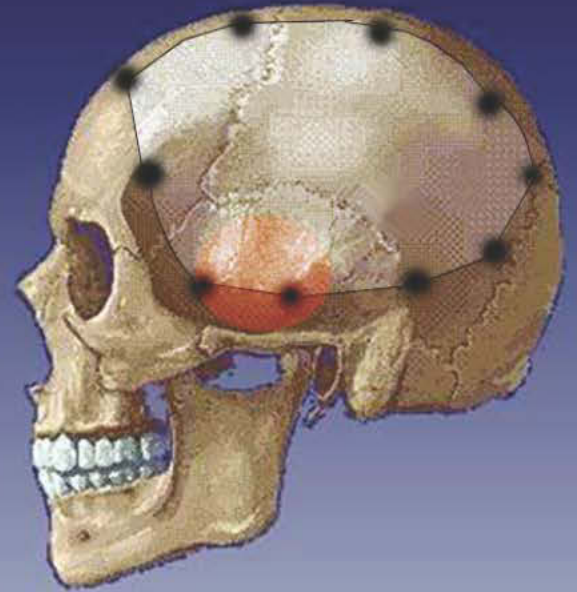
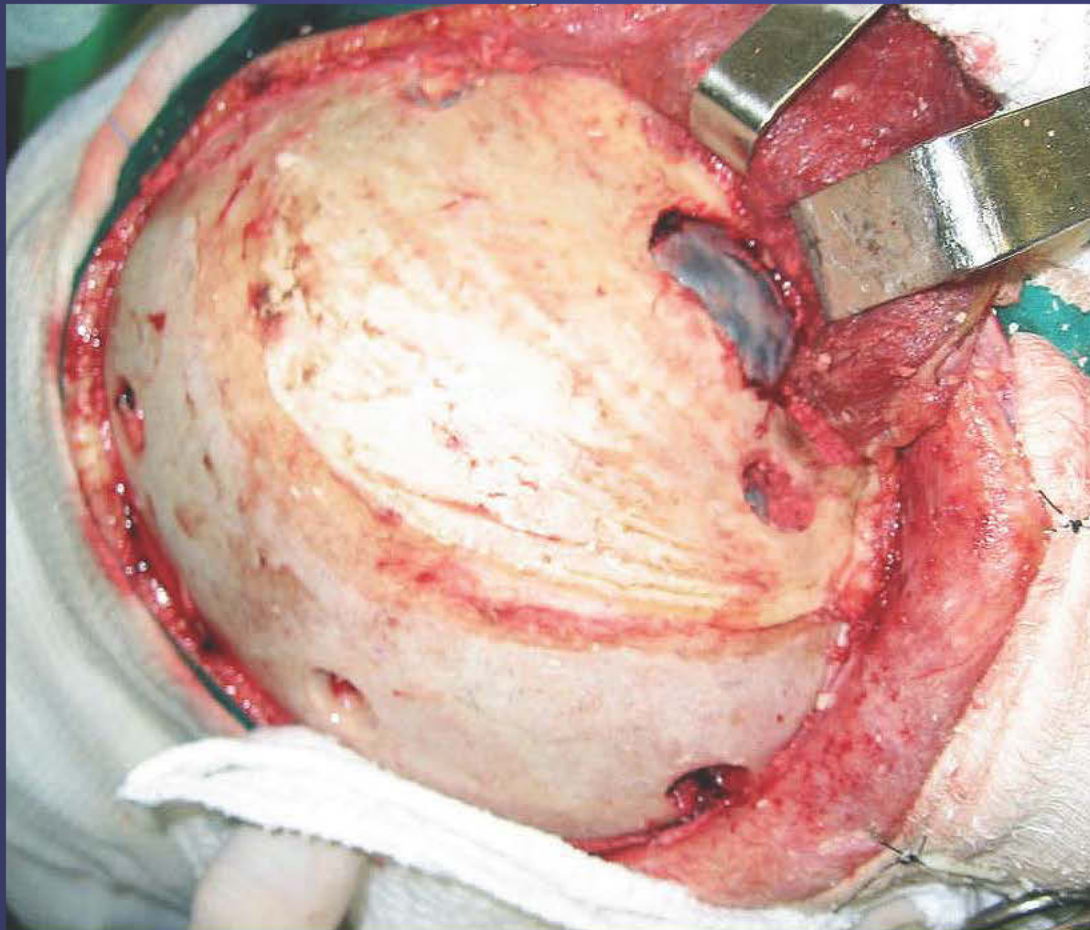


