



# CEGUERA CORTICAL POSTOPERATORIA TRAS LOBECTOMIA SUPERIOR DERECHA

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Rev Esp Anestesiol Reanim. 2012;59(3):157-61

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Societat Catalana d'Anestesiologia, Reanimació i Terapèutica del Dolor  
(SCARTD)

# Cas Clínic

- Dona
- 60 anys.
- Sd. Tòxica 8 mesos
- Programa PDTR
- Nòdul LSD PER TC
- Broncoscòpia negativa
- Neoplàsia pulmonar LSD

Malaltia actual



- Sobrepès lleu (IMC 26).
- Tabaquisme
- Hipertensió arterial
- Dislipèmia
- Diabetes Mellitus tipus 2
- IAM inferoposterolateral subagut antic.

Antecedents



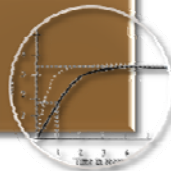
- VE lleugerament hipertròfic
- Discreta Hipocinèsia inferoapical i posterior
- Contractilitat global conservada
- Insuficiència mitral lleugera.

Ecocardiografia



- FVC 96%
- FEV<sub>1</sub> 90%
- FEV<sub>1</sub>/FVC 69%
- PB negativa.

PFR



- AAS 100 mg/d,
- Simvastatina 10 mg/d,
- Glibenclàmida 15 mg/d,
- Metformina 2.550 mg/d
- Valsartan/hidroclortiazida 160/25 mg/d
- Amlodipino 10 mg/d.

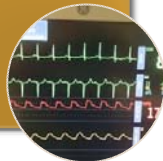
Medicació



# Intraoperatori

- Electrocardiograma (ECG)
- Pressió arterial invasiva (PAI)
- Pulsioximetria (SpO<sub>2</sub>)
- EtCO<sub>2</sub>
- Diuresis horària
- PVC
- Gasometries seriades i glucèmia

## Monitorització



- Premedicació: Midazolam 2 mg
- Inducció: Fentanil 2,5 µg/kg, Propofol 2 mg/kg, Atracuri 0,6 mg/kg
- Manteniment: propofol a 6 ml/Kg/h, i bolus de fentanil i atracuri.
- ALR: catèter paravertebral 12 ml de bupivacaina 0,5% (60 mg).

## Maneig farmacològic



- CORMACK 1
- Intubació selectiva
- TET de doble llum esquerre 37
- Broncho-part® (Rush, Kernen, Alemanya).

## TET



- Respirador Servo® (Maquet, Solna, Suècia)
- VCV, corba de flux quadrada, Relació I:E 1:2
- Vt de 8ml/kg i FR de 12
- FiO<sub>2</sub> d'1, PEEP de 8 cm H<sub>2</sub>O.

## Ventilació



- Vt de 6ml/kg,
- FR de 15,
- PEEP de 8 cm H<sub>2</sub>O, FiO<sub>2</sub> 1
- No requereix altres teràpies d'oxigenació.

## VUP

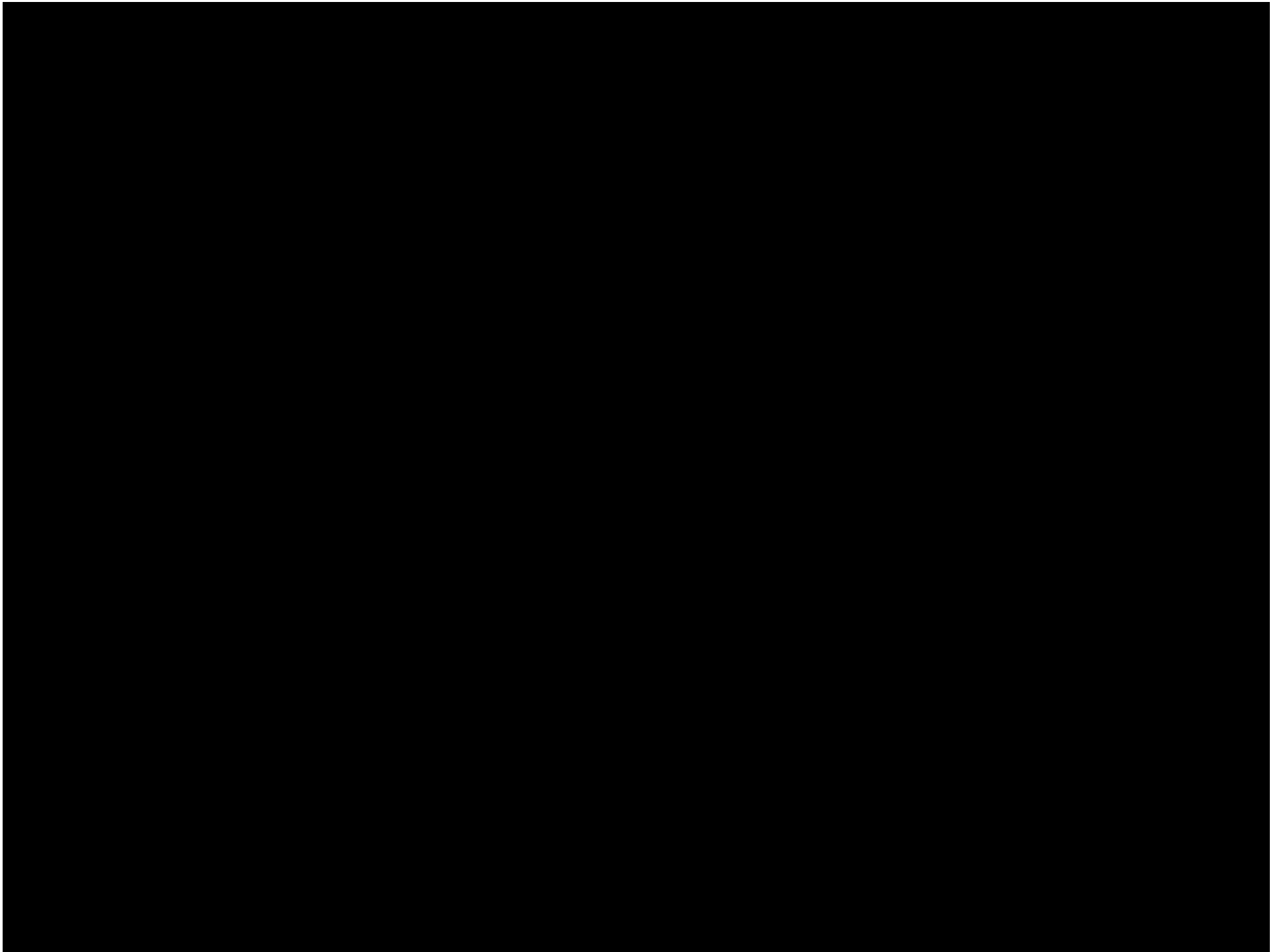


- Lobectomia Superior Dreta
- Decúbit lateral esquerre
- Duració 140 minuts
- Sense incidències tècniques
- Estabilitat clínica en tot moment.
- Extubació al quiròfan.

