

SIDS

Autopsia: che cosa escludere ?

Ezio Fulcheri

SIDS

**è primariamente
una diagnosi di
ESCLUSIONE**

Tabella 3. Diagnosi differenziale della sindrome da morte improvvisa infantile

Aspirazione, asfissia, annegamento

Patologie cardiache (es. aritmie, alterazioni strutturali)

Alterazioni elettrolitiche o disidratazione

Difetti congeniti del metabolismo

Infezioni (es. meningite, sepsi, polmonite)

Avvelenamenti

Traumi

SIDS
è primariamente
una diagnosi di
ESCLUSIONE



Ipotesi di reato



Svariate cause patologiche

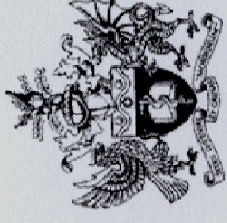
SIDS

**è primariamente
una diagnosi di**

ESCLUSIONE

**Livelli diagnostici
progressivi
per
raffinare le diagnosi**





The Royal College of Pathologists

Guidelines on Autopsy Practice

Scenario 8: Sudden unexpected deaths in infancy (SUDI)

The role of the autopsy

- To establish whether the death is attributable to a natural disease process (infection, metabolic disorder, congenital abnormalities).
- To consider the possibility of accidental death (trauma, poisoning, scalding, drowning).
- To consider the possibility of asphyxia/airway obstruction.
- To consider the possibility of non-accidental injury.
- To document the presence/absence of pathological processes and to contribute to the multidisciplinary clinicopathological evaluation of the death.

Note that these autopsy reports will be anonymously submitted to the Confidential Enquiry into Maternal and Child Health (CEMACH) in England and Wales, and in Scotland to SUDI case review conferences, coordinated by the Scottish Cot Death Trust.



M. VALDÉS-DAPENA

D. S. HUFF

MANUALE DELLE AUTOPSIE PERINATALI

Edizione italiana a cura di
Prof. V. TERRIBILE WIEL MARIN e Dott. R. SALMASO

PICCIN

**Si rendono necessari
protocolli specifici
che superino le normali
tecniche settorie
applicate in
patologia perinatale.**

**Causa mortis
e
segni della morte**

Il “come si muore” ed i “segni della morte” non devono rappresentare elementi confondenti le vere cause di morte vale a dire il “perchè è morto” .

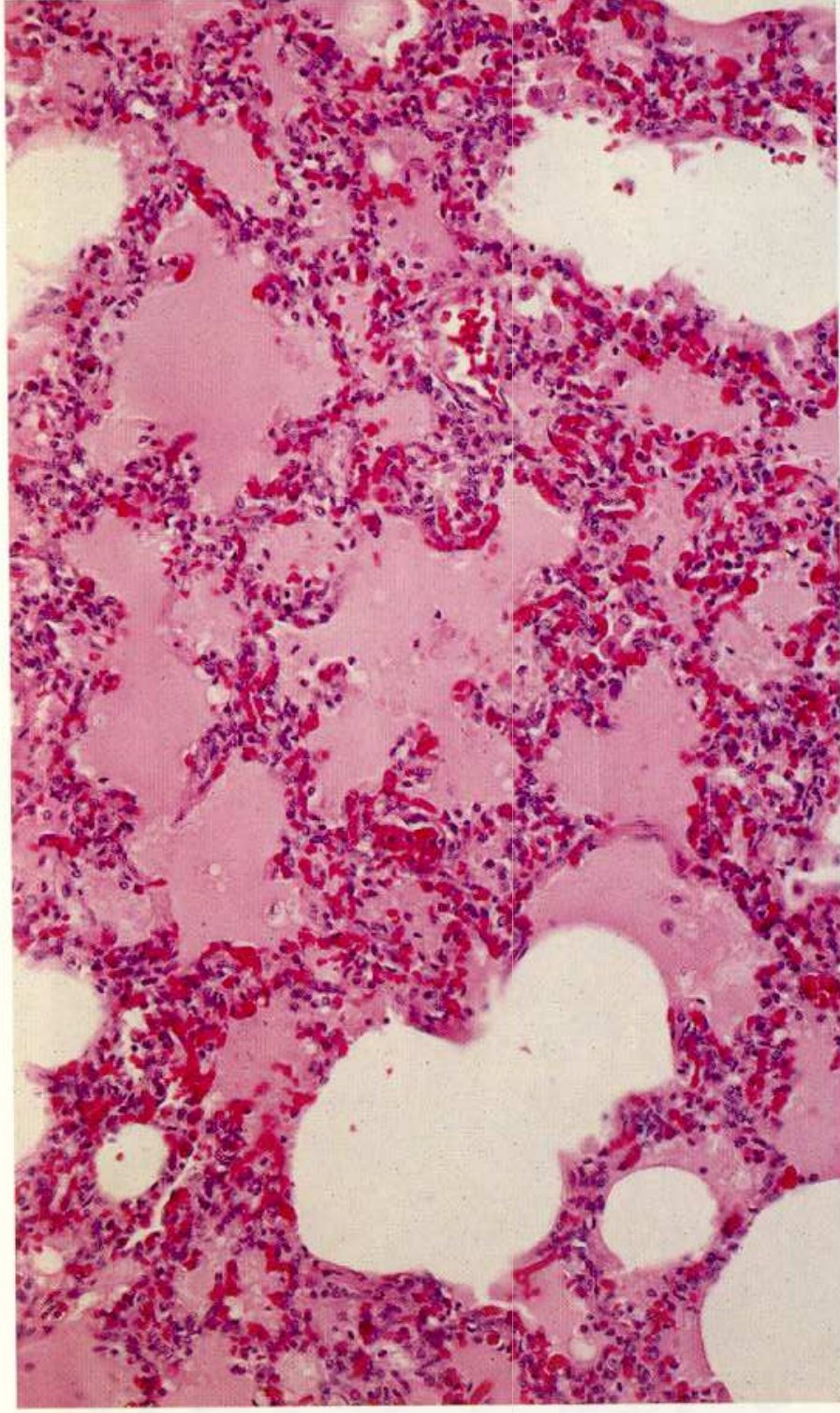


Figure 5-9. Pulmonary edema, moderate to marked. 160x

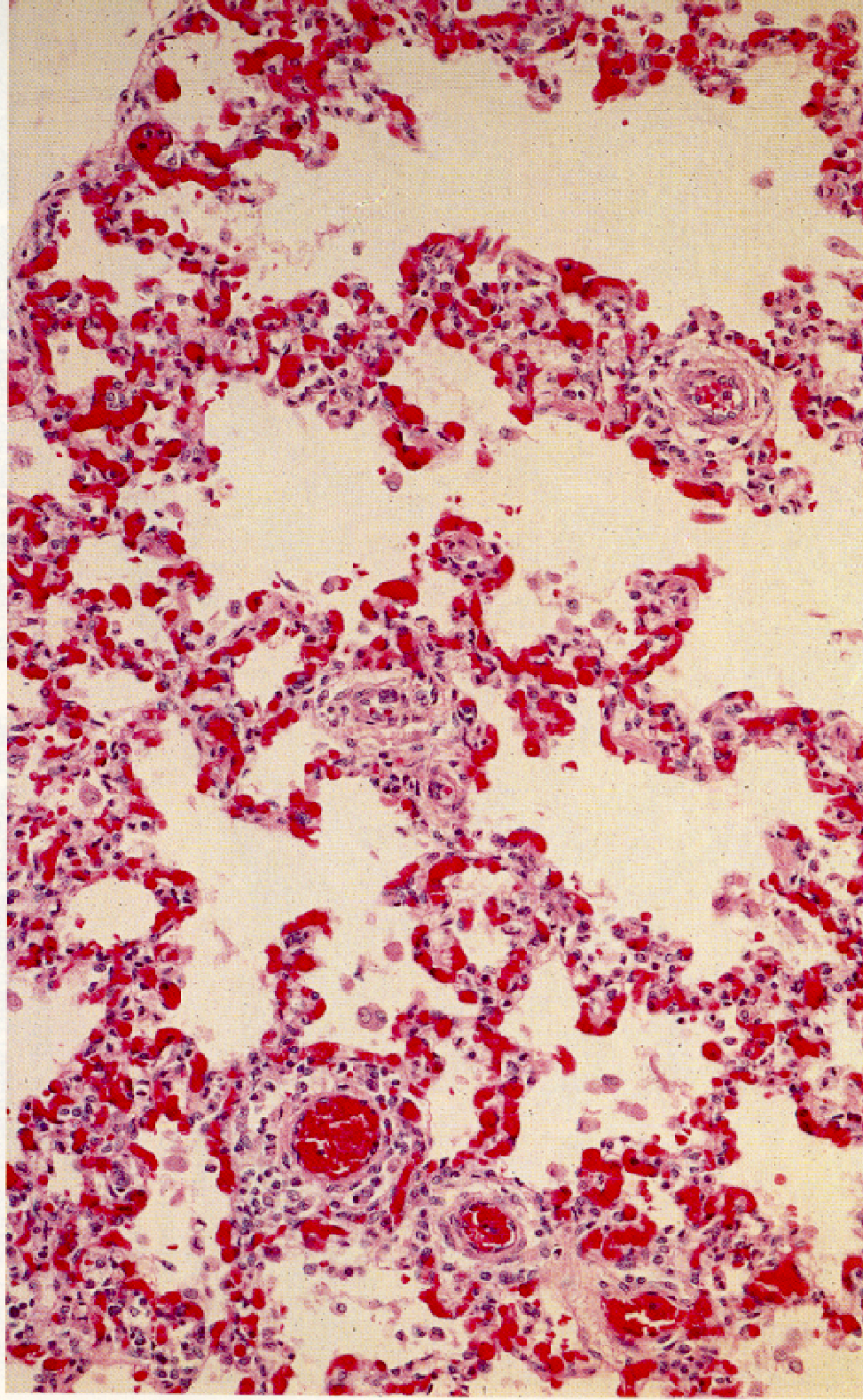


Figure 5-6. Pulmonary congestion of a mild to moderate degree. 160x

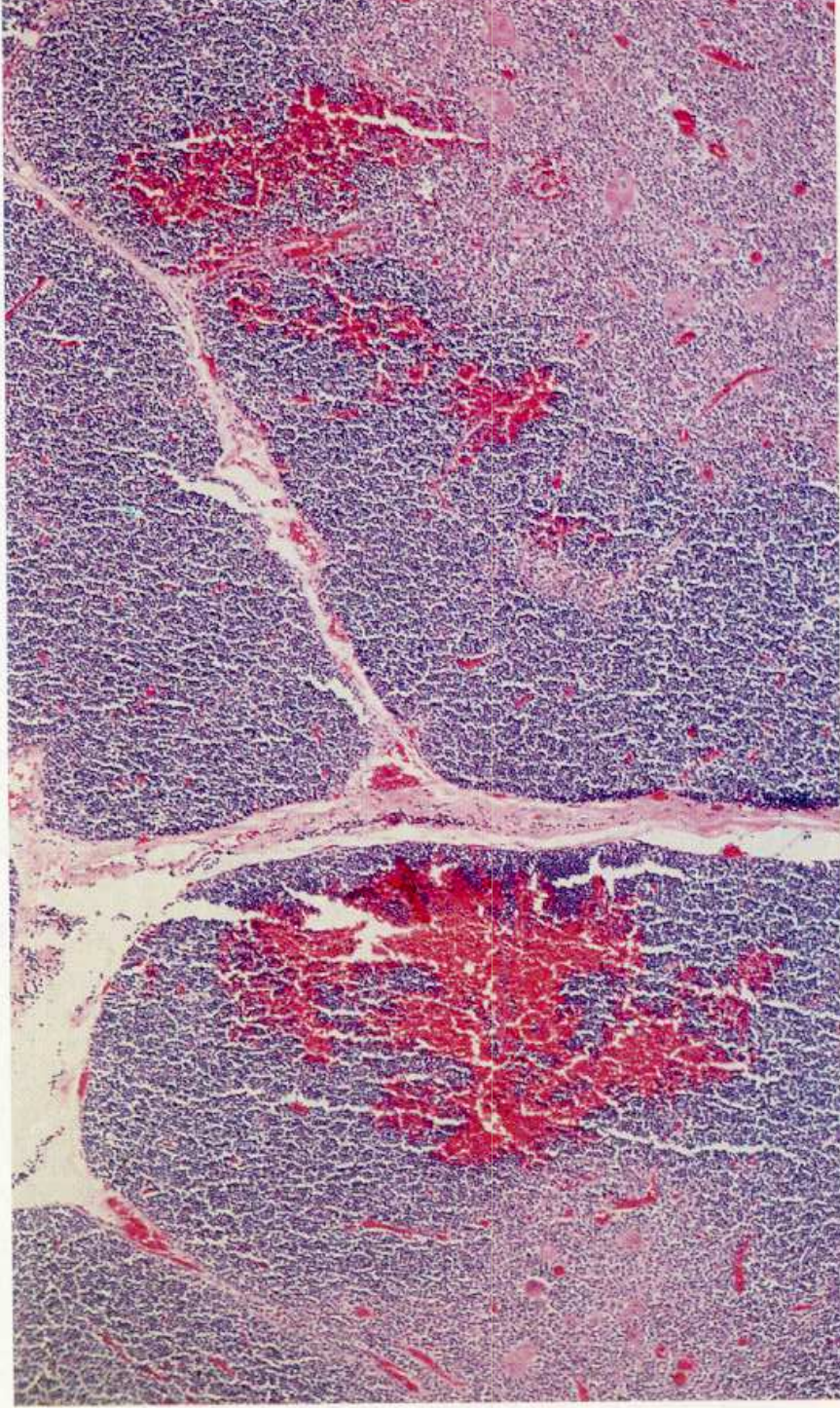


Figure 5-13. Thymic petechiae. 60x

III

**Identificazione di cause
patologiche molto
specifiche e peculiari per
l'età neonatale**



**Iter diagnostico particolare
Protocolli specifici
Diagnostica di livello specialistico**

Table 6-2. Explained Causes of Sudden Death in Infants Classified by Anatomical Site of Mortal Lesion