# C.D. "Secundária"

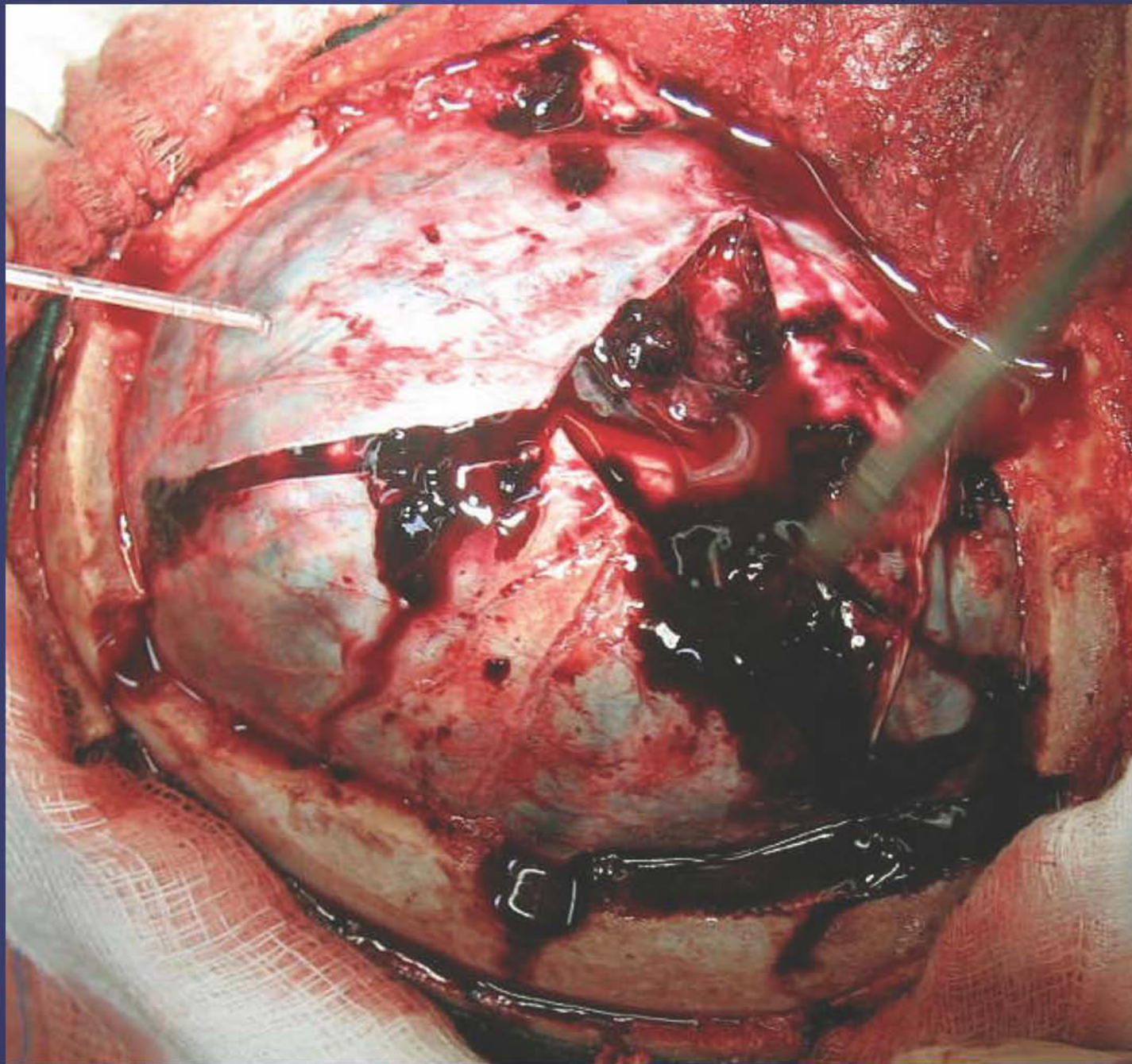


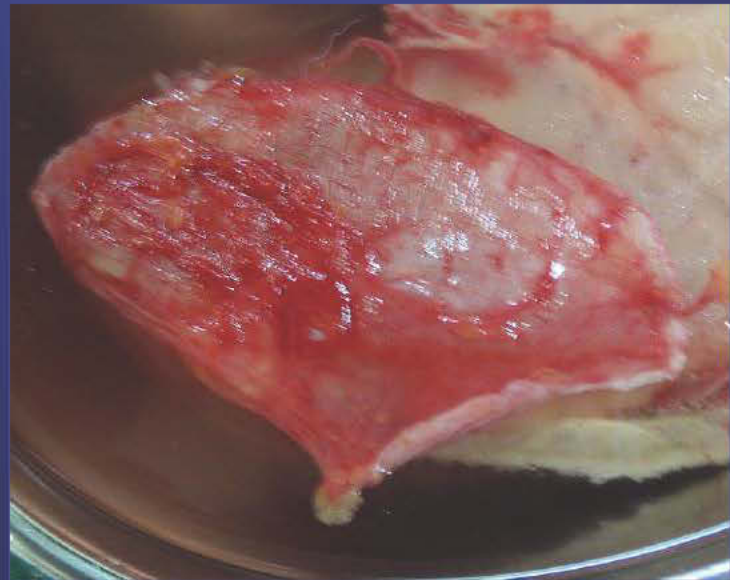
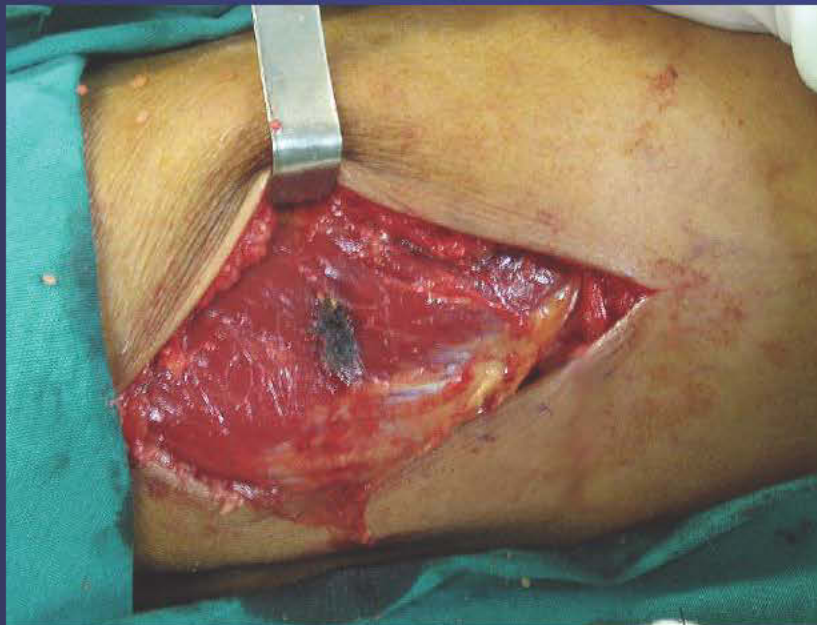
**HSDA < Contusão Temporal < Tumefação**

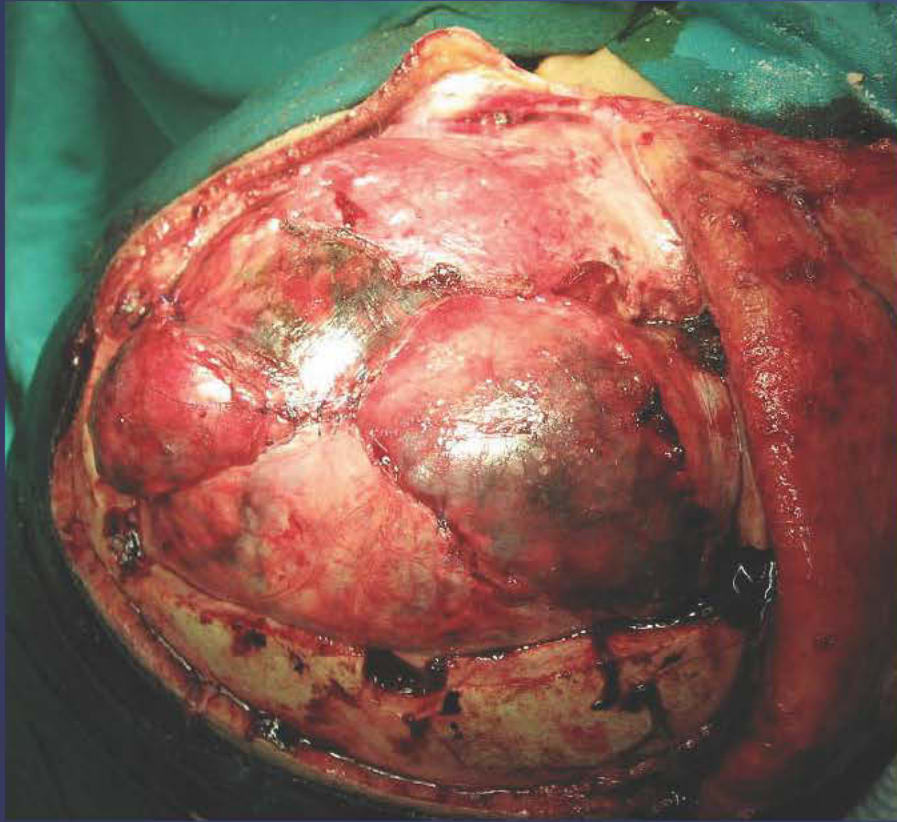




Doulat, 2007

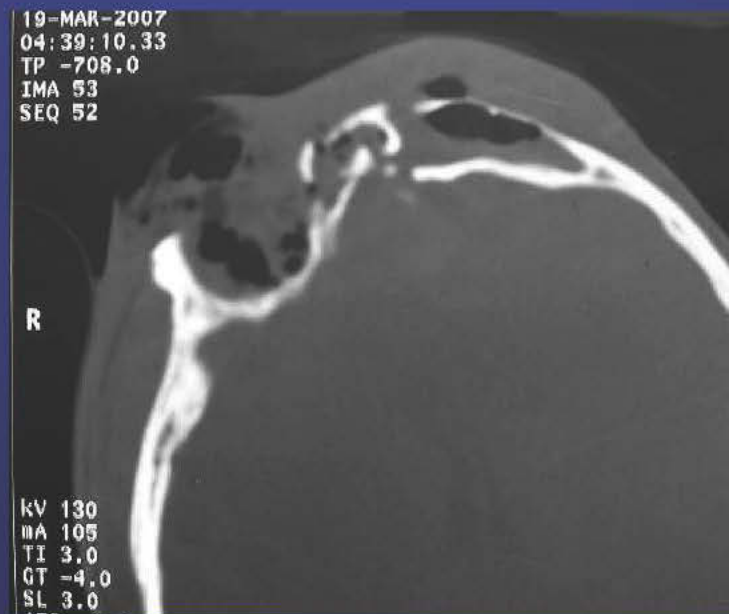
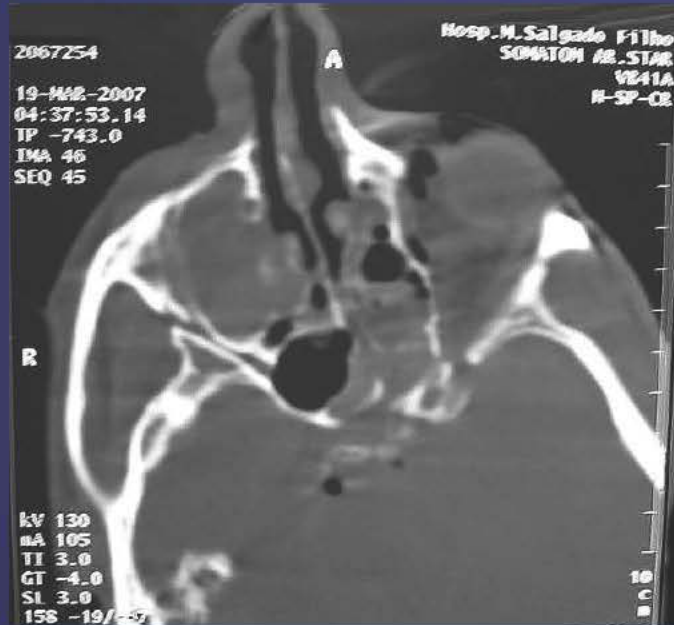