## Cirurgia



# Postoperatori



# PÈRDUA DE VISIÓ EN EL POSTOPERATORI



# Epidemiologia

Complicació rara  
(0,01 a 1%)

Conseqüències  
devastadores

Cirurgies d'alt risc

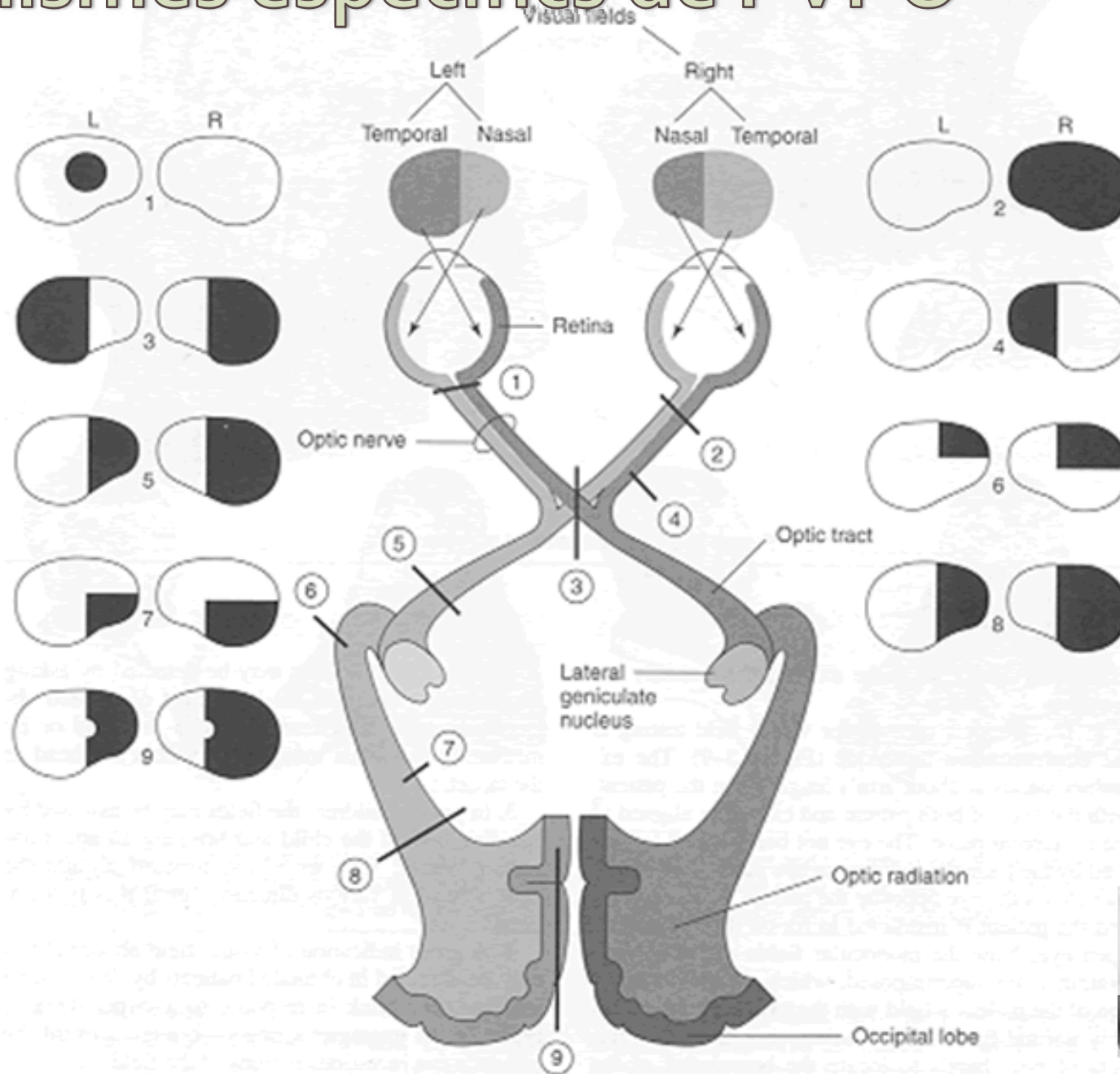
Afectació de  
qualsevol porció  
de les vies  
òptiques

Infart cerebral  
extremadament  
rar

Ignorància

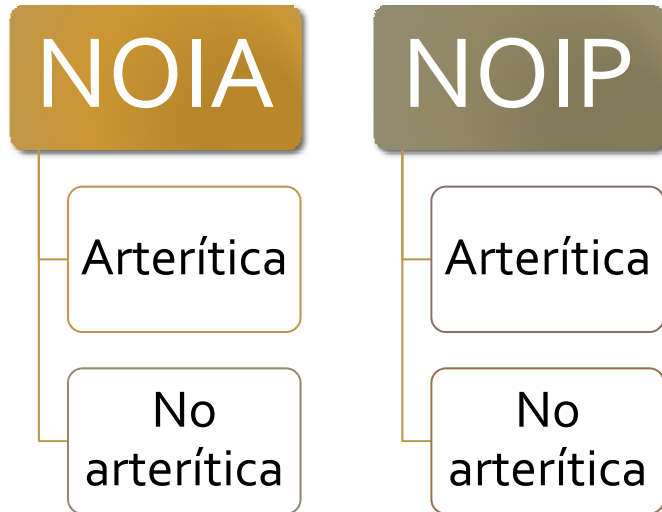


# Mecanismes específics de PVPO





# Neuropatia òptica isquèmica



CARDIACA  
ESPINAL  
CAP I COLL  
NASSAL

## Fisiopatologia controvertida

- Informació expenses casos clínics
- NOIA vs NOIP

## Factors de risc

- Hipotensió
- Hemorràgia
- Hemodinàmia venosa (PIO)
- Vasopressors
- Hemorràgia retrobulbar
- FRCV
- Malaltia cerebrovascular prèvia



# Neuropatia òptica isquèmica

Anesthesiology 2009; 110:246-53

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## Perioperative Ischemic Optic Neuropathy

### A Case Control Analysis of 126,666 Surgical Procedures at a Single Institution

Sarah E. Holy, M.D.,\* Jonathan H. Tsai, M.D.,\* Russell K. McAllister, M.D.,† Kyle H. Smith, M.D.‡

**Table 3. Incidence of Perioperative ION**

Type of Surgery	AION Cases	PION Cases	Total ION
CABG (n = 2,749)	7 (0.25%)	2 (0.07%)	9 (0.33%)
Spine surgery (n = 1,110)	1 (0.09%)	3 (0.27%)	4 (0.36%)
Other surgery (n = 122,807)	—	4 (0.003%)	4 (0.003%)
<b>Total (n = 126,666)</b>	<b>8 (0.006%)</b>	<b>9 (0.007%)</b>	<b>17 (0.013%)</b>

AION = anterior ischemic optic neuropathy; CABG = coronary artery bypass graft; ION = ischemic optic neuropathy; PION = posterior ischemic optic neuropathy.