- **Cardiovascular**
 - Mycocarditis (usually viral)
 - Congenital heart disease
 - Congenital aortic valvular stenosis
 - Endocardial fibroelastosis
 - Anomalous origin of the left coronary artery
 - Cardiomyopathy
 - Rhabdomyoma (especially in tuberous sclerosis)
 - Coronary arteritis (Kawasaki's disease)
- **Respiratory**
 - Upper airway obstruction
 - Bronchopneumonia
 - Bronchiolitis, severe
- **Gastrointestinal Tract**
 - Cystic remnant of thyroglossal duct in the base of the tongue (causing obstruction to the airway)
 - Enterocolitis with diarrhea, dehydration and/or fluid and electrolyte imbalance
- **Pancreas**
 - Cystic fibrosis of the pancreas (with overheating)
- **Endocrine**
 - Congenital adrenal hypo- or hyperplasia
- **Central Nervous System**
 - Trauma
 - Cerebral edema secondary to trauma
 - Subdural hematoma
 - Meningitis
 - Encephalitis
 - Arteriovenous malformation
- **Systemic**
 - Dehydration
 - Cervical cellulitis (Lucwig's angina)
 - Poisoning (carbon monoxide)
 - Overheating (especially in infants with cystic fibrosis)



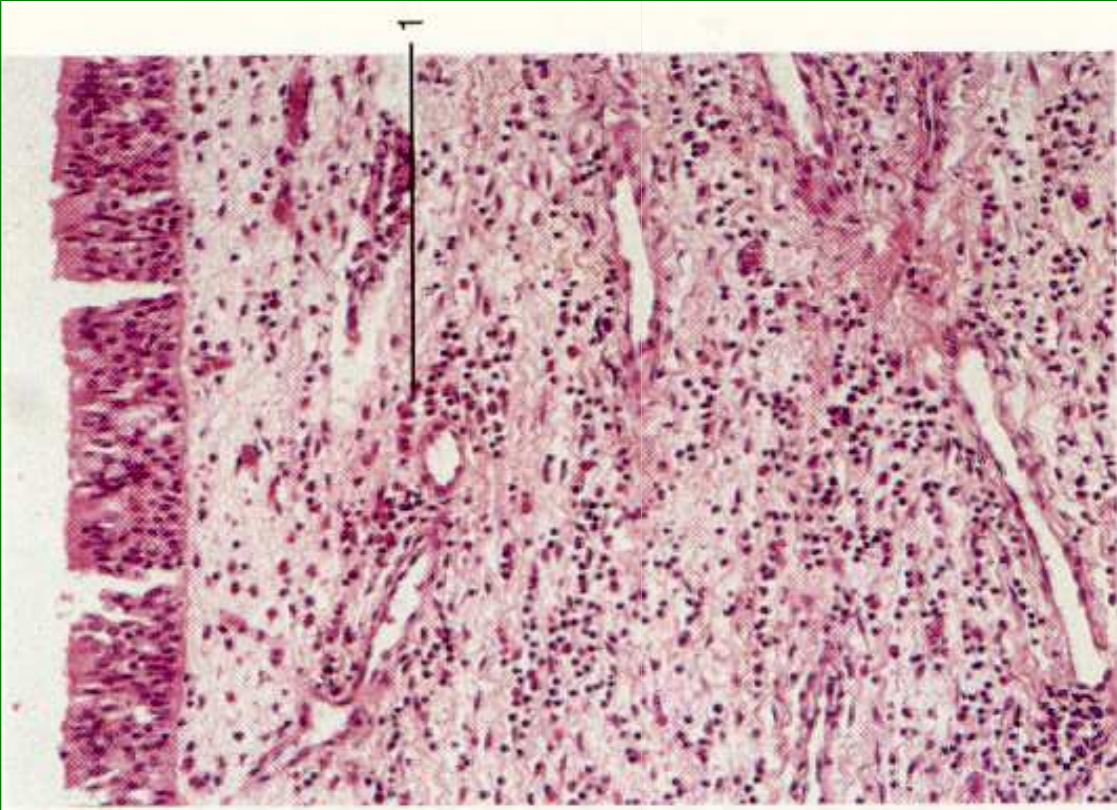


Fig. 15.12. SIDS. Inflammation of the mucosa of the nasal passages. H & E, 128 x.

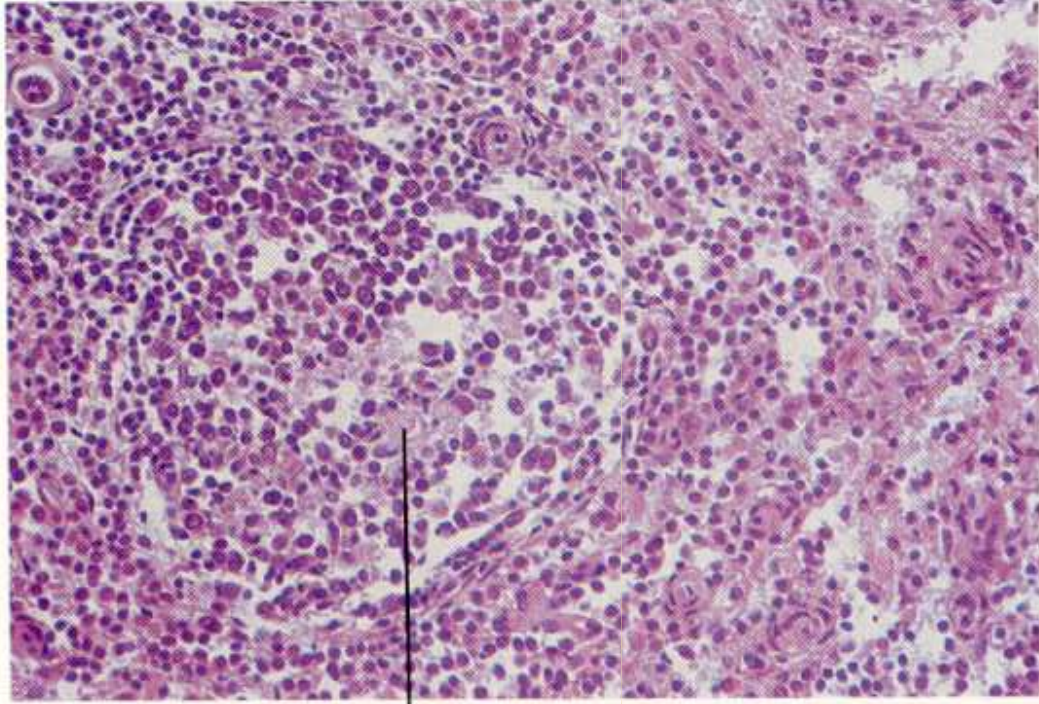


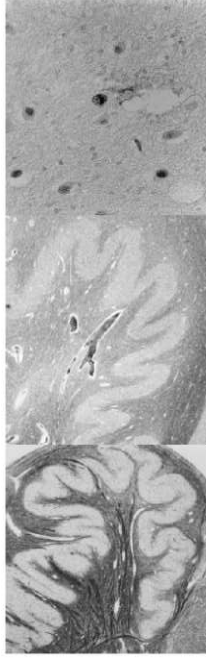
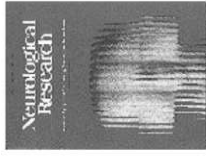
Fig. 15.13. SIDS. Necrosis of the germinal center in a malpighian corpuscle of the spleen. H & E, 80 x.

IV

**Identificazione di cause
patologiche rare**



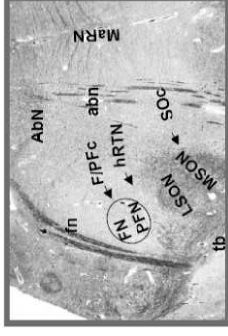
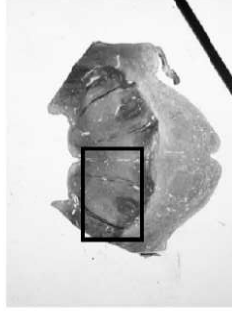
**rete di diagnostica
integrata di secondo livello**



A.M. Lavezzi, G. Ottaviani, M. Mauri, L. Maturri.

Biopathology of the olivocerebellar network in sudden unexplained perinatal and sudden infant death syndrome related to maternal cigarette smoking.

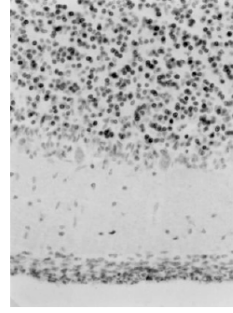
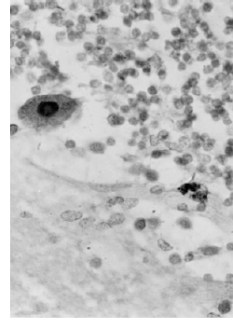
Neurol Res 2007, 29(6): 525-532.



Lavezzi A.M., Wees-Mayer D.E., Yu M.Y., Casale V, Corna M.F., Oneda R., Maturri L.

The human retrotrapezoid nucleus: congenital alterations in sudden infant death syndrome and sudden intrauterine unexplained death.

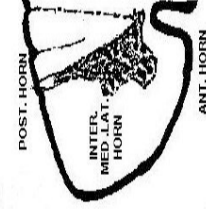
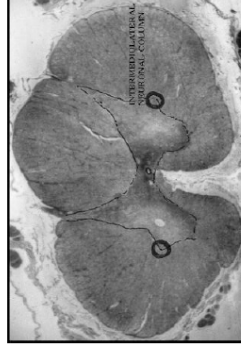
In press...



AM. Lavezzi, G. Ottaviani, M. Mauri, L. Maturri.

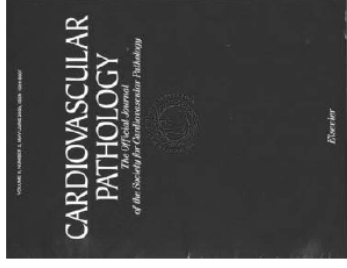
Alterations of biological features of the cerebellum in sudden perinatal and infant death.

Curr Mol Med 2006; 6: 429-435



Lavezzi A.M., Corna M.F., Hehboob R., Maturri L.
Neuropathology of the intermedialateral nucleus of the spinal cord in sudden unexplained perinatal and infant death.

Int J Devl Neuroscience 2010, 28: 133-138



G. Ottaviani, L. Rossi, SG. Ramos, L. Maturri.
Pathology of the Heart and Conduction System
in a case of Sudden Death due to a Cardiac
Fibroma in a 6-month-old child.

Cardiovasc Pathol 1999; 8: 109-112



G.Ottaviani, L.Maturri, L.Rossi, AM.Lavezzi, T.N.James
Multifocal Cardiac Purkinje Cell Tumor in
Infants.

Europace 2004; 6: 138-141

Am J Forensic Med Pathol. 2011 Dec;32(4):331-5.

Numerous cortical tubers and rhabdomyomas in a case of sudden unexpected infant death.

Izevbaye I, Sun J, Fazlollah L.

From the Department of Pathology, State University of New York at Buffalo, Buffalo, NY.

Am J Forensic Med Pathol. 2011 Aug 3. [Epub ahead of print]

Death of a 6-Month-Old Due to a Tracheal Bronchus.

Hansen-Welches L, Slabach R, Landrum JE, Prahlow JA.

From the *Indiana University School of Medicine, Indianapolis, IN; †Department of Anesthesiology, Georgetown University Hospital, Washington, DC; ‡Elkhart County Coroner, Elkhart; §Indiana University School of Medicine-South Bend at the University of Notre Dame; and ||South Bend Medical Foundation, South Bend, IN

Acta Paediatr. 2011 Jul 18. doi: 10.1111/j.1651-2227.2011.02413.x. [Epub ahead of print]

Gliosis in neonatal SUDI cases.

Chiu M, Elder D, Zuccollo J.

Medical Student, University of Otago, Wellington, New Zealand Department of Paediatrics & Child Health, University of Otago, Wellington, New Zealand Department Obstetrics & Gynaecology, University of Otago, Wellington, New Zealand

Ups J Med Sci. 2011 August; 116(3): 220.