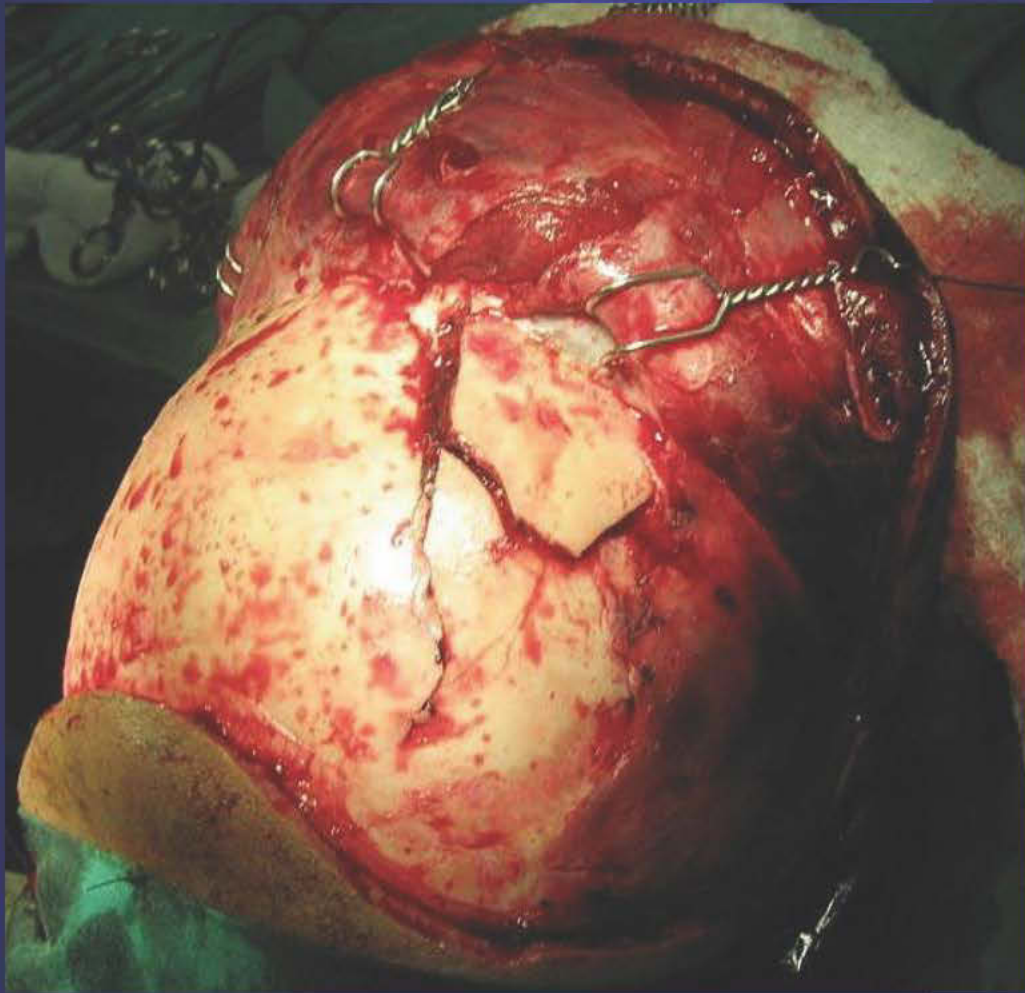
## Fratura Base Anterior + [Tumefação > HSDA > HED]



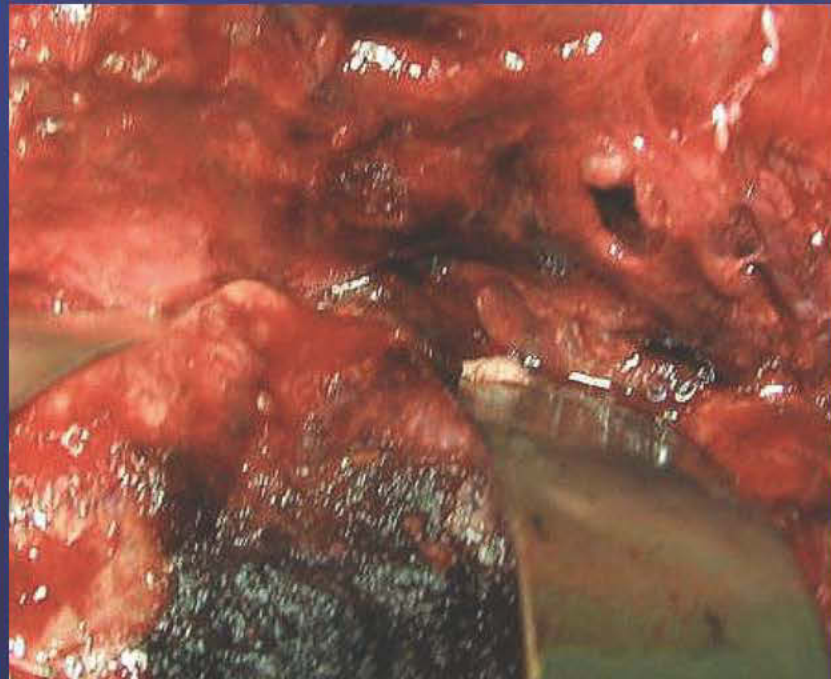
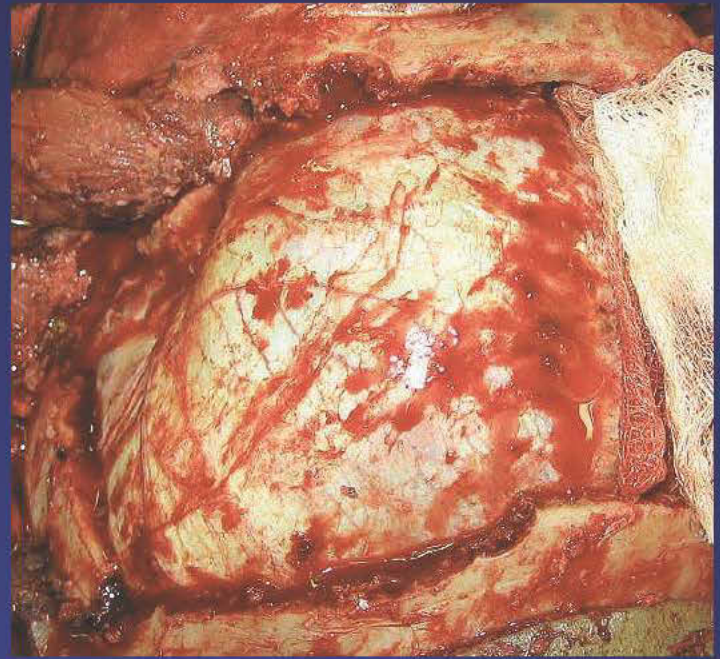
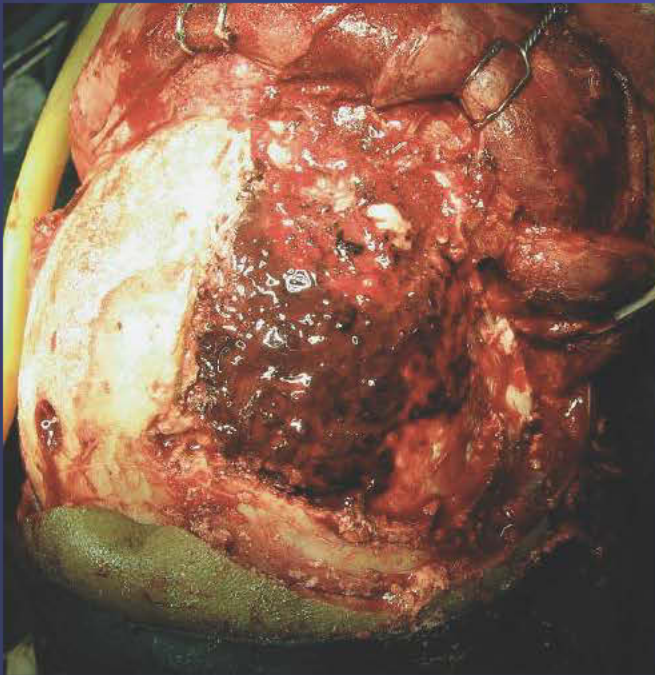