**Table 4. All ION Patients and Controls**

Preoperative Variables	Patients (n = 17)	Controls (n = 34)	P Value*	Odds Ratio	95% CI	
Age	65.8 ± 8.6	64.4 ± 6.7	N/A	N/A	—	—
Body mass index†	30.6 ± 5.5	29.8 ± 6.3	0.6088	1.028	0.925	1.142
Medical history						
Diabetes	4 (23.5)	7 (20.6)	0.8138	1.179	0.300	4.631
Smoking‡	11 (64.7)	20 (58.8)	0.6556	1.356	0.356	5.171
Hypertension	14 (82.4)	19 (55.9)	0.0791	3.386	0.868	13.208
Coronary artery disease	11 (64.7)	20 (58.8)	0.4292	2.732	0.226	33.003
Myocardial infarction	4 (23.5)	9 (26.5)	0.8232	0.859	0.227	3.251
Stroke	1 (5.9)	5 (14.7)	0.3106	0.295	0.028	3.120
Renal disease	0 (0.0)	0 (0.0)	N/A	N/A	—	—
Hyperlipidemia	10 (58.8)	17 (50.0)	0.5419	1.459	0.433	4.917
Mean arterial pressure§	97.5 ± 8.5	100.4 ± 8.8	0.2705	0.959	0.891	1.033
Hematocrit	41.7 ± 4.3	42.2 ± 3.4	0.6248	0.960	0.814	1.132
Disc-at-risk	9/14 (60.0)	10/20 (50.0)	0.4243	1.794	0.428	7.520
Disc-at-risk with missing imputed as "yes"	12 (70.6)	24 (70.6)	1.0000	1.000	0.301	3.321
Disc-at-risk with missing imputed as "no"	9 (52.9)	10 (29.4)	0.1270	2.611	0.761	8.956
Intraoperative variables						
Mean arterial pressure						
Lowest	56.4 ± 11.1	55.3 ± 14.3	0.7717	1.008	0.957	1.062
Change from preop	-41.1 ± 13.8	-44.8 ± 15.7	0.3212	1.027	0.975	1.082
% Change from preop	-41.8 ± 12.4	-44.5 ± 14.3	0.4203	1.023	0.967	1.083
Duration (in min)	15.9 ± 28.4	7.0 ± 4.7	0.1919	1.070	0.967	1.184
Hematocrit	25.8 ± 4.8	23.4 ± 2.9	0.3223	—	—	—
Lowest	-18.3 ± 4.2	-17.2 ± 3.7	0.3063	1.164	0.861	1.574
Change from preop	-41.6 ± 9.5	-42.1 ± 7.6	0.7043	0.895	0.723	1.107
% Change from preop	—	—	—	0.982	0.894	1.078
Blood products administered	6 (35.3)	9 (26.5)	0.4285	1.877	0.395	8.922
Blood loss amount	880.0 ± 882.6	800.0 ± 979.7	0.5946	1.000	0.999	1.001
Lowest temperature	30.8 ± 2.4	30.0 ± 2.0	0.4431	1.161	0.793	1.701
Surgery time (in h)	4.8 ± 2.7	4.3 ± 2.1	0.3055	1.217	0.836	1.770
Vasopressors	14 (82.35%)	24 (70.59%)	0.2968	2.500	0.447	13.982
Postoperative variables						
Mean arterial pressure						
Lowest	62.1 ± 14.0	69.8 ± 11.1	0.0723	0.950	0.898	1.005
Change from preop	-35.3 ± 17.7	-30.6 ± 13.6	0.3179	0.980	0.943	1.019
% Change from preop	-35.6 ± 15.8	-30.0 ± 12.2	0.2068	0.971	0.928	1.016
Duration (in min)	27.6 ± 26.8	26.2 ± 40.0	0.8942	1.001	0.986	1.016
Hematocrit						
Lowest	25.9 ± 4.0	28.6 ± 5.2	0.1061	0.872	0.739	1.030
Change from preop	-15.7 ± 6.1	-13.4 ± 5.2	0.3005	0.940	0.835	1.057
% Change from preop	-37.0 ± 12.0	-31.8 ± 11.5	0.2532	0.966	0.912	1.025
Blood products administered	10 (58.8)	15 (44.1)	0.3315	1.793	0.552	5.822

# Neuropatia òptica isquèmica

## Risk Factors for Ischemic Optic Neuropathy After Cardiopulmonary Bypass: A Matched Case/Control Study

(Anesth Analg 2001;93:1410–6)

Gregory A. Nuttall, MD\*, James A. Garrity, MD†, Joseph A. Dearani, MD‡, Martin D. Abel, MD\*, Darrell R. Schroeder, MS§, and Charles J. Mullany, MB, MS‡

Departments of \*Anesthesiology, †Ophthalmology, and ‡Surgery, Mayo Graduate School of Medicine, Rochester, Minnesota; and §Department of Biostatistics, Mayo Clinic, Rochester, Minnesota

Table 1. Patient and Procedural Characteristics

Characteristic	Controls (n = 34)	Cases (n = 17)	P value <sup>a</sup>
Age (yr)	61 ± 20	65 ± 8	NS
Male sex	24 (71)	12 (71)	NS
Body mass index (kg/m <sup>2</sup> )	25.1 ± 4.8	27.4 ± 5.1	NS
Preoperative NYHA class ≥3	32 (94)	12 (71)	NS
Coronary artery disease	23 (68)	13 (76)	NS
Valve defect	15 (44)	3 (18)	NS
Diabetes	8 (24)	5 (29)	NS
Hypertension	24 (71)	15 (88)	NS
Current/former smoker	24 (71)	13 (76)	NS
Clinically severe vascular disease	3 (9)	8 (47)	0.012
β-blocker use	13 (38)	8 (47)	NS
Asprin use	11 (32)	8 (47)	NS
Warfarin use	1 (3)	2 (12)	NS
Hgb (g/dL)	13.6 ± 1.9	14.2 ± 1.5	NS
Total cholesterol (mg/dL)	220 ± 61	237 ± 44	NS
Creatinine (mg/dL)	1.3 ± 0.8	1.4 ± 0.7	NS
Previous cardiac surgery	6 (18)	5 (29)	NS
Preoperative angiogram ≤48 h	10 (29)	10 (59)	0.034
Ejection fraction (%)	59 ± 9	59 ± 13	NS