Features of diaphragmatic myositis in a case of sudden infant death

Michael Eisenhut

Luton & Dunstable Hospital NHS Foundation Trust, Luton, United Kingdom

Ann Pathol. 2011 Apr; 31(2):93-7.

[A rare cause of sudden cardiac failure: histiocytoid cardiomyopathy].

Coulibaly B, Piercecchi-Marti MD, Fernandez C, Wasier AP, Viard L, Fraisse A, Figarella-Branger D, Leonetti G, Camboulives J, Paut O.

Service d'anatomie pathologique et de neuropathologie, CHU Timone,, Marseille, France.

Pediatr Pulmonol. 2011 Oct;46(10):1041-4. doi: 10.1002/ppul.21463. Epub 2011 Apr 25.

Portopulmonary hypertension secondary to congenital extrahepatic portosystemic shunt with heterotaxy and polysplenia: a cause of sudden death in an infant.

Kobayashi D, Edwards HD, Singh J, Nadkarni MD, Lantz PE, Cook AL.

Department of Pediatrics, Wake Forest University School of Medicine, Winston-Salem, North Carolina.

Am J Forensic Med Pathol. 2011 Jun;32(2):166-8.

Large multifocal cardiac myxoma causing the sudden unexpected death of a 2-month-old infant -a rapidly growing, acquired lesion versus a congenital process?: a case report.

Kure K, Lingamfelter D, Taboada E.

University of Missouri-Kansas City and Truman Medical Centers, Kansas City, MO, USA.

**Nel 2011
pubblicati 115 lavori sulla
SIDS**

V

**Identificazione di cause
patologiche
molto particolari**



**Centro di riferimento
diagnostico regionale**

Table 10-4. Histopathological Findings Based on the Pathology Study Panel Review of Microscopic Slides for Singleton SIDS Cases and Explained Deaths^{a,b}

	SIDS Cases %	Explained Deaths %
Epiglottitis		
Normal	59	49
Inflammation	40	48
Trachea		
Normal	70	55**
Inflammation	29	45**
Denuded epithelium	10	13
Neutrophils	<1	<1
Thick basement membrane	<1	<1
Adventitial hemorrhage	<1	<1
Thyroid		
Normal	98	98
Thymus		
Normal	56	64
Petechiae	44	25**
Lung		
Normal	10	13
Congestion	89	80**
Alveolar hemorrhage	66	54*
Edema	63	51*
Septal hemorrhage	30	13**
Macrophages	15	18
Emphysema	14	18
Pleural hemorrhage	13	5*
Bronchiolitis	10	26**
Poor inflation/atelectasis	7	16**
Aspiration	10	13
Bronchitis	8	13
Pneumonia	8	34**
Alveolar collapse	10	12
Postmortem bacterial colonies	5	4
Pneumonitis	4	7
Resuscitative changes	1	2
Granuloma	<1	<1

Table 10-4 Continued

	SIDS Cases %	Explained Deaths %
Heart		
Normal	95	92
Endocardial thickening	2	2
Petechiae	3	3
Lymphocytic infiltrate	<1	<1
Interstitial hemorrhage, pericapillary	<1	<1
Diaphragm		
Normal	98	98
Gastroesophageal Junction		
Normal	85	81
Inflammation	12	11
Cellular infiltrate	<1	<1
Liver		
Normal	45	36
Congestion	35	35
Extramedullary hematopoiesis	23	14*
Fatty change	8	19**
Triaditis	5	3
Abnormal glycogen	1	2
Hepatitis	1	2
Hepatocellular necrosis	<1	2
Focal inflammation	<1	<1
Portal fibrosis	<1	<1
Sinus leukocytes	<1	<1
Foamy vacuolization	<1	<1
Hemangioma	<1	<1
Pancreas		
Normal	88	82
Islet cell hyperplasia	6	10
Cystic fibrosis	<1	<1
Spleen		
Normal	76	63**
Congestion	18	27*
Acute splenitis	2	7**
Hemosiderosis	<1	1
Extramedullary hematopoiesis	<1	1

SIDS Cases % Explaned Deaths %

	SIDS Cases %	Explaned Deaths %
Adrenal		
Normal	59	59
Congestion	40	35
Brown fat present, periadrenal	74	74
Hemorrhage	3	4
Lipid depletion	1	2
Kidney		
Normal	63	58
Congestion	26	30
Relative immaturity	7	7
Calcium deposits	4	8
Pyelonephritis	<1	<1
Vacuolization of proximal tubular epithelium	<1	<1
Ileum		
Normal	95	91
Lymphoid hyperplasia	3	10 **
Eosinophilic infiltrate	<1	1
Lymphoid depletion	<1	<1
Mesenteric Lymph Node		
Normal	93	82 **
Lymphocytic depletion	1	4
Congestion	<1	1
Acute adenitis	<1	3
Blood		
Normal	97	91 **
Sickled cells	<1	3

	SIDS Cases %	Explained Deaths %
Brain		
Encephalitis	1	<1
Meningitis	<1	6 **
Edema	<1	1
Abscess	<1	<1
Inflammation	<1	<1
Excess subependymal neural nests	<1	<1
<hr/>		
Normal	90	84
Congestion	28	27
Perivascular hemorrhage	17	16
Petechiae	16	17
Calcification	3	6
Hypoxic changes	2	6 **
Relative immaturity	<1	<1

**Possono essere cause concomitanti o
associate ciascuna può essere necessaria
ma non sufficiente**



**Centro diagnostico molto dedicato che effettua
autopsie secondo specifici protocolli e in tempi
corretti tali consentire la raccolta delle informazioni.**



Sudden unexpected death in infancy

A multi-agency protocol for care and investigation

The report of a working group convened
by The Royal College of Pathologists and
The Royal College of Paediatrics and
Child Health

Chair: The Baroness Helena Kennedy QC

This document received input from many stakeholders (see Appendices V and VI) and was discussed and approved by the Councils of both The Royal College of Pathologists and The Royal College of Paediatrics and Child Health. In accordance with the publications policy of The Royal College of Pathologists, the document was placed on the Fellows and Members Area of their website from 25 June to 16 July 2004 for consultation. To date, 15 detailed replies were received and forwarded to the members of the Working Group, who found them very helpful in preparing this final report. Inevitably, given the nature and sensitivity of the subject, some contentious issues remain. The Working Group expects that the protocol will be further refined in future and welcomes feedback from those who use it. Comments should be sent to publications@rcpath.org with 'SUDI' in the subject line.

Professor John A Lee
Director of Publications, The Royal College of Pathologists

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September 2004
Further copies of this publication can be obtained from the Colleges' websites,
www.rcpath.org and www.rcpch.ac.uk



Royal College of
Obstetricians and
Gynaecologists

Setting standards to improve women's health

Green-top Guideline No. 55

October 2010

Late Intrauterine Fetal Death and Stillbirth





The Sudden Unexplained Death In Childhood Program

*...an Answer When There's
No Explanation*



ONE OF A KIND. SECOND TO NONE.



 University of San Diego®

www.sandiego.edu

I. Microscopic sections (in addition to routine sections of heart, lung, etc.)

a. Representative sections of brain including

- 1. Bilateral Hippocampus**
- 2. Midbrain**
- 3. Pons**
- 4. Rostral Medulla**
- 5. Cerebellum including Dentate**
- 6. Basal Ganglia**
- 7. Watershed Cortex**

b. Thymus

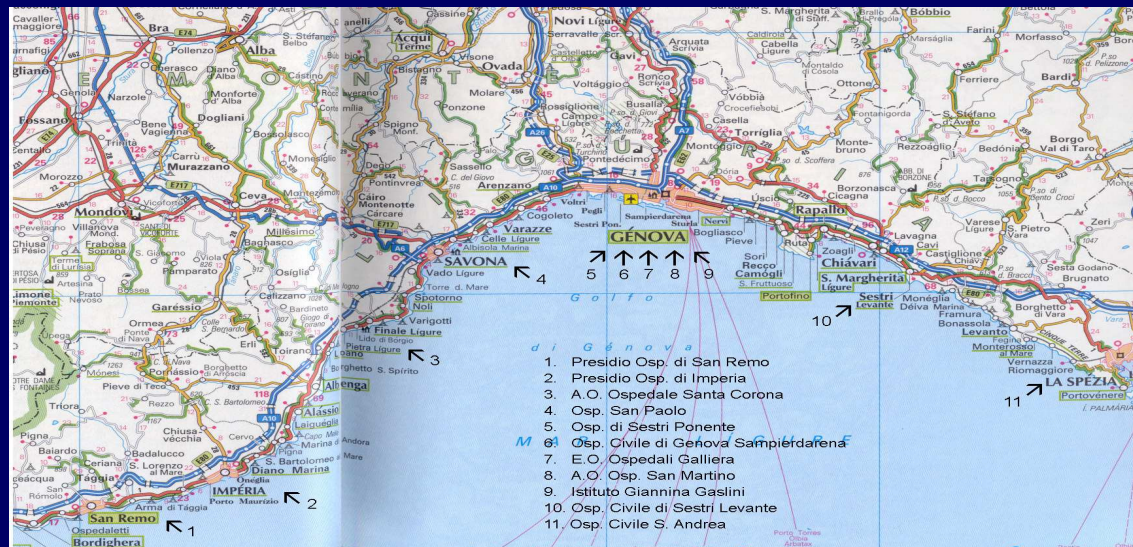
c. Gastro-esophageal junction for signs of GER

II. Retain as much brain tissue as possible in formalin

III. Specimens for ancillary testing

- a. Blood & bile spots for metabolic testing**
- b. Urine and/or blood for toxicology**
- c. Vitreous electrolytes, VUN, creatinine**
- d. Microbiology specimens for culture/PCR when indicated**
- e. Fresh frozen tissue for further metabolic studies or genetic studies (including channelopathies)**

IV. Radiographs, preferably a detailed skeletal series and photographs as indicate



1.A – PRELIEVI DA EFFETTUARSI PRIMA DEL RISCONTRO AUTOPTICO:

1.A.1) Per coltura microbiologica:

- a) Un tampone nasale per ciascuna narice
- b) Un tampone del cavo orale
- c) Un tampone anale
- d) Un campione di liquor cefalo-rachidiano ottenuto sterilmente con puntura lombare

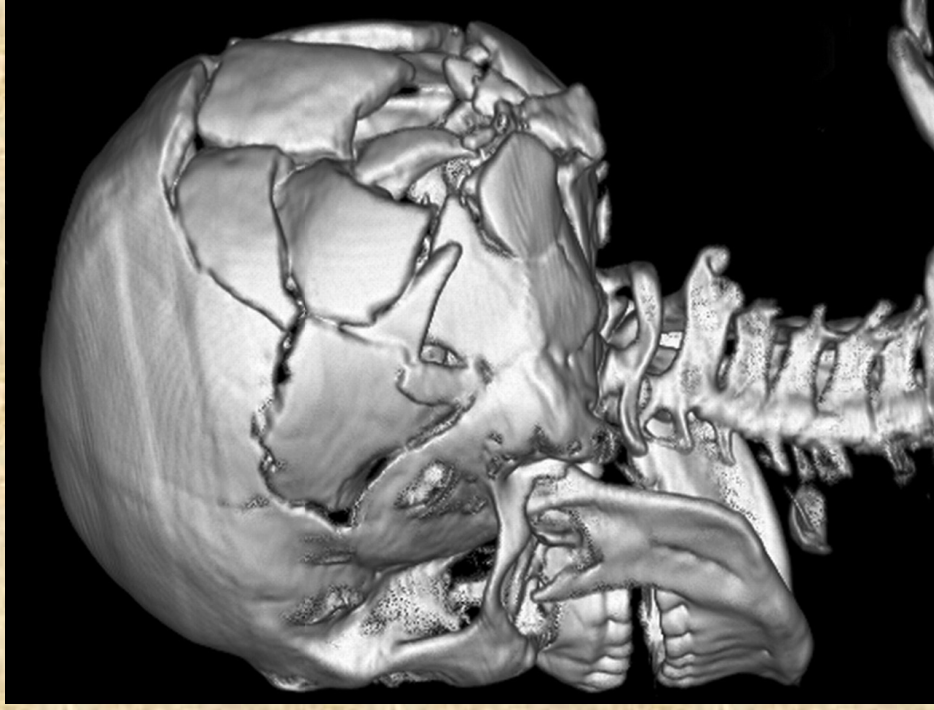
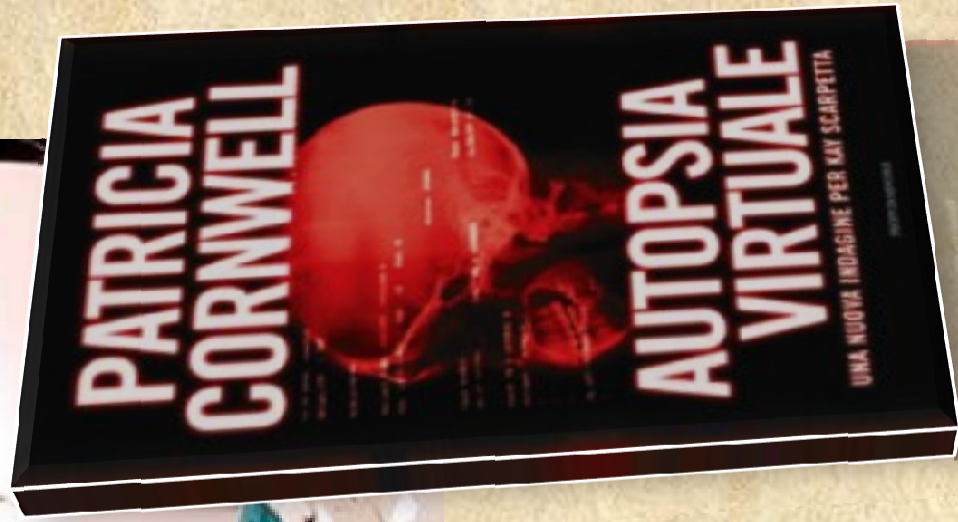
1.A.2. – Per esami batteriologici o virologici:

- 1) Un campione di sangue
- 2) Un campione di midollo osseo ottenuto mediante puntato sternale o biopsia della cresta iliaca
- 3) Un campione di contenuto gastrico
- 4) Un campione di feci
- 5) Tampone faringeo
- 6) Tampone bronchiale
- 7) Tampone polmonare

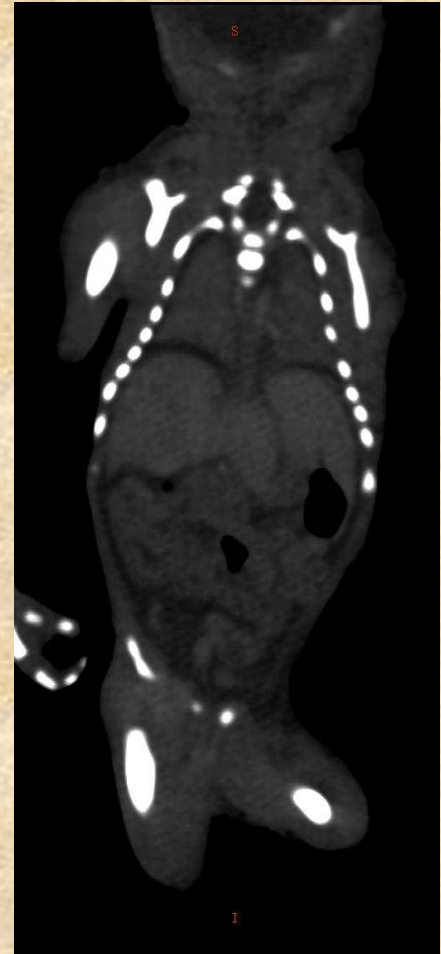
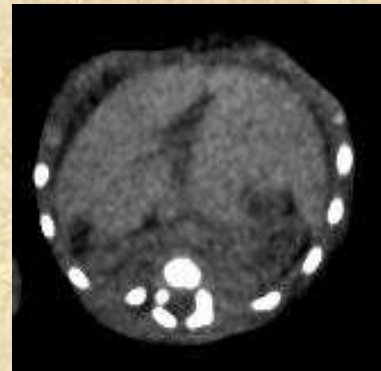
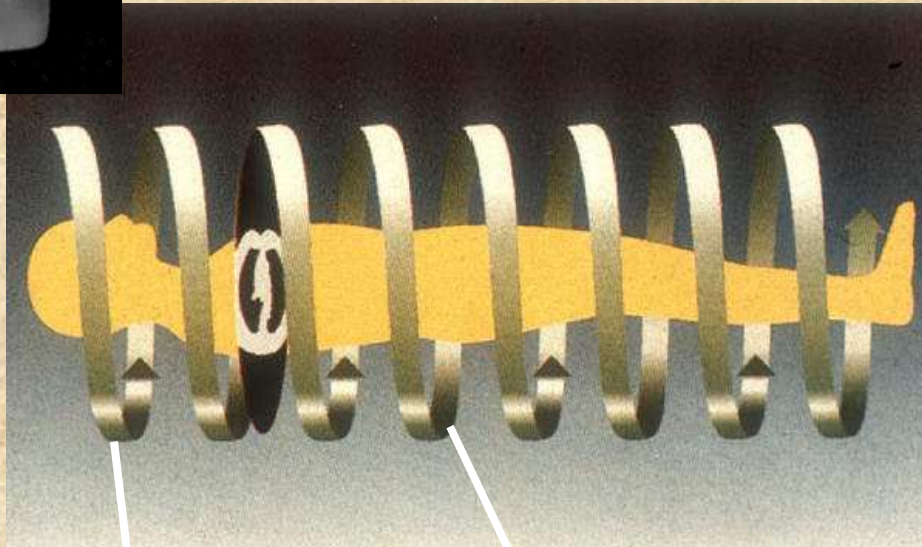
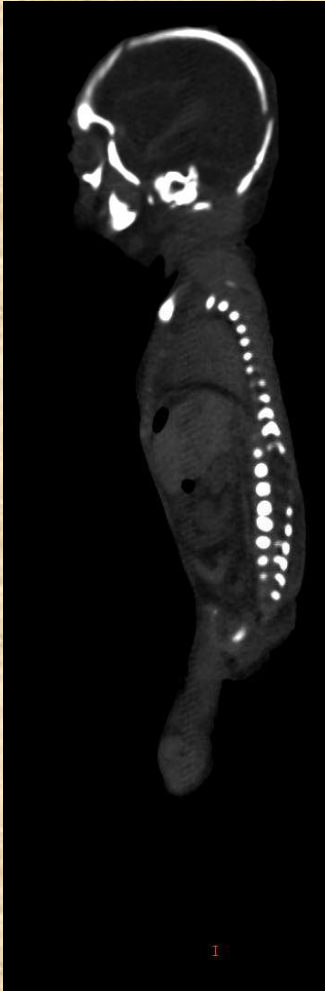
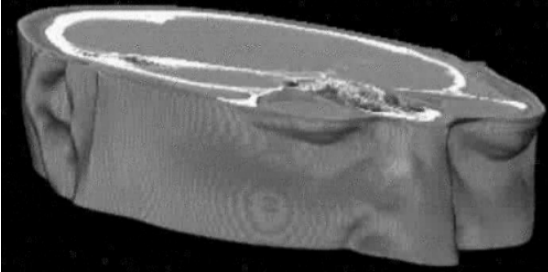
1.B. – PRELIEVI DA EFFETTUARSI IN CORSO DI AUTOPSIA PRIMA DELLA RIMOZIONE O ALL'ATTO DELL'APERTURA DEGLI ORGANI:

1.B.1. – Per esami tossicologici:

- 1) Un campione di contenuto gastrico
- 2) Un campione di materiale digesto presente nel duodeno
- 3) Un campione di materiale alimentare contenuto nell'ileo
- 4) Un campione di feci
- 5) Un campione di bile
- 6) Un campione di urina
- 7) Un campione di sangue

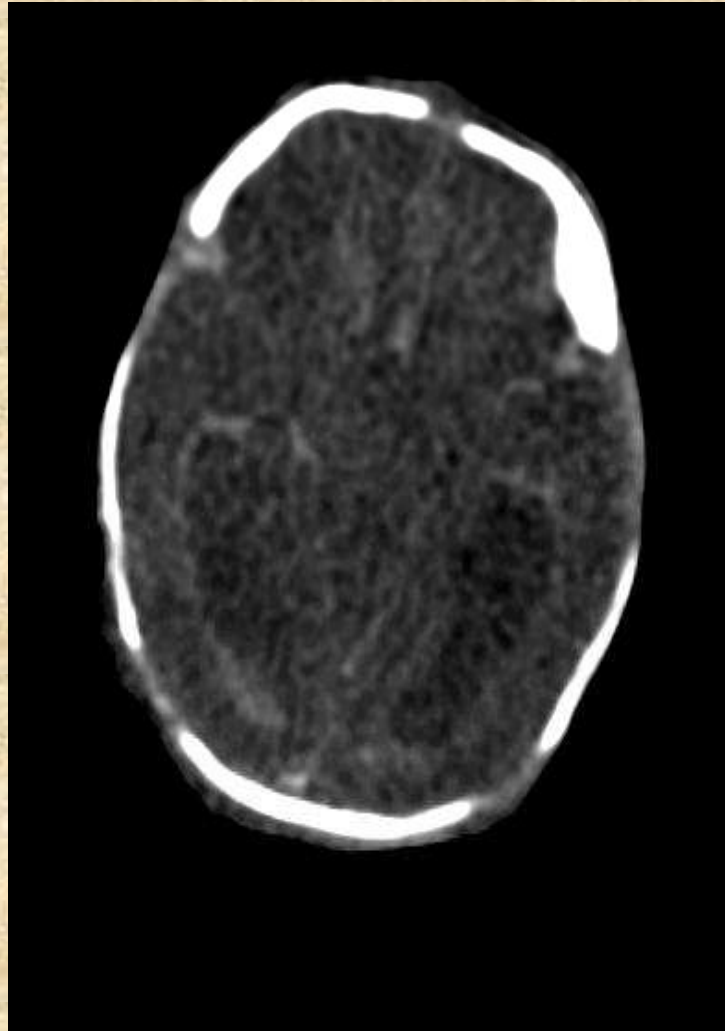


Virtual Autopsy: CT

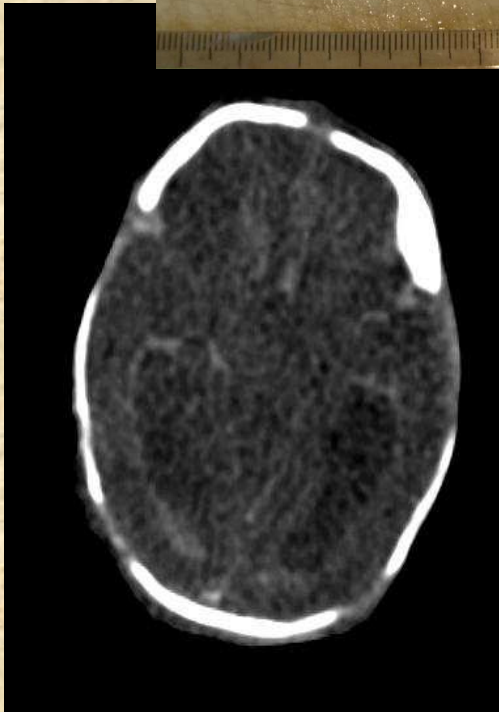


Idrocefalo

Virtual Autopsy: CT



Idrocefalo



Virtual Autopsy: CT



MPR: ricostruzione piano sagittale

1.B.2. – Per indagine genetica:

•*Per la ricerca di polimorfismi genetici:*

Fissare in etanolo 90°-95° frammenti delle dimensioni di circa 0,5 cm³ dei seguenti organi, da conservare a temperatura ambiente:

1.midollo allungato (il frammento deve essere prelevato al di sotto dell'oliva inferiore, mantenendo l'integrità della porzione superiore, al fine di consentire l'esame istopatologico su sezioni seriate)

2.corteccia cerebellare

3.corteccia cerebrale in zona parietale

4.parenchima epatico

5.miocardio comune

6.muscolo striato

•*Per lo studio delle varianti della sindrome del Q-T lungo*

1) Un campione di sangue (congelato a -20°C)

2) Un campione di milza (congelato a -20°C)

Yonsei Med J. 2011 Nov 1;52(6):1035-8. doi: 10.3349/ymj.2011.52.6.1035.

Prenatal Diagnosis of Congenital Lipoid Adrenal Hyperplasia (CLAH) by Molecular Genetic Testing in Korean Siblings.

Ko HS, Lee S, Chae H, Choi SK, Kim M, Park IY, Suh BK, Shin JC.

Department of Obstetrics and Gynecology, College of Medicine, The Catholic University of Korea, 505 Banpo-dong, Seocho-gu, Seoul 137-450, Korea

Am J Med Genet A. 2011 Oct;155A(10):2512-5.

Report of a further family with dominant deafness-onychodystrophy (DDOD) syndrome.

White SM, Fahey M.

Genetic Health Services Victoria, Royal Children's Hospital, Parkville, Australia.

Circ Cardiovasc Genet. 2011 Oct 1;4(5):510-5. Epub 2011 Aug 11.

Loss-of-Function Mutations in the KCNJ8-Encoded Kir6.1 KATP Channel and Sudden Infant Death Syndrome.

Tester DJ, Tan BH, Medeiros-Domingo A, Song C, Makielski JC, Ackerman MJ

Departments of Medicine

Cardiology. 2011;119(1):21-33. Epub 2011 Jul 16.

Cardiac channelopathies and sudden infant death syndrome.

Tfelt-Hansen J, Winkel BG, Grunnet M, Jespersen T.

Danish National Research Foundation Centre for Cardiac Arrhythmia (DARC),
Copenhagen, Denmark

Physiol Genomics. 2011 Aug 24;43(16):974-80. Epub 2011 Jun 21.

Gene expression analysis characterizes antemortem stress and has implications for establishing cause of death.