≠





Doutel, 2007

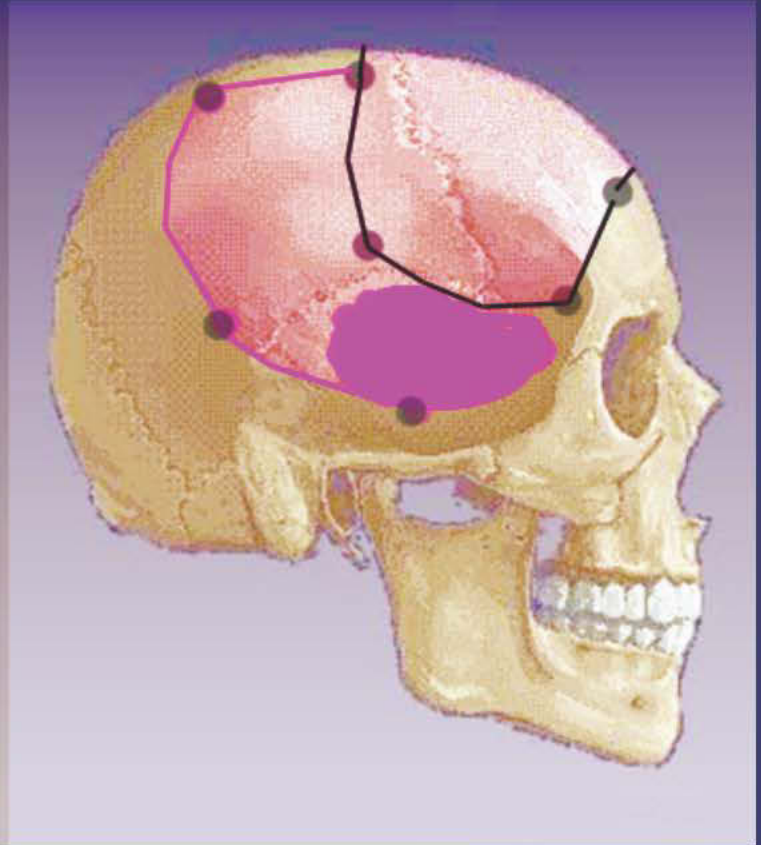
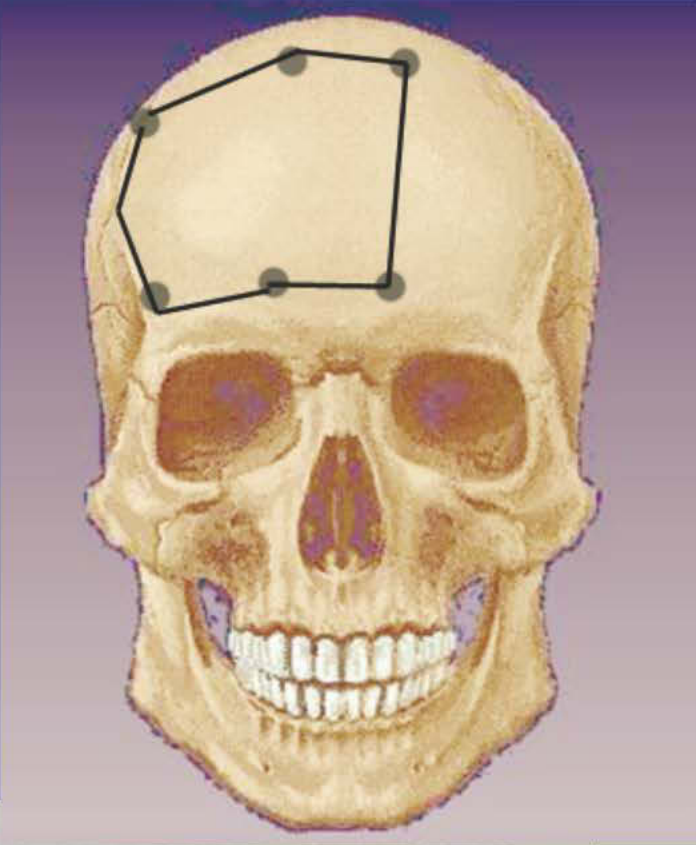






# C.D. "Terciária"





**A Principal Meta Cirúrgica é a redução da P.I.C.**

**A Perfusão Cerebral depende da Redução da P.I.C.**

**Deve-se identificar o que mais aumenta a P.I.C.**

**- Hematoma Extra / Intra-Axial**

**- Contusão / Hematoma Cerebral**

**- Tumefação Cerebral:**

**Focal**

**Hemisférica**

**Difusa**



# DERIVAÇÃO VENTRICULAR EXTERNA



# Referência

**MOHR e cols., 1983, 1986.**

“Mais importante do que a ocupação, parcial ou total, dos ventrículos cerebrais pela hemorragia dos aneurismas rotos, foi a avaliação do grau da dilatação das cavidades parenquimatosas intracranianas.”

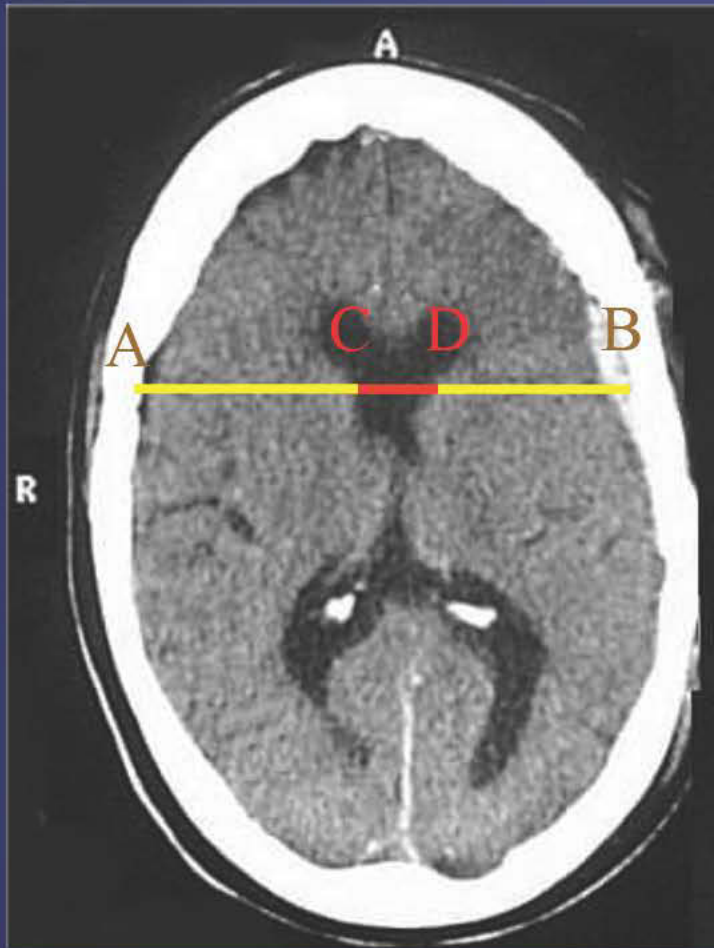
Propuseram o *Índice Bicaudado* para a avaliação do prognóstico dos pacientes com hemoventrículo.