# Neuropatia òptica isquèmica

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Type of procedure			NS
Valve only	9 (26)	1 (6)	
CABG ± valve	22 (65)	12 (71)	
Other	3 (9)	4 (24)	
Highest pre-CPB systolic blood pressure (mm Hg)	155 ± 30	168 ± 37	NS
Highest pre-CPB diastolic blood pressure (mm Hg)	75 ± 14	85 ± 17	NS
Lowest pre-CPB systolic blood pressure (mm Hg)	89 ± 12	90 ± 16	NS
Lowest pre-CPB diastolic blood pressure (mm Hg)	52 ± 11	51 ± 11	NS
Highest post-CPB systolic blood pressure (mm Hg)	129 ± 16	132 ± 23	NS
Highest post-CPB diastolic blood pressure (mm Hg)	64 ± 13	70 ± 15	NS
Lowest post-CPB systolic blood pressure (mm Hg)	85 ± 14	80 ± 13	NS
Lowest post-CPB diastolic blood pressure (mm Hg)	49 ± 11	47 ± 7	NS
CPB time (min)	101 ± 47	146 ± 65	0.026
Cross-clamp time (min)	58 ± 27	61 ± 24	NS
Lowest intraoperative Hgb (g/dL)	8.2 ± 1.4	7.6 ± 1.4	NS
Lowest intraoperative Pao <sub>2</sub> (mm Hg)	150 ± 101	137 ± 57	NS
Lowest intraoperative % saturation	96 ± 1	94 ± 7	NS
Lowest intraoperative glucose (mg/dL)	102 ± 33	148 ± 92	NS
Highest intraoperative glucose (mg/dL)	164 ± 64	199 ± 90	NS
RBC units transfused	3.8 ± 1.7	7.1 ± 4.8	0.014
Any non-RBC transfused	8 (24)	10 (59)	0.028
Lowest CO (L/min)	4.4 ± 1.1	5.3 ± 2.5	NS
Highest CO (L/min)	7.4 ± 2.2	7.8 ± 2.5	NS
Lowest postoperative Hgb (g/dL)	8.8 ± 1.5	7.7 ± 1.1	0.022
Any perioperative circulatory support	26 (76)	11 (65)	NS



# Neuropatia òptica isquèmica

## Risk Factors Associated with Ischemic Optic Neuropathy after Spinal Fusion Surgery

Anesthesiology 2012; 116:15-24

The Postoperative Visual Loss Study Group\*

### What We Already Know about This Topic

- Visual loss after spinal fusion surgery is a devastating complication most commonly caused by ischemic optic neuropathy (ION)
- The risk factors for ION after spinal fusion surgery have not been systematically evaluated with detailed perioperative data

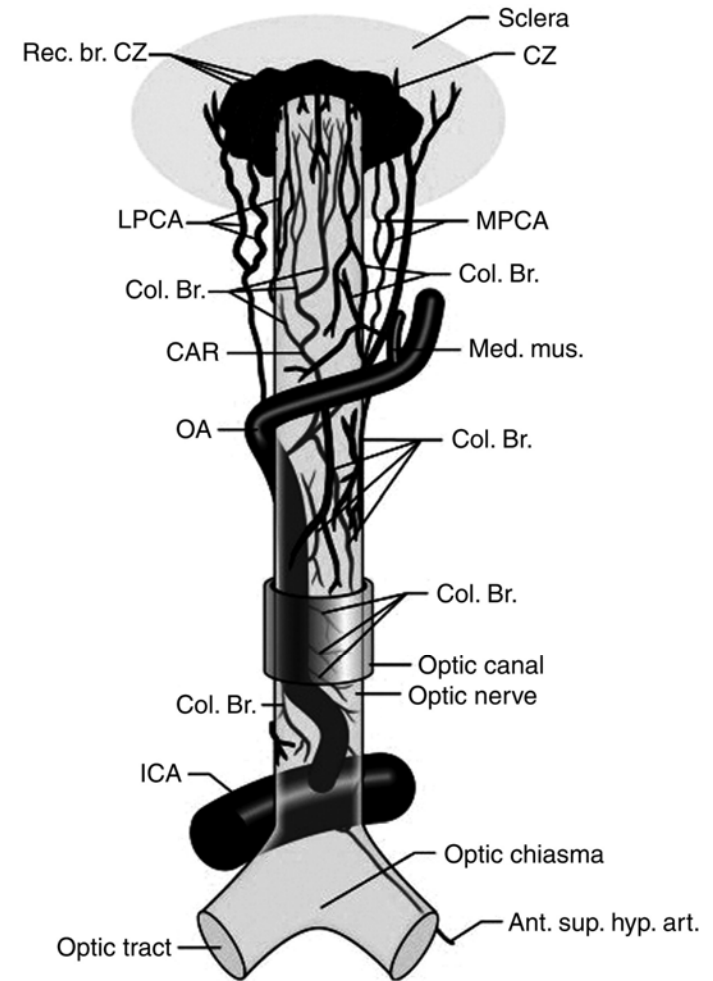
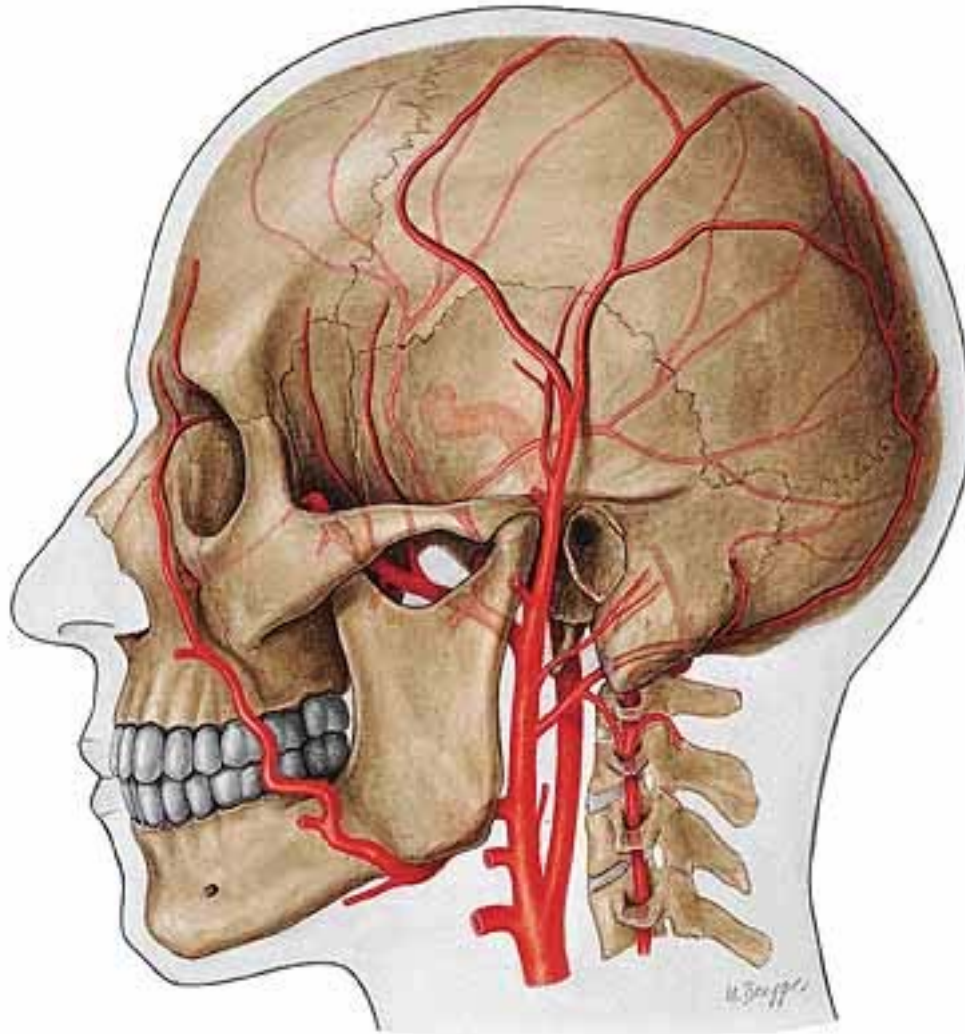
### What This Article Tells Us That Is New