Jardine D, Cornel L, Emond M.

Department of Pediatrics, University of Washington, Seattle, WA 98195, USA.

1.B.3 – Per indagini metaboliche:

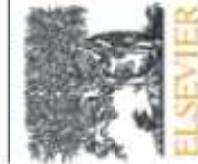
1) Urina in una provetta sterile. Anche una quantità (0,1 ml) può essere sufficiente. Se la vescica è vuota e non si riesce a raccogliere l'urina è necessario strofinare delicatamente sulla parete vescicale 2 tamponi di cotone finchè siano visibilmente bagnati e conservarli in provette sterili.

Il campione di urina o i tamponi vanno congelati a -20°C appena possibile o stoccati in B.I.T.-T

2) Circa 10 ml di sangue raccolto in provetta di plastica contenente EDTA. Congelare al più presto a -20°C o stoccare in B.I.T.-T

3) Un frammento di fegato (indicativamente un cubo di 2-2,5 cm di lato) congelato ed avvolto in foglio di alluminio a -20°C o stoccato in B.I.T.-T

4) Un frammento di muscolo scheletrico (indicativamente un cubo di 2-2,5 cm di lato) congelato ed avvolto in foglio di alluminio a -20°C o stoccato in B.I.T.-T



Contents lists available at ScienceDirect

Molecular Genetics and Metabolism

journal homepage: www.elsevier.com/locate/ymgme



Retrospective review of Japanese sudden unexpected death in infancy: The importance of metabolic autopsy and expanded newborn screening

Takuma Yamamoto^a, Hidekazu Tanaka^{b,*}, Hironori Kobayashi^c, Ko Okamura^a, Tatsuya Tanaka^d, Yuko Emoto^a, Kana Sugimoto^{a,1}, Masato Nakatome^{a,2}, Norio Sakai^e, Hisanaga Kuroki^{a,2,3}, Seiji Yamaguchi^c, Ryoji Matoba^a

^a Department of Legal Medicine, Osaka University Graduate School of Medicine, 2-2 Yamada-oka, Suita, Osaka 565-0871, Japan

^b Department of Pharmacology, Osaka University Graduate School of Medicine, 2-2 Yamada-oka, Suita, Osaka 565-0871, Japan

^c Department of Pediatrics, Shimane University Faculty of Medicine, 89-1 En-ya, Izumo, Shimane 693-8501, Japan

^d Center for Medical Research and Education, Osaka University Graduate School of Medicine, 2-2 Yamada-oka, Suita, Osaka 565-0871, Japan

^e Department of Pediatrics, Osaka University Graduate School of Medicine, 2-2 Yamada-oka, Suita, Osaka 565-0871, Japan

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ABSTRACT

Sudden unexpected death in infancy is defined as sudden unexpected death occurring before 12 months of age. The common causes of sudden unexpected death in infancy are infection, cardiovascular anomaly, child abuse, and metabolic disorders. However, the many potential inherited metabolic disorders are difficult to diagnose at autopsy and may therefore be underdiagnosed as a cause of sudden unexpected death in infancy. In the present study we retrospectively reviewed 30 Japanese sudden unexpected death in infancy cases encountered between 2006 and 2009 at our institute. With postmortem blood acylcarnitine analysis and histologic examination of the liver, we found two cases of long-chain fatty acid oxidation defects. Molecular analysis revealed that the one patient had a compound heterozygote for a novel mutation (p.L644E) and a disease-causing mutation (p.F183Y) in the carnitine palmitoyltransferase 2 gene. Furthermore, retrospective acylcarnitine analysis of the newborn screening card of this patient was consistent with carnitine palmitoyltransferase II deficiency. Metabolic autopsy and expanded newborn screening would be helpful for forensic scientists and pediatricians to diagnose fatty acid oxidation disorders and prevent sudden unexpected death in infancy.

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J Clin Pathol. 2011 Nov;64(11):1005-9.

Tandem mass spectrometry findings at autopsy for detection of metabolic disease in infant deaths: postmortem changes and confounding factors.

Pryce JW, Weber MA, Heales S, Malone M, Sebire NJ.

UCL Institute of Child Health, Great Ormond Street Hospital for Children, London, UK

Forensic Sci Int. 2011 Jul 15;210(1-3):e1-3. Epub 2011 Apr 30.

Very long-chain acyl CoA dehydrogenase deficiency which was accepted as infanticide.

Eminoglu TF, Tumer L, Okur I, Ezgu FS, Biberoglu G, Hasanoglu A.

Gazi University Hospital, Department of Pediatric Nutrition and Metabolism, Ankara, Turkey.

1.B.4. – Per indagine gas cromatografia:

- *Per la ricerca di componenti del fumo di sigaretta (nicotina e cotonina)*

Una ciocca di capelli della vittima e possibilmente ciocche di capelli di entrambi i genitori in provette di vetro separate e ben sigillate, da conservare a temperatura ambiente.

Childs Nerv Syst. 2011 Nov; 27(11):1979-83. Epub 2011 Jul 9.

Severe intra- and periventricular hemorrhage: role of arteriolosclerosis related to maternal smoke.

Matturri L, Mecchia D, Lavezzi AM.

Lino Rossi Research Center for the Study and Prevention of Unexpected Perinatal Death and SIDS-
Department of Surgical, Reconstructive and Diagnostic Sciences, University of Milan, Milan, Italy.

BMC Pediatr. 2011 Jul 6; 11:62.

**Brain iron accumulation in unexplained fetal and infant death victims with smoker mothers--
the possible involvement of maternal methemoglobinemia.**

Lavezzi AM, Mohorovic L, Alfonsi G, Corna MF, Matturri L.

Lino Rossi Research Center for The Study and Prevention of Unexpected Perinatal Death and SIDS,
Department of Surgical, Reconstructive and Diagnostic Sciences, University of Milan, Italy.

1.C – IL RISCONTRO DIAGNOSTICO

L'autopsia deve essere completa seguendo i protocolli e le istruzioni operative codificate a livello internazionale.

Ogni organo deve essere esaminato macroscopicamente e campionato per l'esame istologico.

In particolare, nel caso di sospetta S.I.D.S. dovranno essere prelevati con particolare cura:

1.C.1.- Encefalo in toto così da consentire prelievi mirati su:

- 1) Tronco encefalico per lo studio dei nuclei arcuati
- 2) Sezioni seriate del bulbo (per lo studio dei centri di regolazione cardiorespiratori)
- 3) Prelievi a livello della corteccia frontale bilateralmente
- 4) Prelievi dei nuclei della base

-

1.C.2. – Cuore in toto senza effettuare dissezioni così da consentire prelievi mirati secondo protocollo per :

- A) Lo studio di eventuali malformazioni cardiache
- B) Lo studio della conduzione cardiaca

1.C.3. – Vasi:

- 1) Segmenti a livello di strutture del SNA (ganglio stellato e glomo carotideo)
- 2) Segmenti bilaterali della biforcazione delle carotidi

Punti chiave

Sistema Nervoso Centrale



L. Maturri, G. Ottaviani, L. Rossi

Sudden and Unexpected Death due to an Hemangioendothelioma located in the Medulla Oblongata: a Case Report.

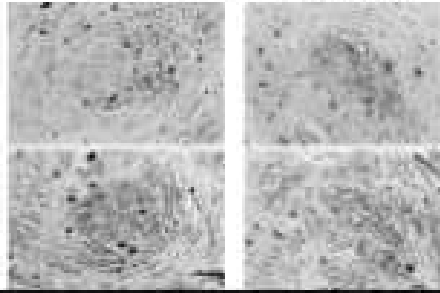
Acta Clin Pathol 1999; 31: 29-33



L. Maturri, G. Ottaviani, S.G. Ramos, B. Biondo, L. Rossi

Discrete T-lymphocytic Leptomeningitis of the Ventral Medullary Surface in a Case of Sudden Unexpected Infant Death.

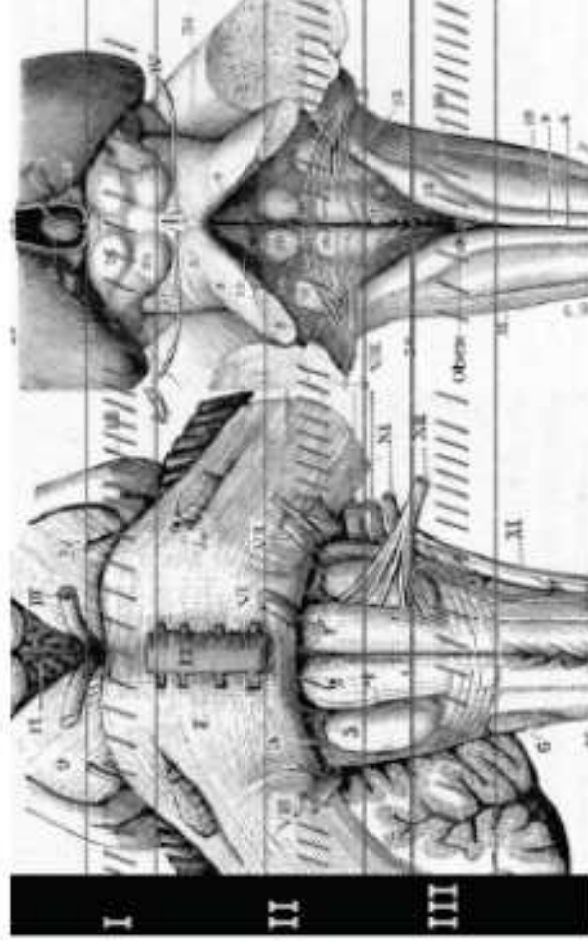
Acta Clin Pathol 1998; 2: 313-316



L. Maturri, G. Ottaviani, AM. Lazzari

Unexpected sudden death related to encephalitis of the brainstem.

Acta Neuropathol 2005;105:554-558



Sampling of the brainstem, ventral (left) and dorsal (right) surface :

the main groups of neurons involved in the control of the vital functions (respiratory, cardiovascular, arousal, upper digestive) are located in these 3 different brainstem areas

- **TECHNIQUES AND CRITERIA IN PATHOLOGIC AND FORENSIC-MEDICAL DIAGNOSTICS OF SUDDEN UNEXPECTED INFANT AND PERINATAL DEATH**

Matturri L., Ottaviani G., Lavezzi A.M.

Am J Clin Pathol 2005; 124: 259-268

- **GUIDELINES FOR NEUROPATHOLOGIC DIAGNOSTICS OF PERINATAL UNEXPECTED LOSS AND SUDDEN INFANT DEATH SYNDROME (SIDS) – A TECHNICAL PROTOCOL**

Matturri L., Ottaviani G., Lavezzi A.M.

Virchows Arch 2008; 452: 19-25



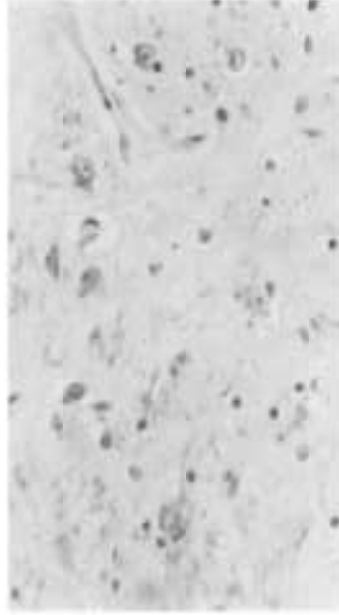
III

Hypoplasia of the parabrachial Kölliker-Fuse complex was detected in unexplained intrapartum stillbirth and early neonatal deaths

"Preliminary Study on the Cytoarchitecture of the Human Parabrachial / Kölliker-Fuse Complex, with Reference to Sudden Infant Death Syndrome and Sudden Intrauterine Unexplained Death"

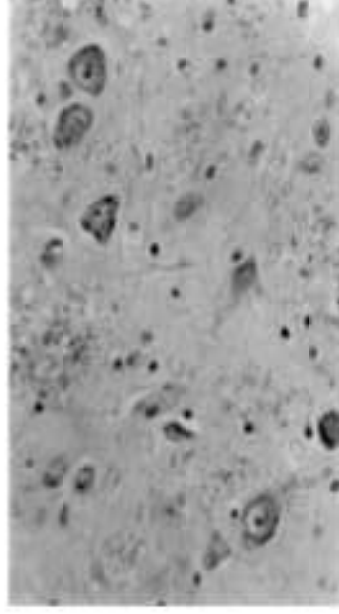
AM. Lavezzi, G. Ottaviani, G. Ballabio, L. Rossi, L. Matturri

Pediatr Dev Pathol 2004; 7: 171-179



KF in a neonate born at 41+1 weeks with severe asphyxia. Sudden death 20h after delivery.