O limite superior normal deste índice tomográfico é de 0.15.

Todos os pacientes que apresentaram Índice Bicaudado igual ou superior a 0.25 morreram.



# Índice de Mohr



$$\text{Índice Bicaudado} = \frac{CD}{AB}$$

Normal  $\leq 0.15$

# Objetivos

**Avaliar a importância do IM na urgência da Hidrocefalia Aguda**

**Correlacionar os valores desse Índice com os resultados obtidos**

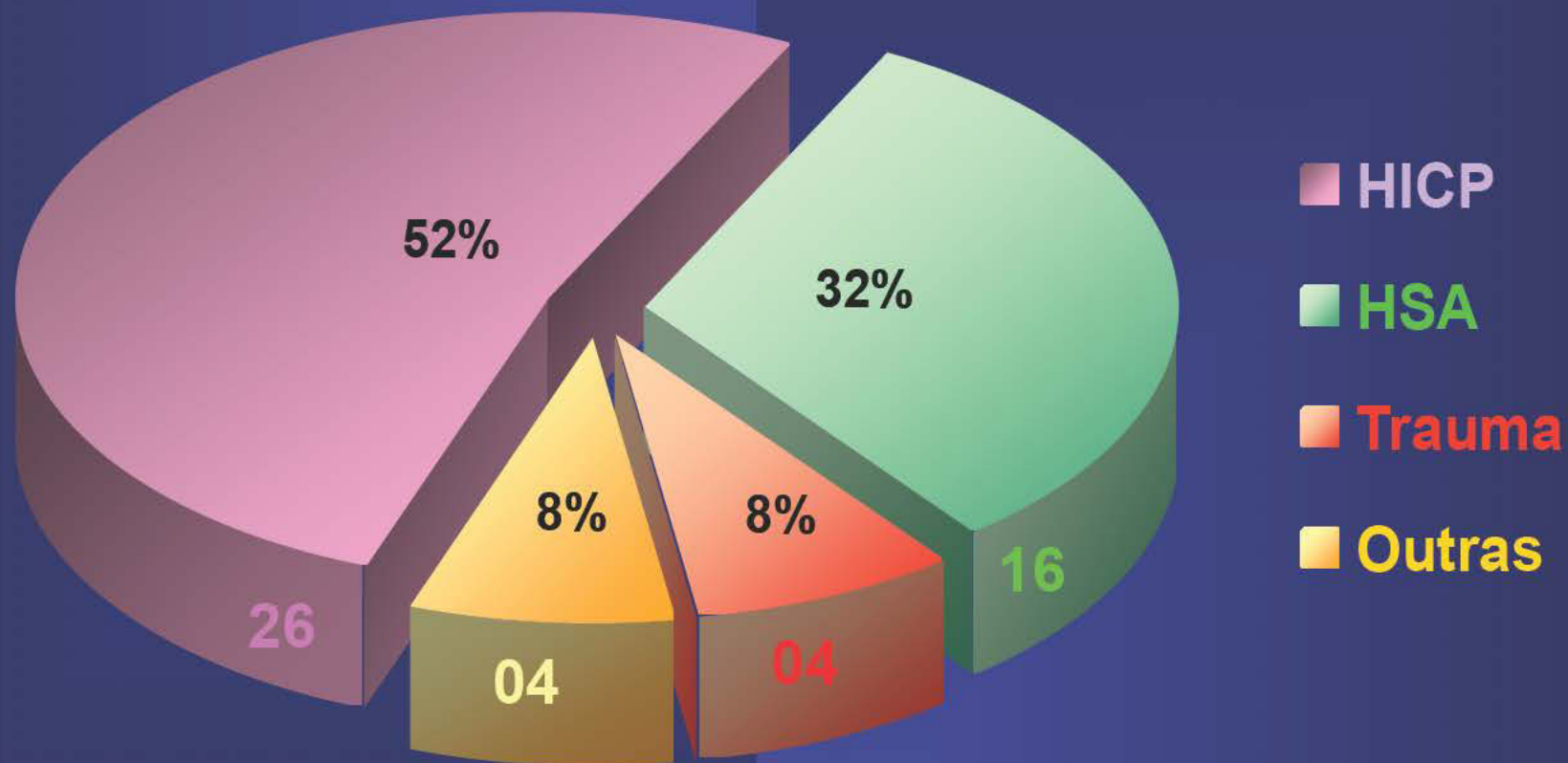
**Obter um rápido e confiável parâmetro para escolha do  
tratamento**

**Propor o método que permita proporcionar melhor prognóstico**





# Etiologia



# Critérios do Estudo

Hidrocefalia até 72 h

D.V.E. com M / P.I.C.