- In a case-control examination of 80 patients with ION compared with 315 matched control subjects, independent risk factors were male sex, obesity, Wilson frame use, longer anesthetic duration, greater estimated blood loss, and lower percent colloid administration

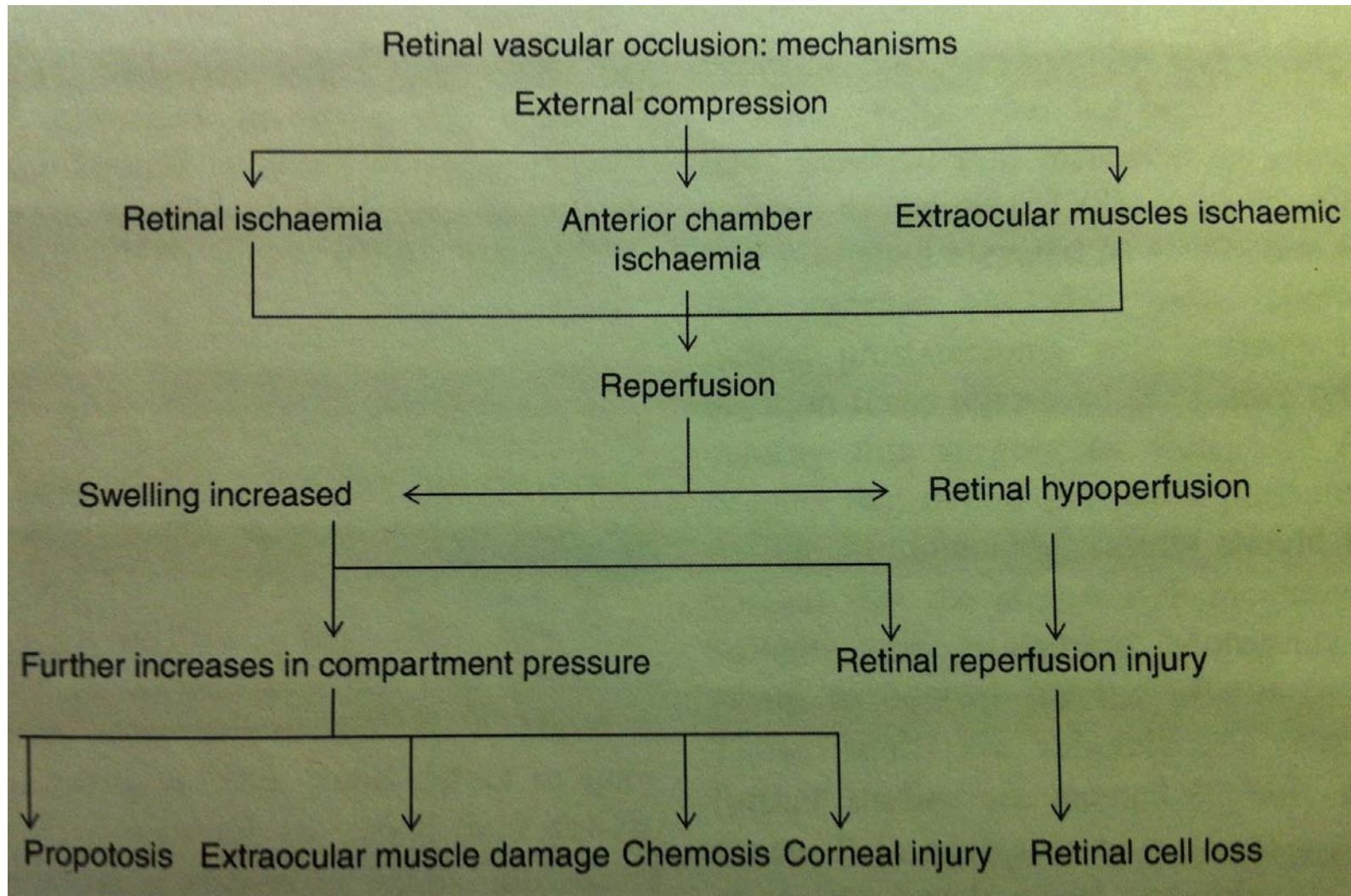
**Results:** After multivariate analysis, risk factors for ION after spinal fusion surgery included male sex (odds ratio [OR] 2.53, 95% CI 1.35–4.91,  $P = 0.005$ ), obesity (OR 2.83, 95% CI 1.52–5.39,  $P = 0.001$ ), Wilson frame use (OR 4.30, 95% CI 2.13–8.75,  $P < 0.001$ ), anesthesia duration (OR per 1 h = 1.39, 95% CI 1.22–1.58,  $P < 0.001$ ), estimated blood loss (OR per 1 l = 1.34, 95% CI 1.13–1.61,  $P = 0.001$ ), and colloid as percent of nonblood replacement (OR per 5% = 0.67, 95% CI 0.52–0.82,  $P < 0.001$ ). After cross-validation, area under the curve = 0.85, sensitivity = 0.79, and specificity = 0.82.