Klüver-Barrera, 50x

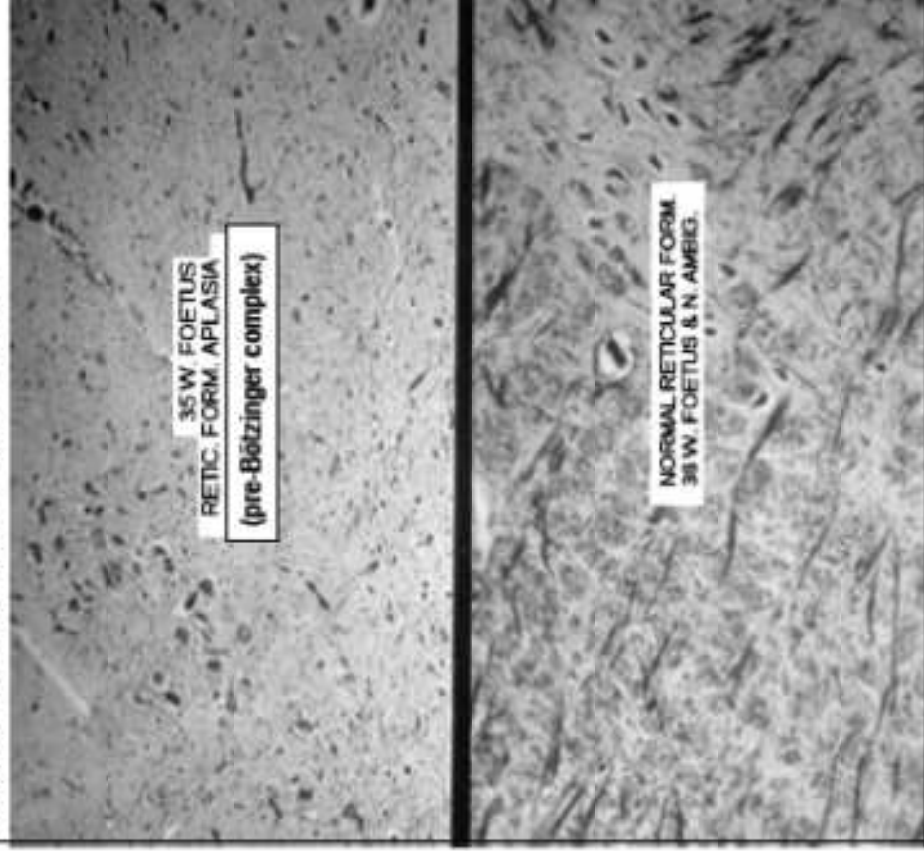


**KF in a control case
Klüver-Barrera, 50x**

Functional neuroanatomy of the human pre-Bötzinger complex with particular reference to sudden unexplained perinatal and infant death

AM Lavezzi and L Matturri

Neuropathology 2008; 28(1):10-6

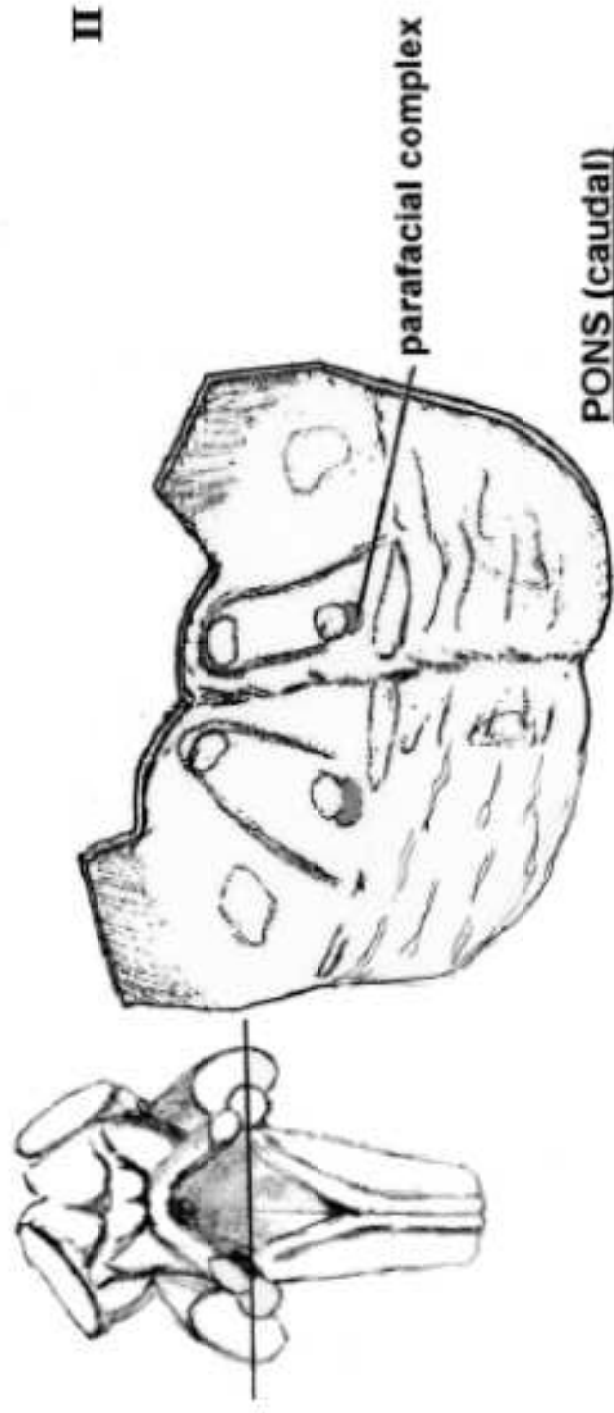


The authors are the first to identify in man the pre-Bötzinger complex, a structure of the brainstem critical for respiratory rhythmogenesis, previously investigated only in rats.

The authors suggest that the pre-Bötzinger complex contains a variety of neurons not only involved in respiratory rhythm generation, but more extensively, essential to the control of all vital functions. Sudden unexpected fetal death could be ascribed to a selective process when developmental alterations of the pre-Bötzinger complex arise.

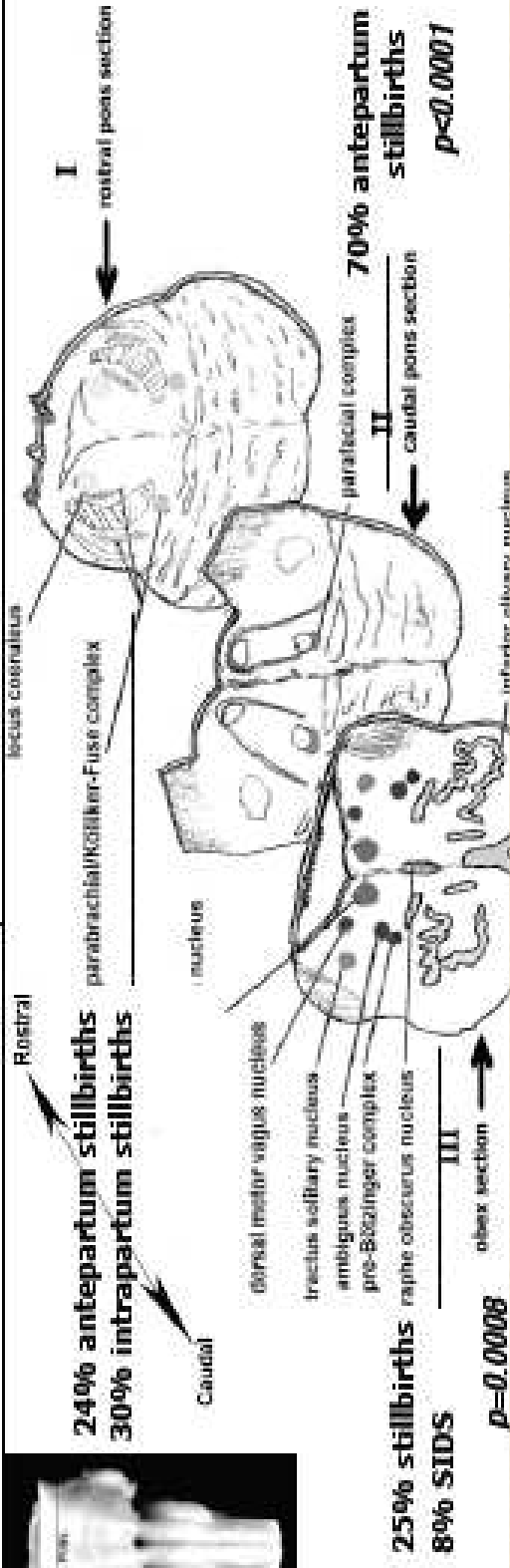
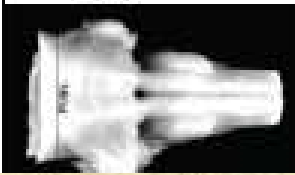
Hypoplasia/agenesis of the pBc was observed in 25% of the perinatal loss.

The parafacial complex is the trigger and the master generator of the vital functions of the pre-Bötzinger complex in mammals.

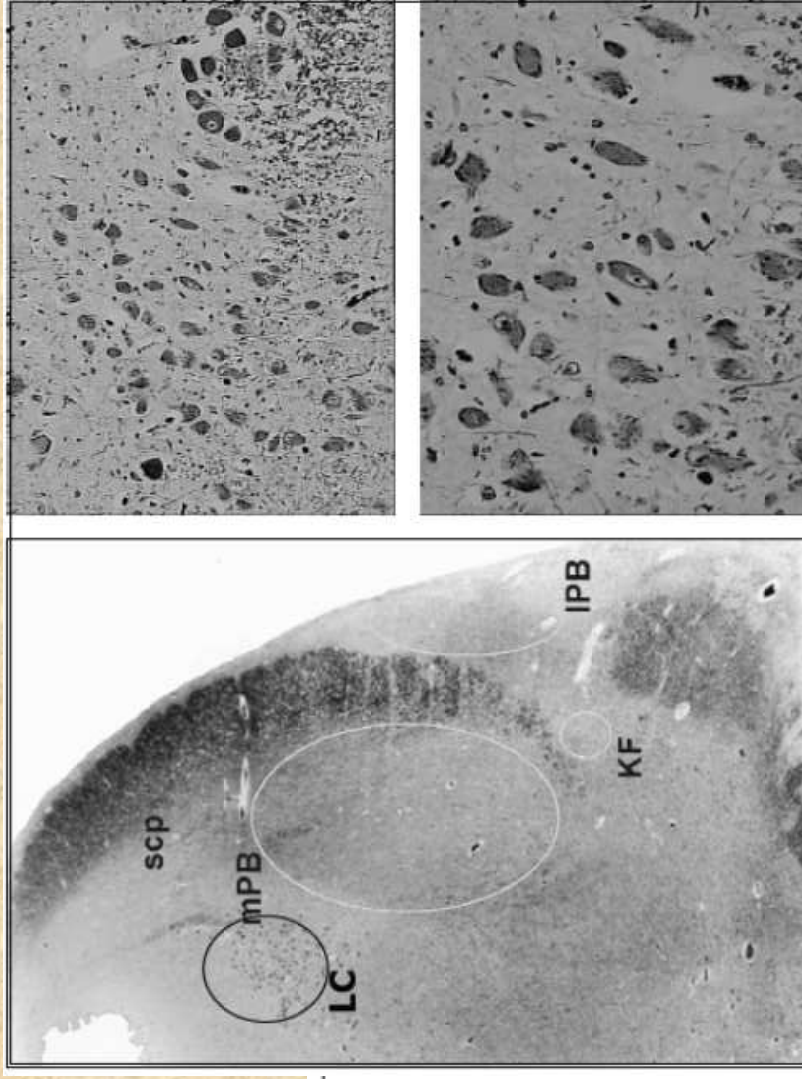
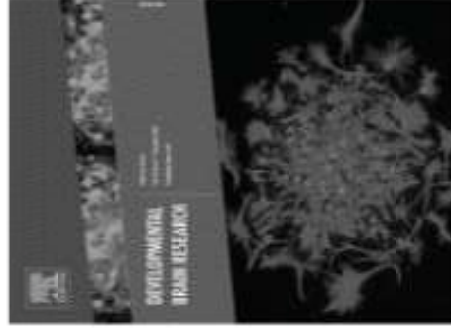


**HYPOPLASIA OF THE PARAFACIAL-FACIAL
COMPLEX: A VERY FREQUENT FINDING IN SUDDEN
UNEXPLAINED FETAL DEATH**

Lavezzi A.M., Matturri L.