Divisão em 3 faixas de aumento ventricular

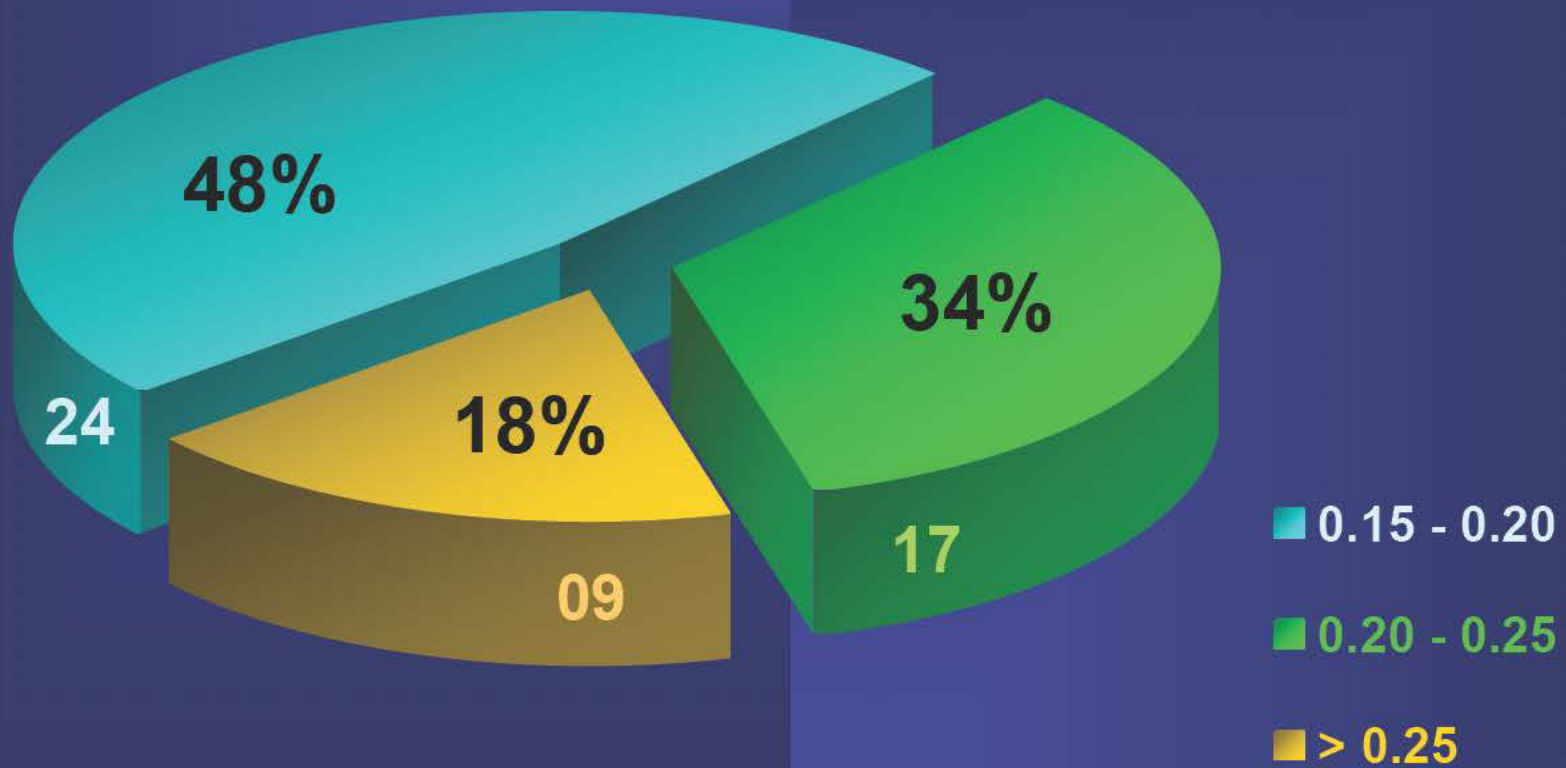
0.15 a 0.20

0.20 a 0.25

$\geq 0.25$

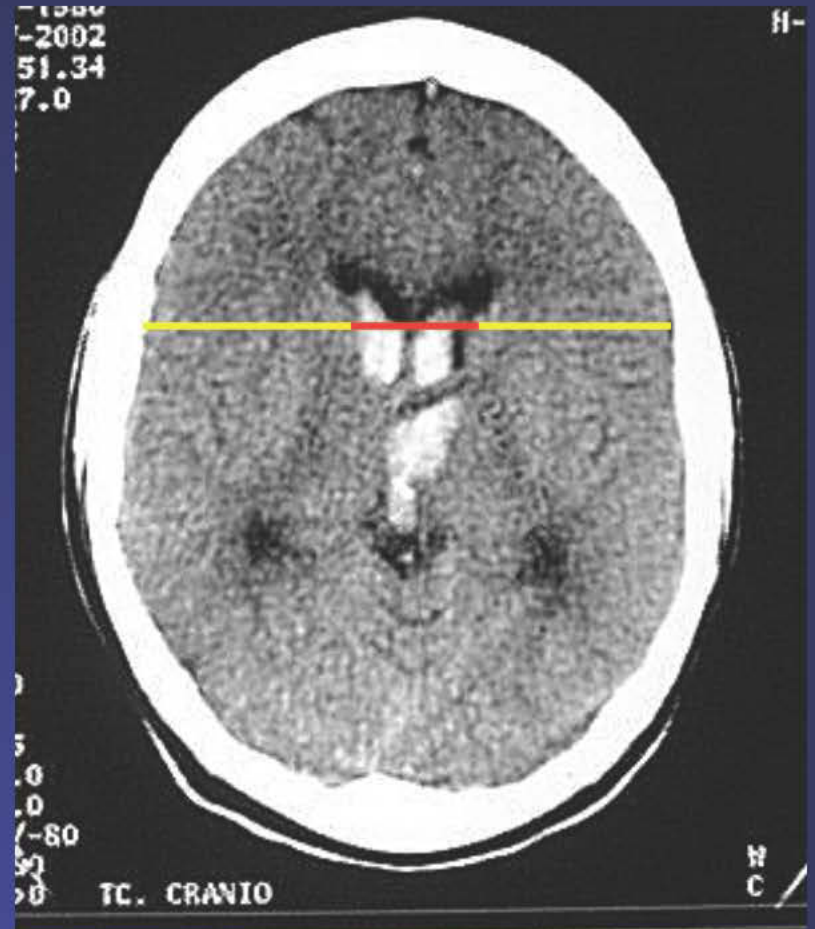
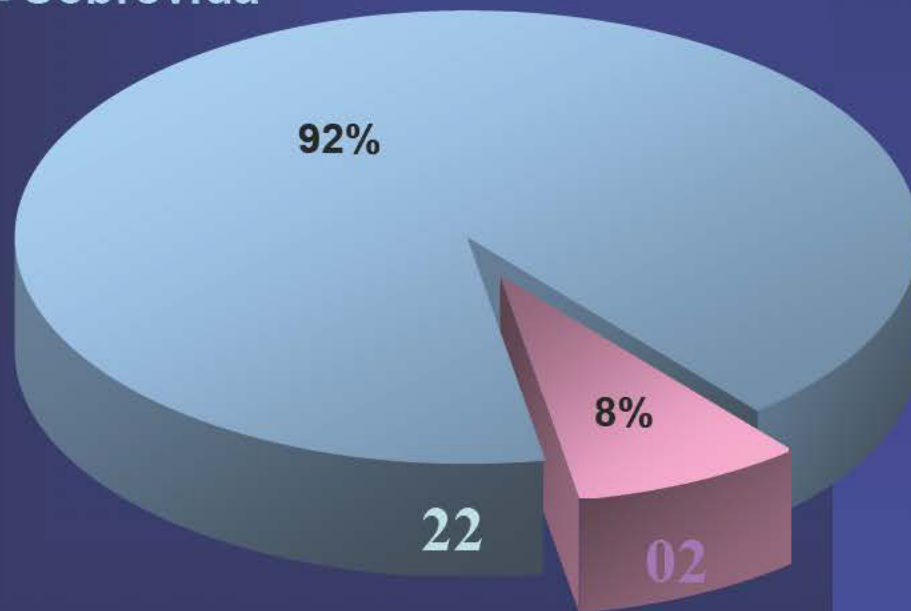


# Casuística



0.15 - 0.20 - 24 Casos

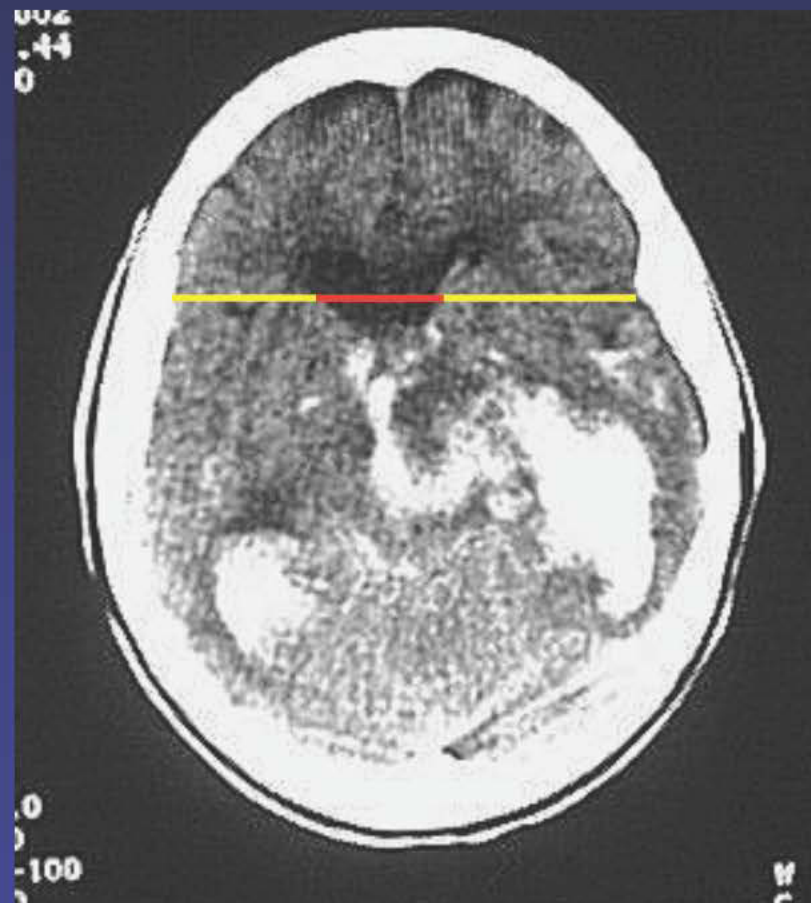
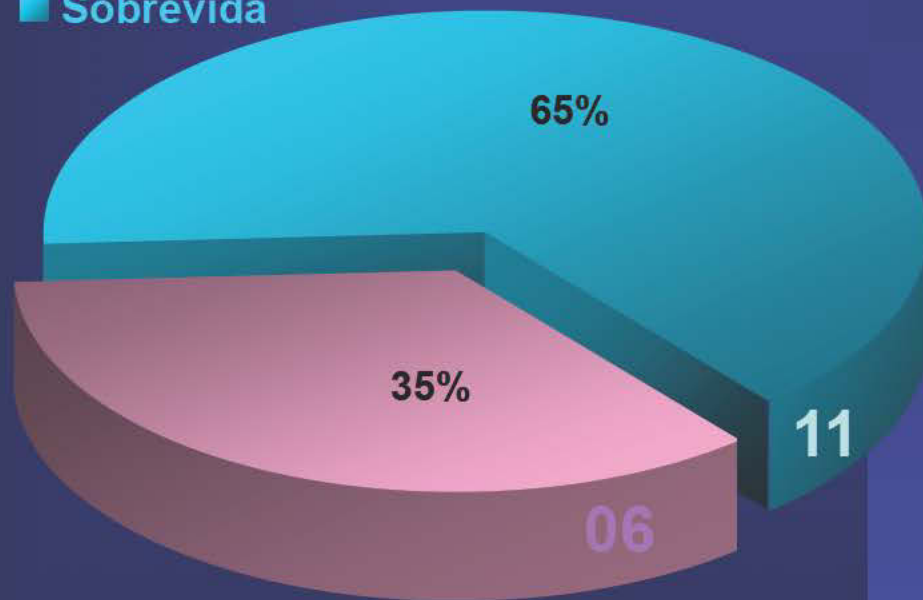
- Óbitos
- Sobrevida