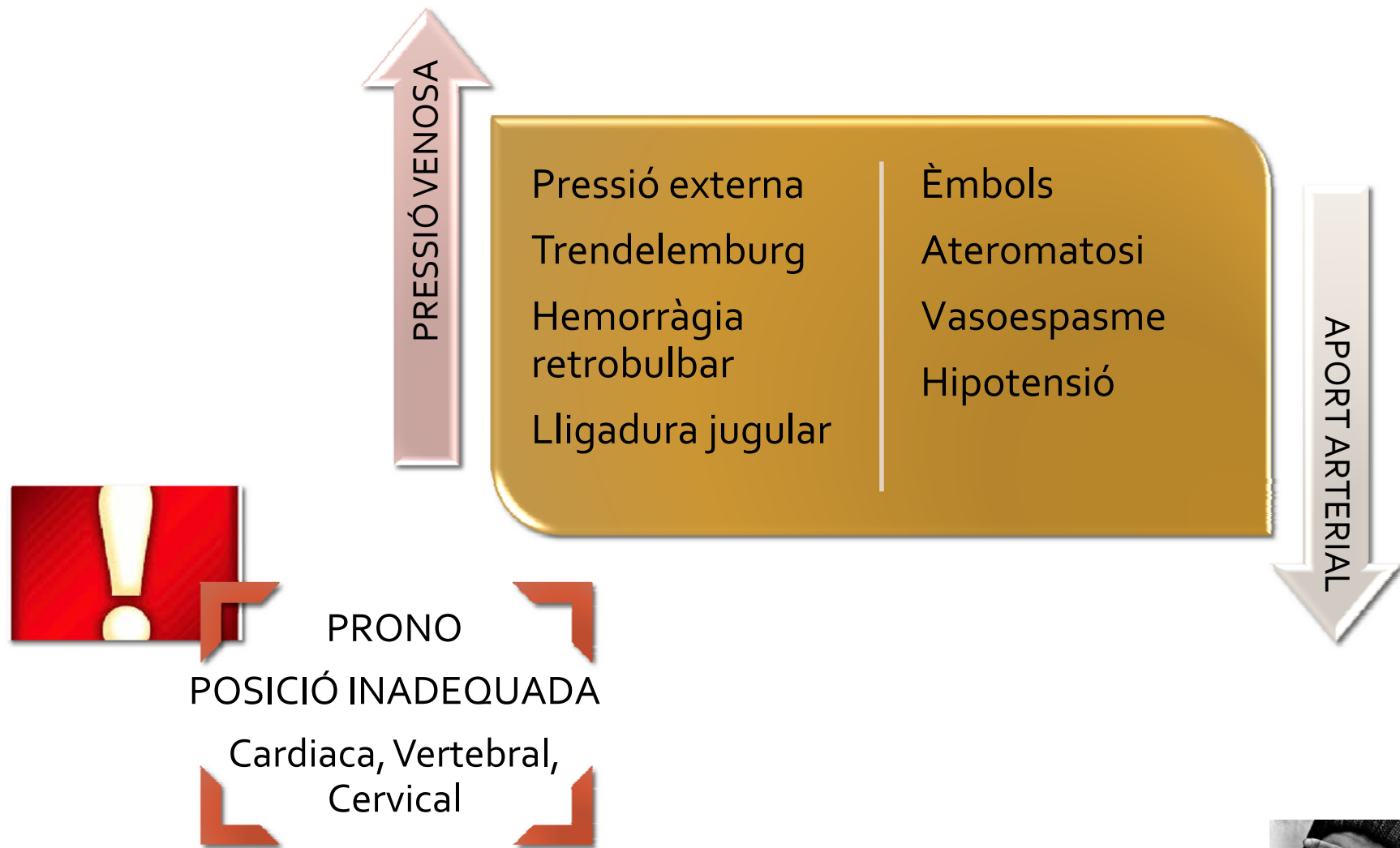
# Isquèmia retiniana: OACR



# Isquèmia retiniana: OACR



# Isquèmia retiniana: OACR





# Isquèmia retiniana

Anesthesiology 2006; 104:1319-28

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## ***Practice Advisory for Perioperative Visual Loss Associated with Spine Surgery***

*A Report by the American Society of Anesthesiologists Task Force on Perioperative Blindness*

**Table 1. Summary of the Advisory**

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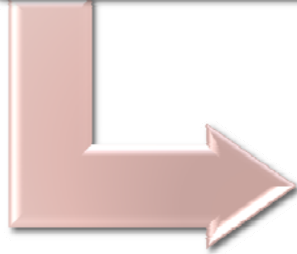
- There is a subset of patients who undergo spine procedures while they are positioned prone and receiving general anesthesia that has an increased risk for development of perioperative visual loss. This subset includes patients who are anticipated preoperatively to undergo procedures that are prolonged, have substantial blood loss, or both (high-risk patients).
- Consider informing high-risk patients that there is a small, unpredictable risk of perioperative visual loss.
- The use of deliberate hypotensive techniques during spine surgery has not been shown to be associated with the development of perioperative visual loss.
- Colloids should be used along with crystalloids to maintain intravascular volume in patients who have substantial blood loss.
- At this time, there is no apparent transfusion threshold that would eliminate the risk of perioperative visual loss related to anemia.
- High-risk patients should be positioned so that their heads are level with or higher than the heart when possible. In addition, their heads should be maintained in a neutral forward position (*e.g.*, without significant neck flexion, extension, lateral flexion, or rotation) when possible.
- Consideration should be given to the use of staged spine procedures in high-risk patients.