Frequent associations:



AM. Lavezzi, G. Ottaviani, R. Mingrone, L. Matturri
Analysis of the Human Locus Coeruleus in
Perinatal and Infant Sudden Unexplained Death.
Possible role of the cigarette smoking in the
development of this nucleus

Dev Brain Res 2005; 154: 71-80

Punti chiave

Sistema Nervoso Autonomo Periferico

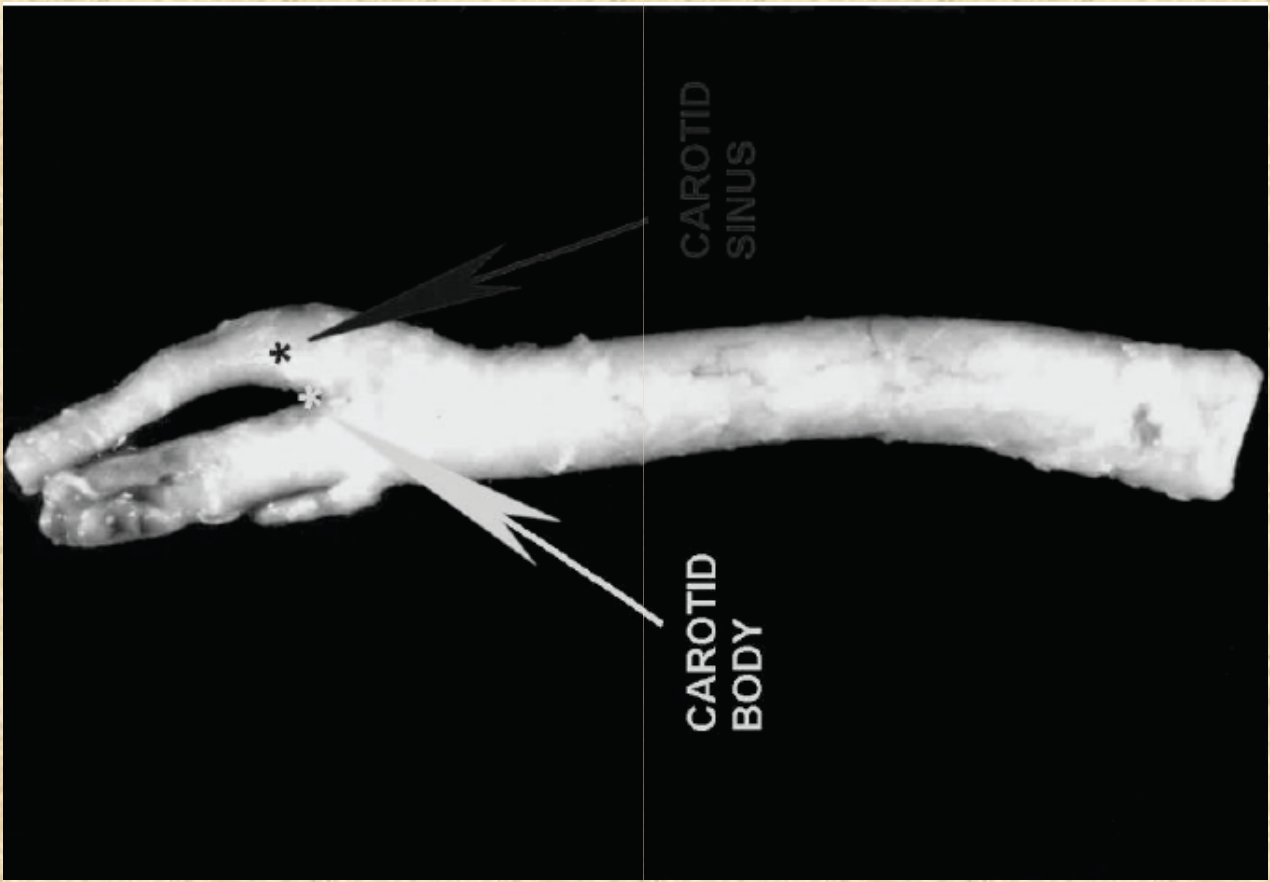
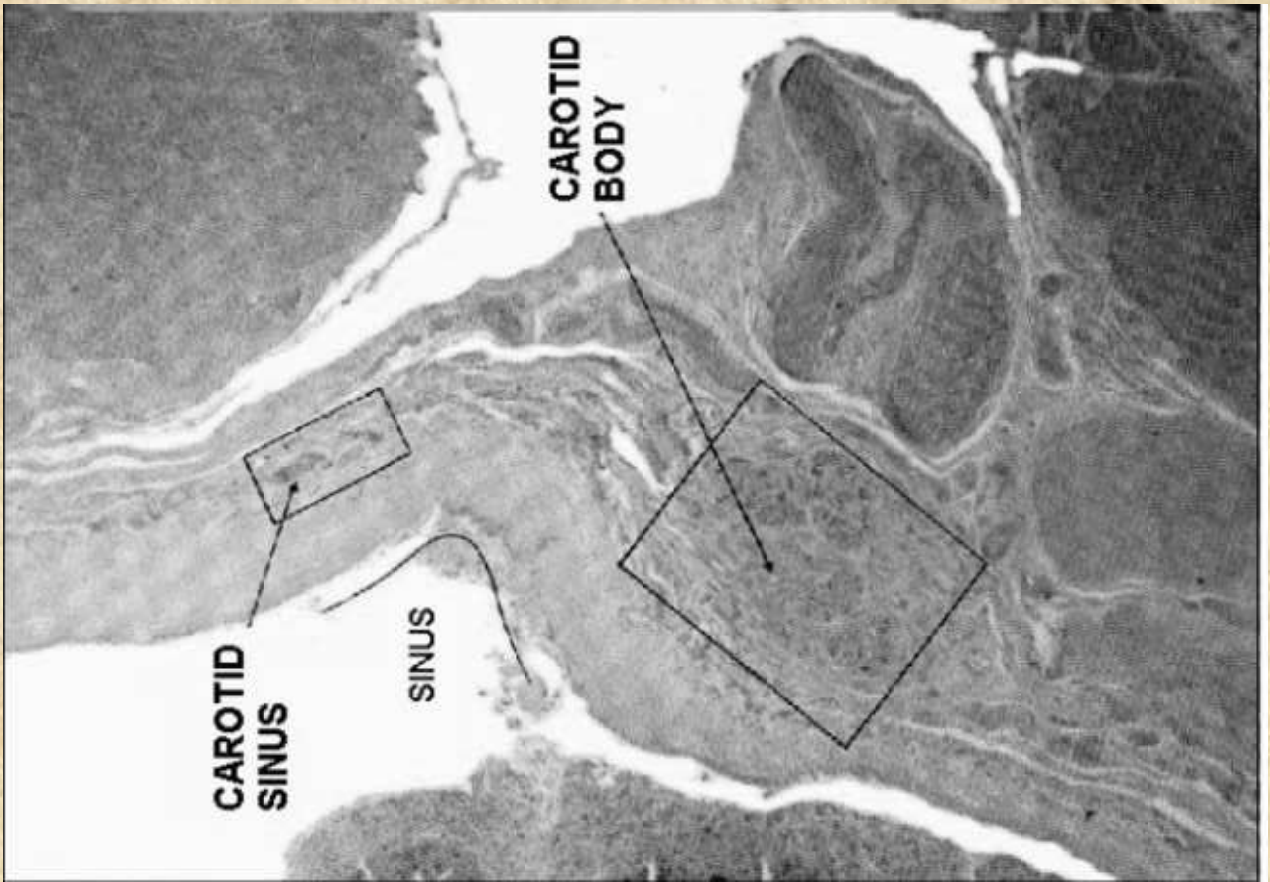


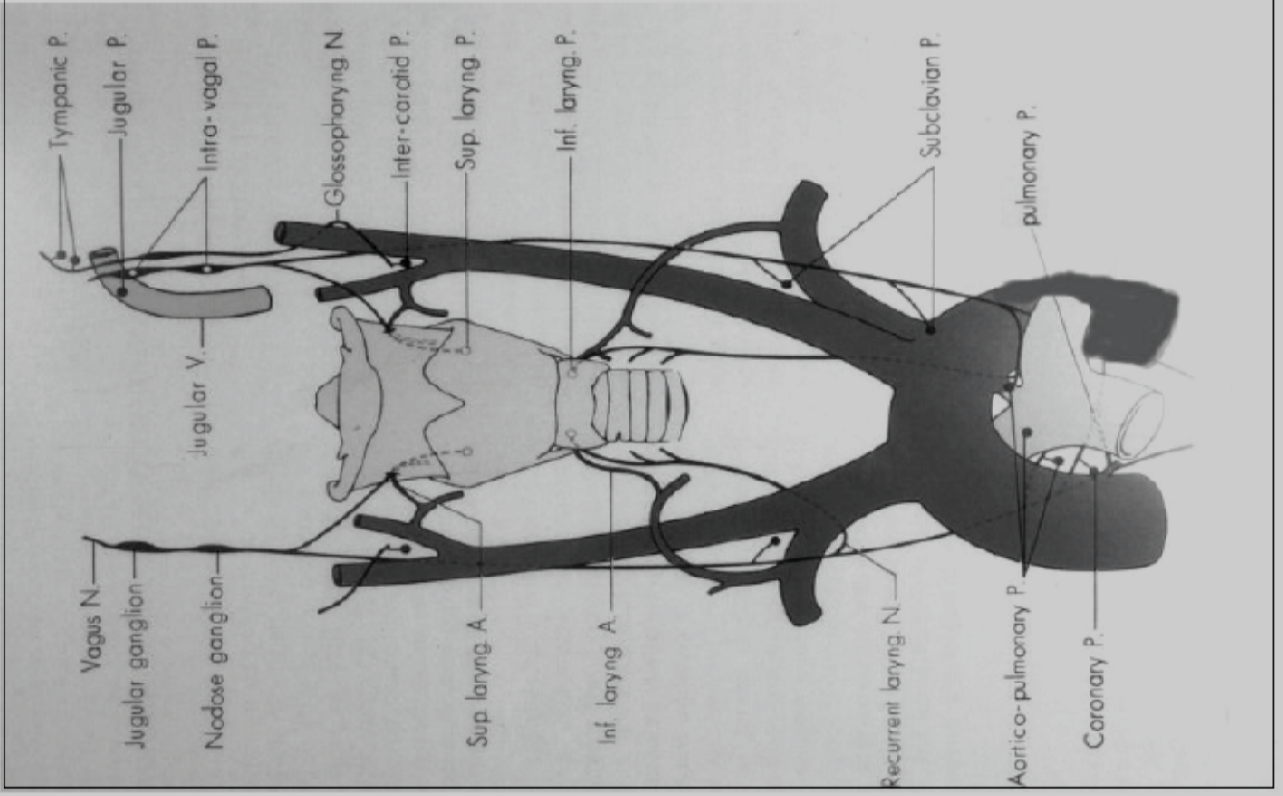
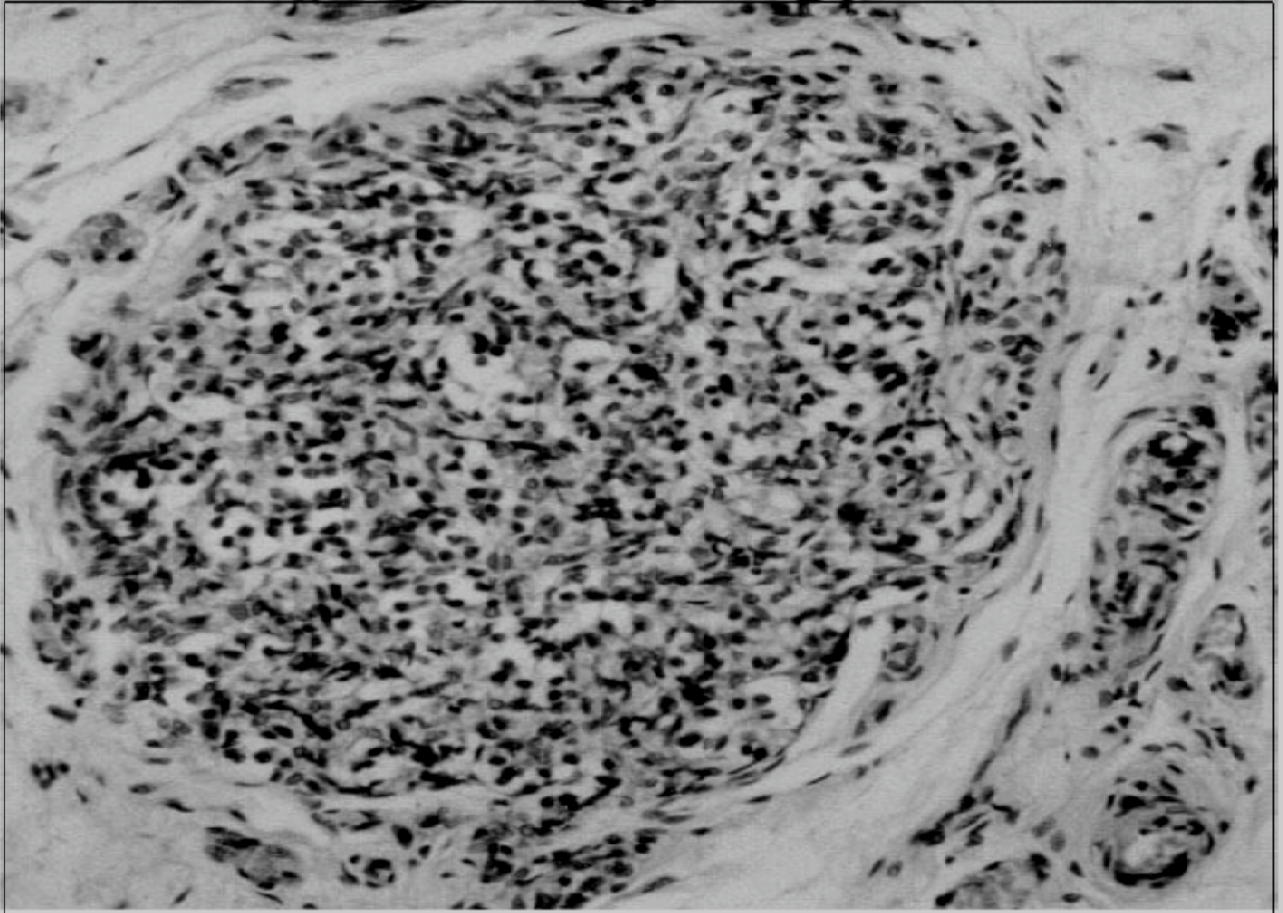
**CENTRO DI RICERCA
LINO ROSSI
Università di Milano**