# 0.20 - 0.25 - 17 Casos

■ Óbitos

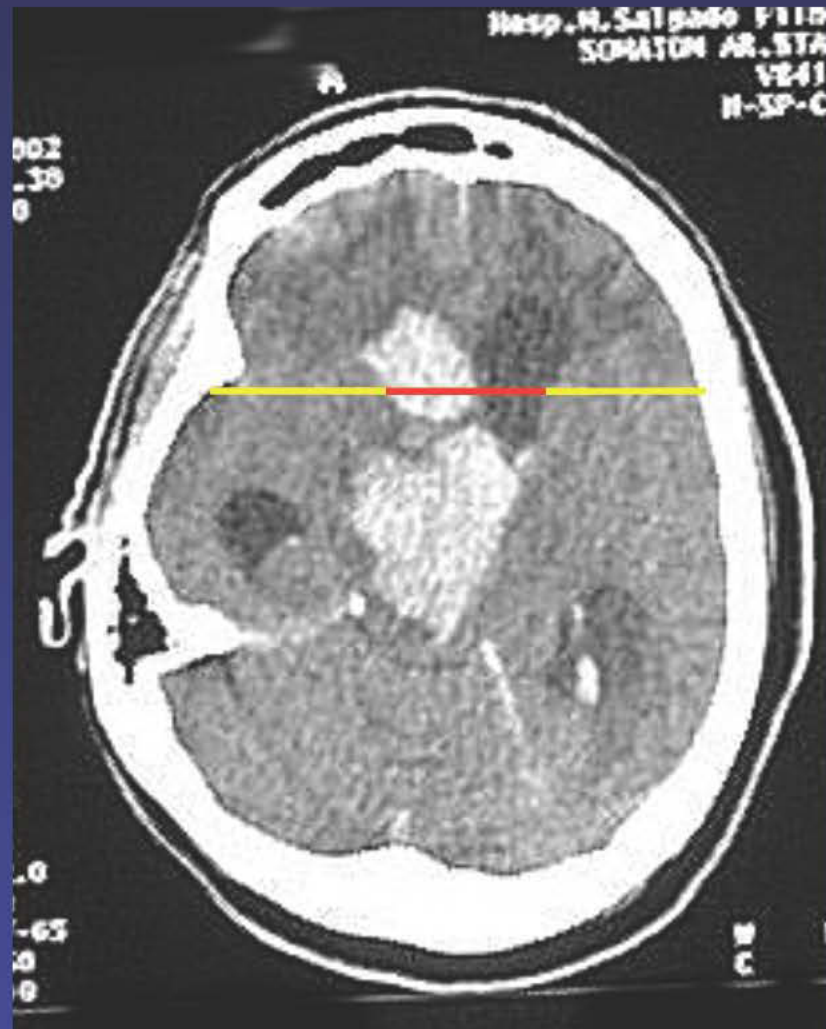
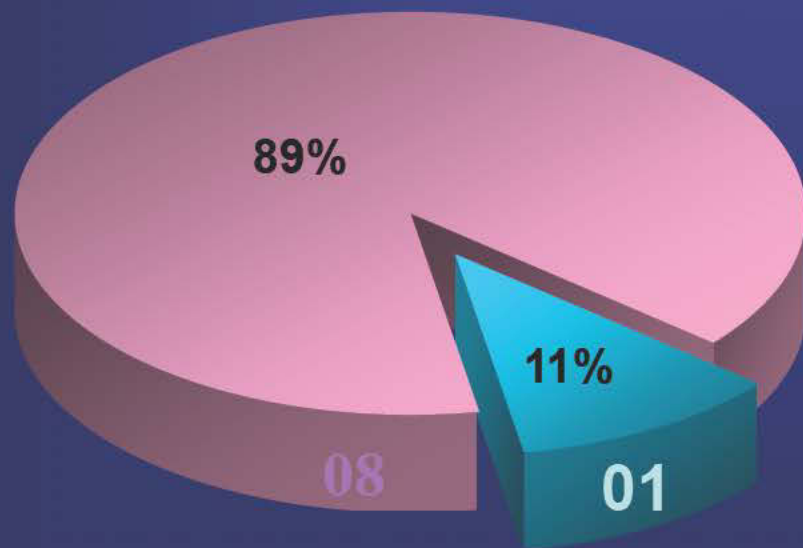
■ Sobrevida