# Cas Clínic

Ceguera bilateral

- Amaurosi bilateral
- Sense altres símptomes acompanyants



Descartem dèficit fictici

- Anestèsia residual
- Alteracions psiquiàtriques

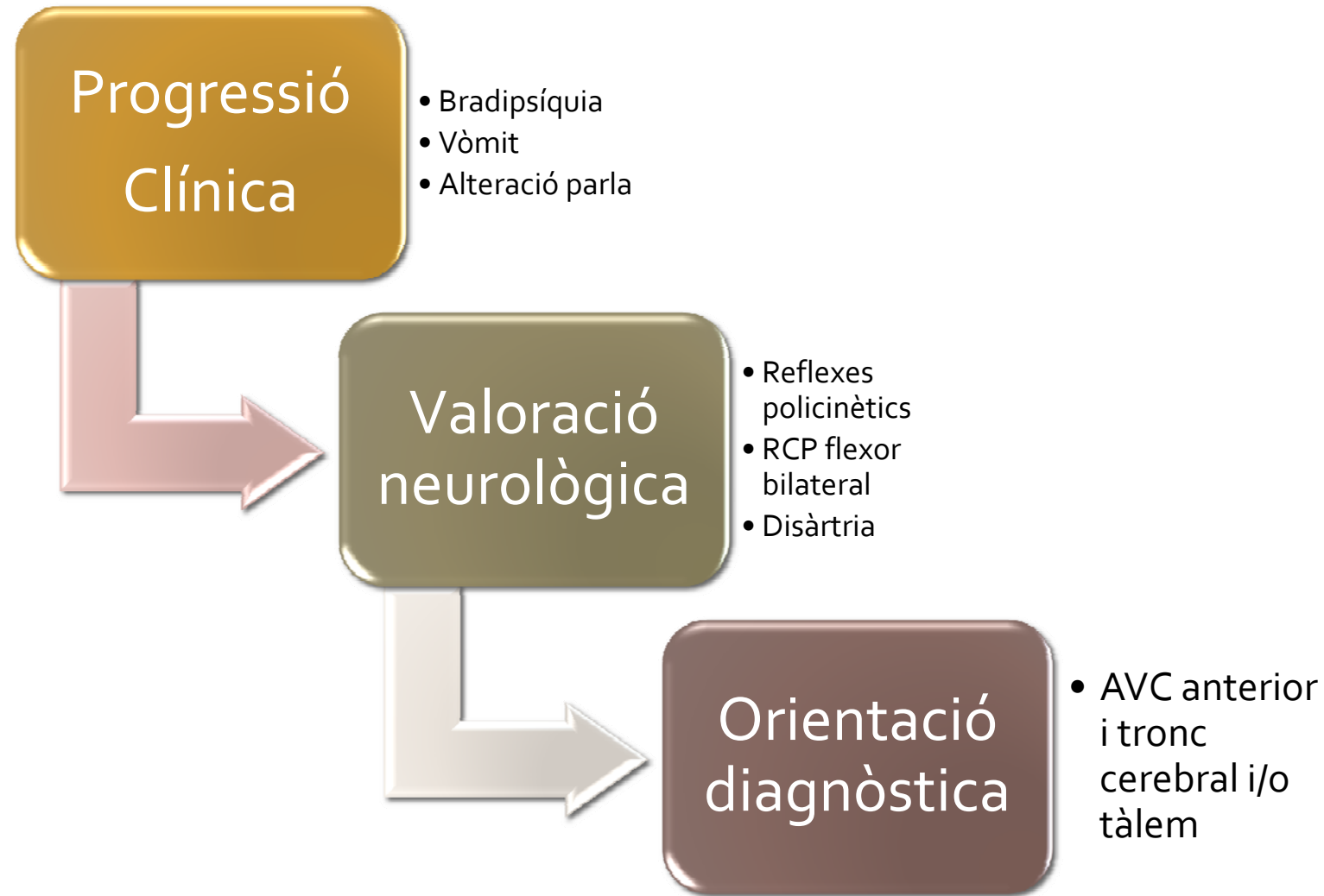


Descartem alteració oftalmològica

- Reflex fotomotor normal
- Fons d'ull normal
- No reflex amenaça



# Cas Clínic



# Ceguera cortical

## Epidemiologia

Poc freqüent

80% cirurgia cardíaca i toràcica

## Diagnòstic

Neuroimatge

Font embolígena

## Clínica

PV bilateral

Absència de nistagmus optocinètic

Absència reflex amenaça

Normalitat motilitat, NO i retina

Signes AVC

## Pronòstic

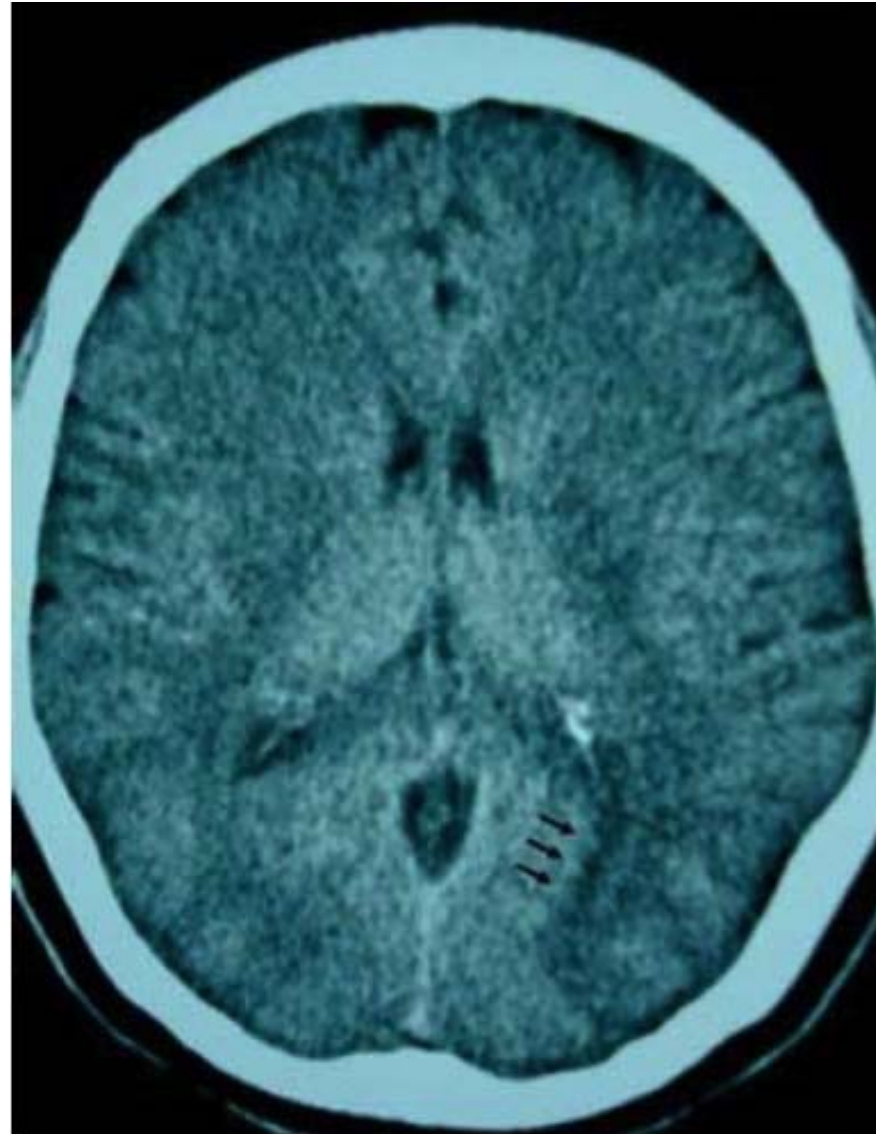
Milloria amb el temps

Defectes campimètrics incomplets

Percepció visual (mides, distàncies)



# Cas Clínic



**Figura 1** Tomografía computarizada craneal simple, corte axial a nivel de astas occipitales de los ventrículos laterales. Hipodensidad subcortical en zona posterior izquierda.



# Sd Leucoencefalopatia Posterior Reversible

## CLÍNICA

- **Aguda/subaguda**
- Alteració consciència
- Encefalopatia
- Cefalea
- Vòmits
- Convulsions
- Alteracions de la visió (ceguera cortical)

## RADIOLÒGIC

- **Regions posteriors**
- TC: baixa atenuació bilateral i simètrica
- RM: hiperintensitat amb T2.
- FLAIR: millor evidència
- Altres tècniques RM: difusió ponderada o mapes de coeficient de difusió aparent