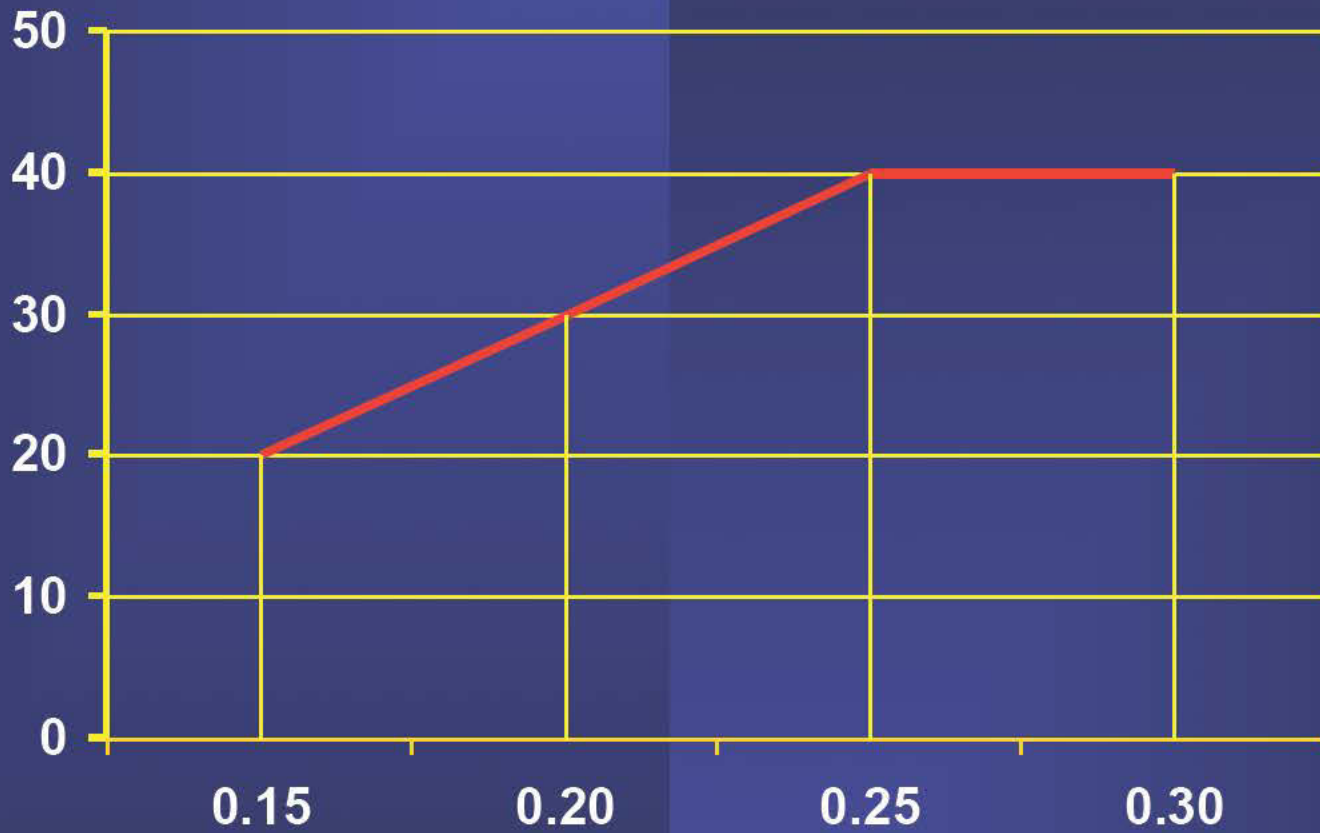
$\geq 0.25$  - 09 Casos

■ Óbitos

■ Sobrevida

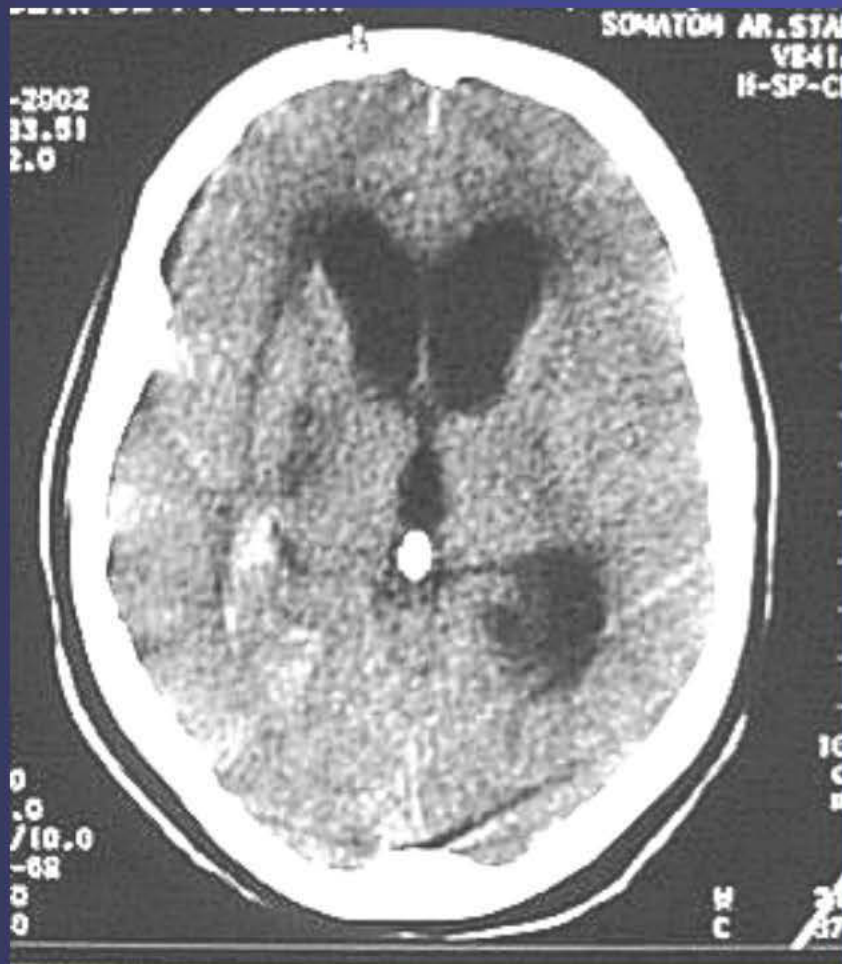


**P.I.C.**  
mmHg

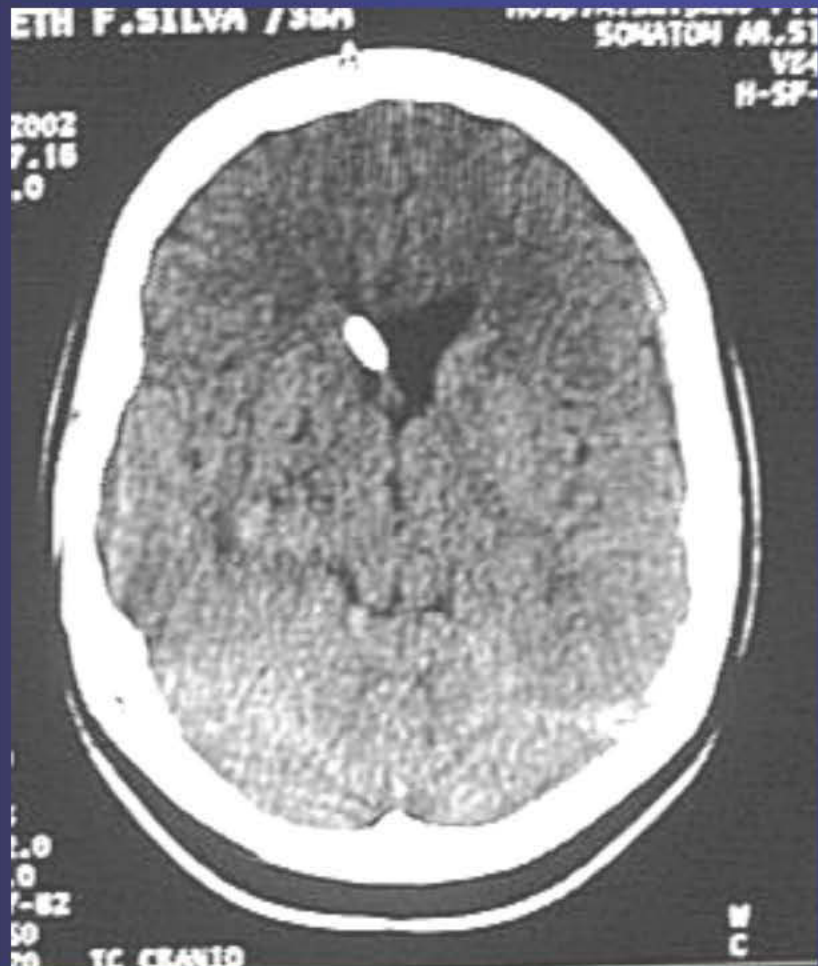


**Índice Bicaudado**









## Conclusões:

1. O IM não é isoladamente indicador de cirurgia.
2. O IM fornece expectativa prognóstica.
3. O IM importa para se expressar a Hidrocefalia.
4. A Tríade Tomográfica se baseia em:

a - Índice de Mohr

b - Sulcos Corticais

c - Cisternas Basais



Plantonista

Chefia  
do Serviço  
de Neurocirurgia

Seu nome  
está aqui  
inscrito  
no livro  
de visitas  
do Hospital

Salão de Espera