Hipertensió

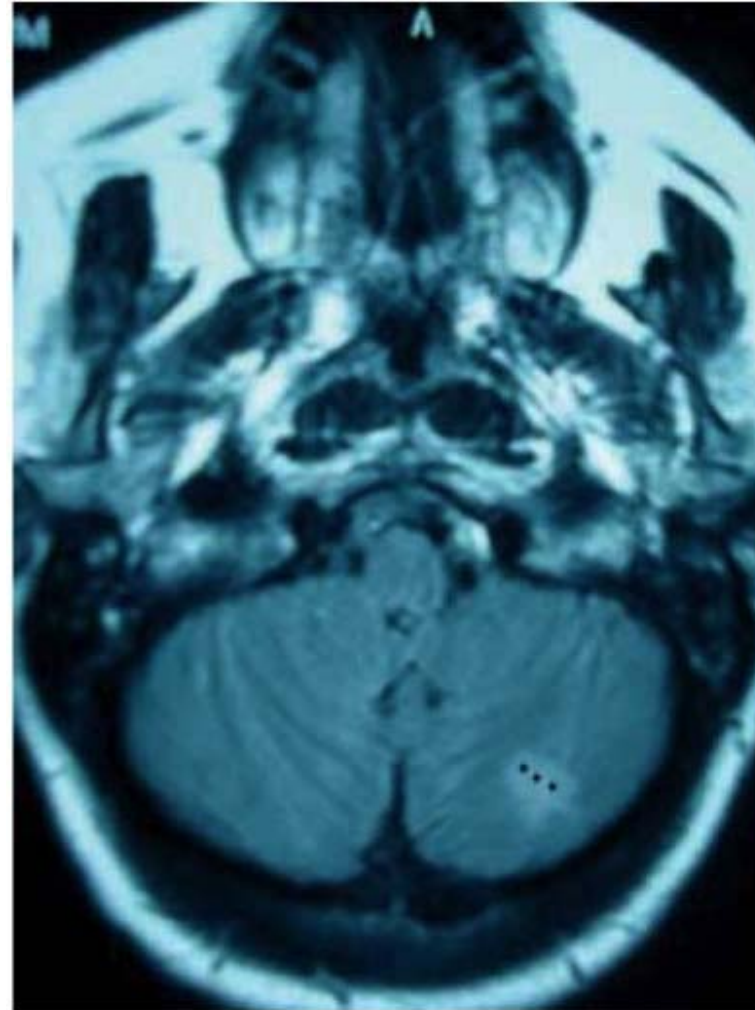
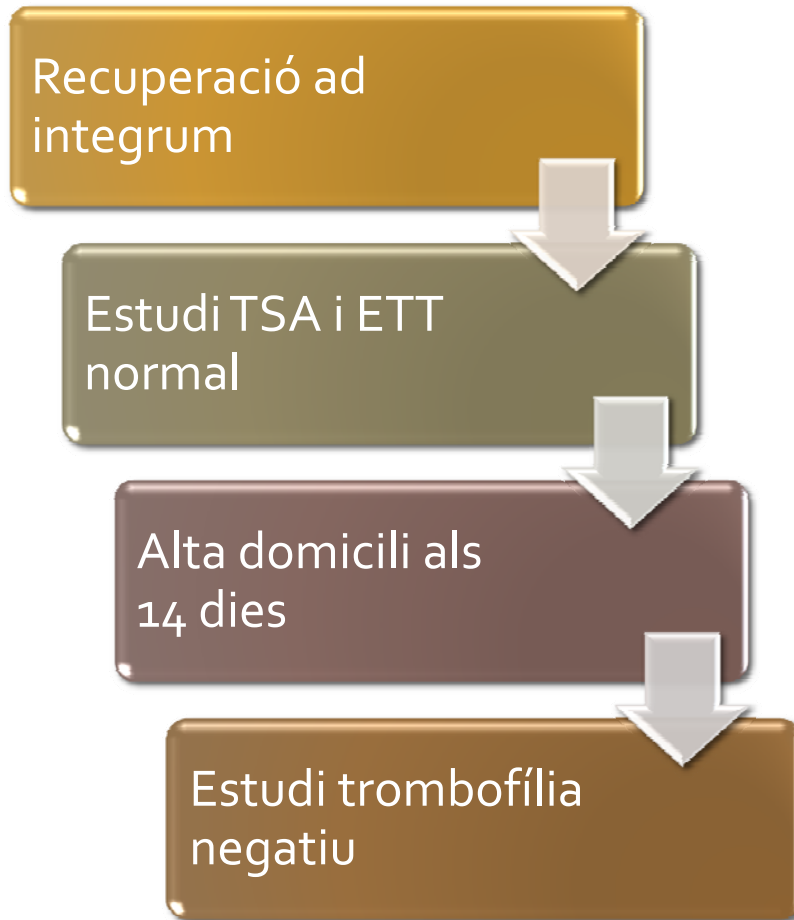
Fallida Renal

QT/IS

Malaltia immune



# Cas Clínic



**Figura 2** Resonancia magnética, secuencia FLAIR. Corte axial que muestra infarto cerebeloso isquémico izquierdo.



# Diagnòstic diferencial

	NOIA	NOIP	OACR	SLPR	ACV
Disco òptic	Edema, hemorragia peripapilar	Normal	Normal. Quizà edema de papila	Normal	Normal
Retina	Normal	Normal	Màcula roja cereza, edema, èmbolo	Normal	Normal
Reflejo fotomotor	Ausente o DEPAR	Ausente o DEPAR	Ausente o DEPAR	Normal	Normal
Acomodaci3n	Normal	Normal	Alterada si compresi3n externa	Alterada	Alterada
Amenaza	Presente	Presente	Presente	Ausente	Ausente
Mùsculos oculomotores	Conservados	Conservados	Afectados segùn compresi3n externa	Conservados	Conservados
Nistagmo	Normal	Normal	Normal	Ausente	Ausente
Campimetría	Defecto altitudinal, escotoma	Defecto altitudinal, escotoma, ceguera	Disminuci3n agudeza visual	Variable	Hemianopsia, ceguera
Otros datos clínicos	Alteraci3n de los potenciales evocados visuales		Ptosis, proptosis, abracci3n corneal, trauma orbicular	Alteraci3n de la conciencia, cefalea, convulsiones, v3mitos	Clínica de ictus cerebral
Factores de riesgo	Arteritis; no arterítica (cirugía cardiotorácica, espinal, cabeza y cuello)	Arteritis; no arterítica (cirugía de espalda)	Compresi3n externa del ojo (cirugía en prono); aumento PIO (cirugía de cuello, nasal o sinusal, ligadura vena yugular, anestesia retrobulbar); microémbolos (cirugía cardiaca)	HTA, preeclampsia, eclampsia, HELLP, inmunosupresi3n, insuficiencia renal aguda o cr3nica, fármacos citot3xicos	FRCV



# Altres causes

Malaltia arterítica

- NOI

Glaucoma agut

Intoxicacions

- Glicina (sd. TURP), CO, Pb, OH, antibiòtics

Ceguera fictícia

- Trastorn conversiu, simulacions

Crisis comicials, migranya, EM

Punció dural (alteració PPCCs)

Èmbol gasós N<sub>2</sub>O



# Conclusions

## Optic Nerve Injury: Role of the Anesthesiologist?

Identificació de pacient de risc PVPO

Mesures fisiològiques

Identificació precoç de PVPO

Diagnòstic diferencial. Multidisciplinar

Necessitat de més i millors estudis clínics



# Moltes gràcies



**Dra. MC Unzueta**, per la seva perseverància

**Dr. JM Bausili**, pel seu exemple

**Dra. N Montero**, pel seu suport impagable.