Protocollo per l'esame del Sistema Nervoso Autonomo Periferico

Prelievo delle seguenti strutture:

- A) Gangli simpatici (gangli stellato e cervicale superiore)**
- B) Biforcazione carotidea**
- C) Plessi gangliari e paragangliari mediastinici**





Punti chiave

Cuore

Linee Guida per lo studio autoptico della morte improvvisa cardiaca

C. BASSO¹, M. BURKE², P. FORNES³, P. J. GALLAGHER⁴, R. H. DE GOUVEIA⁵, M. SHEPPARD⁶,
G. THIENE¹, A. VAN DER WAL⁷

A nome della *Association for European Cardiovascular Pathology*
<http://anpat.unipd.it/aecvpl/>

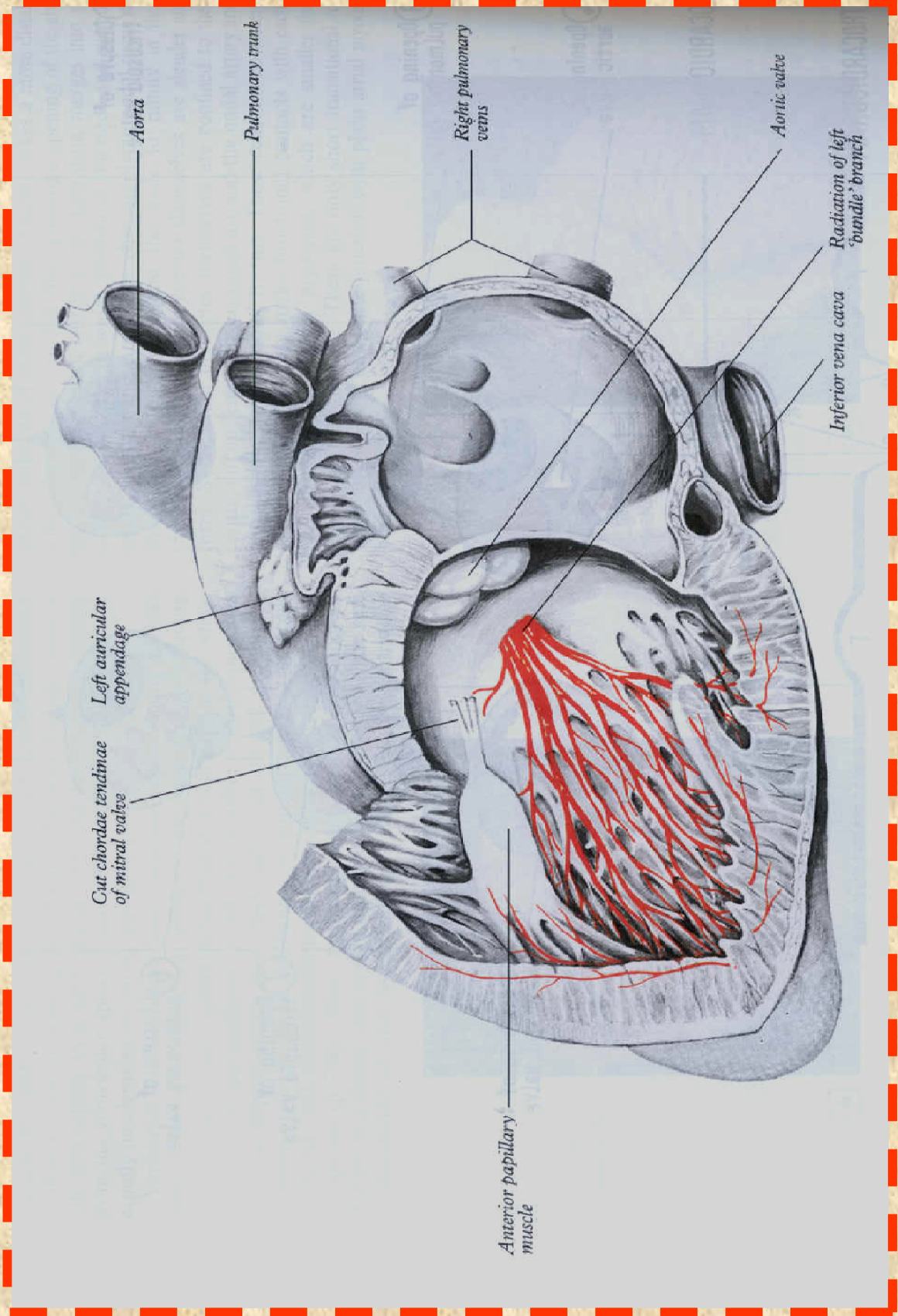
¹ Dipartimento di Scienze Medico Diagnostiche e Terapie Speciali, Università di Padova, Italia; ² Dipartimento di Istopatologia, Royal Brompton & Harefield NHS Trust, Harefield Hospital, UK; ³ Dipartimento di Patologia, Hôpital Européen G. Pompidou, Parigi, Francia; ⁴ Dipartimento di Patologia, Southampton University Hospitals, UK; ⁵ Dipartimento di Patologia, Hospital de Santa Cruz, Lisbona, Portogallo; ⁶ Dipartimento di Patologia, Royal Brompton Hospital, Londra, UK; ⁷ Dipartimento di Patologia, Academic Medical Center, Università di Amsterdam, Olanda

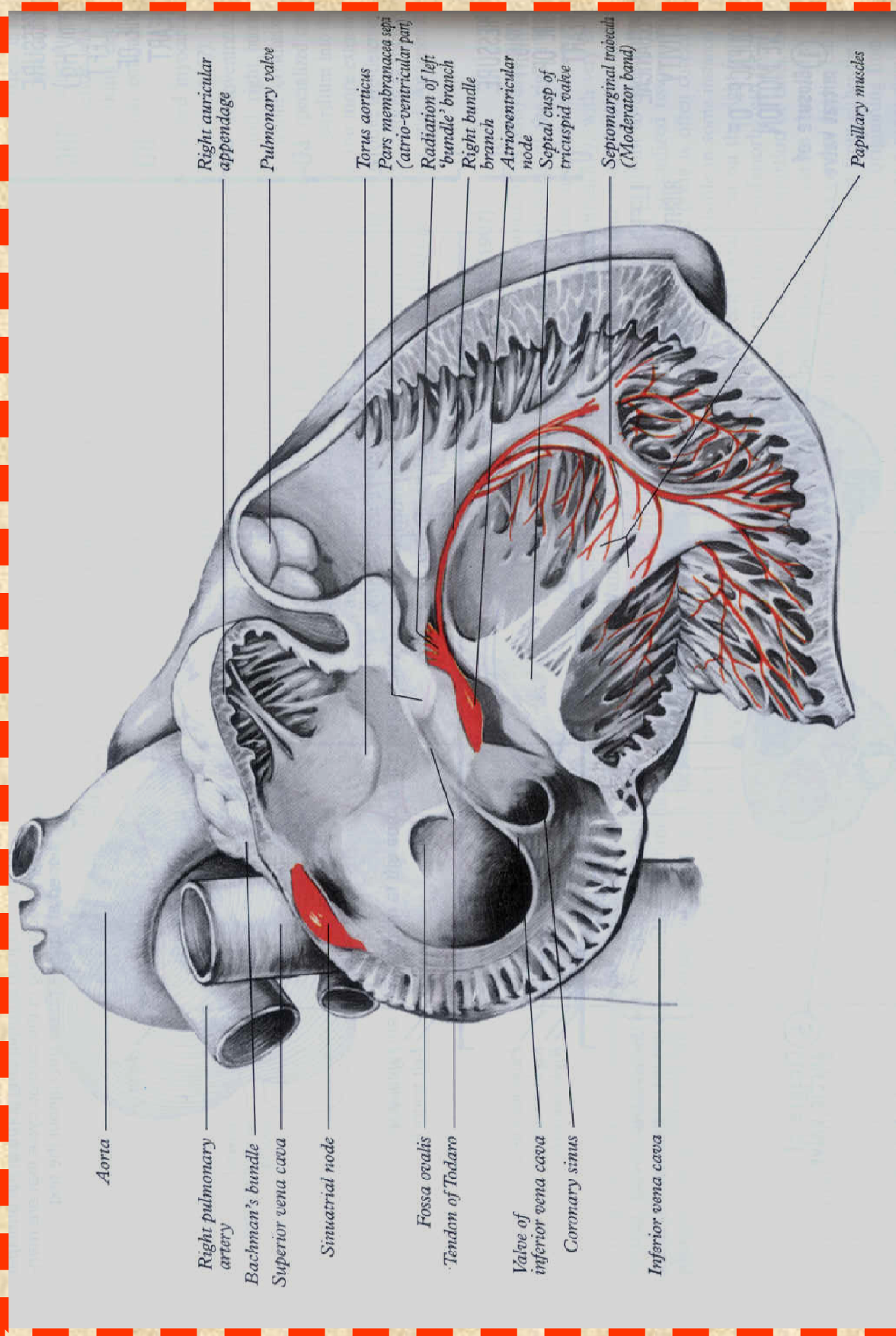
Parole chiave

Autopsia • Linee Guida • Protocollo • Morte improvvisa cardiaca

Tab. 1. Cause di MI allo studio postmortem.

Meccanica	<ul style="list-style-type: none"> Emopericardio e tamponamento cardiaco Rottura dell'aorta ascendente (ipertensione, Marfan, valvola aortica bicuspidale, coartazione, altre) Rottura di cuore post infartuale nella parete libera Embolia polmonare Insufficienza acuta della valvola mitrale con edema polmonare Rottura dei muscoli papillari post infartuale Rottura corde tendinee (prolasso mitrale) Ostruzione intracavitaria (i.e. trombo/neoplasia) Improvvisa disfunzione della protesi valvolare (i.e. lacerazione, deiscenza, blocco trombotico) Assenza congenita parziale del pericardio
Elettrica	<ul style="list-style-type: none"> Arterie coronarie (+/- cicatrice post infartuale) Anomale congenite: <ul style="list-style-type: none"> Origine dall'ACITA Seno sbagliato (arteria coronaria destra dal seno sinistro, arteria coronaria sinistra dal seno destro) Ramo circonflesso sinistro dal seno destro o dall'arteria coronaria destra Origine alta dalla porzione tubulare Plicatura ostiale Origine dell'arteria Polmonare Decorso intramiocardico ("ponte miocardico")
Acquisite	<ul style="list-style-type: none"> Aterosclerosi Complicata (trombo, emorragia) Non complicata
Embolia	<ul style="list-style-type: none"> Embolia Arterite Dissezione
Altro	<ul style="list-style-type: none"> Displasia fibromuscolare Malattia intramurale dei piccoli vasi Ricetto trapianto cardiaco, acuto o cronico Precedenti interventi chirurgici o procedure interventistiche Ry-pass coronarico (vena safena, arteria mammaia, arteria radiale, ecc.) Angioplastica coronarica con palloncino, stents
Miocardio	<ul style="list-style-type: none"> Cardiomiopatia ipertrofica Cardiomiopatia aritmogena del ventricolo destro Cardiomiopatia dilatativa Cardiomiopatia infiammatoria (miocardite) Cardiomiopatie secondarie (accumulo, infiltrative, sarcoidosi ecc.) Cardiomiopatia ipertensiva Ipertrofia idiopatica del ventricolo sinistro Cardiomiopatie non classificate (spongy myocardium, fibroelastosi)
Valvole	<ul style="list-style-type: none"> Stenosi aortica Degenerazione mixoide con prolasso della valvola mitrale Tessuto di conduzione Blocco seno-atriale Blocco atrio-ventricolare (malattia di Lev-Lenegre, Tumore cistico del nodo AV) Preeccitazione ventricolare (sindrome di Wolff-Parkinson-White, sindrome di Lown-Ganong-Levine)
Cardiopatia congenita (operata e non), con e senza sindrome di Eisenmenger	<ul style="list-style-type: none"> Cuore normale (MI "sine materia" o inspiegata o sindrome della MI aritmica) Sindrome del QT Lungo e corto Sindrome di Brugada Tachicardia ventricolare polimorfa catecolaminergica Fibrillazione ventricolare idiopatica
MI: morte improvvisa	





Aorta

Right pulmonary artery

Bachman's bundle

Superior vena cava

Sinoatrial node

Fossa ovalis

Tendon of Todaro

Valve of inferior vena cava

Coronary sinus

Inferior vena cava

Right auricular appendage

Pulmonary valve

Torus aorticus

Pars membranacea septi (atrio-ventricular part)

Radiation of left 'bundle' branch

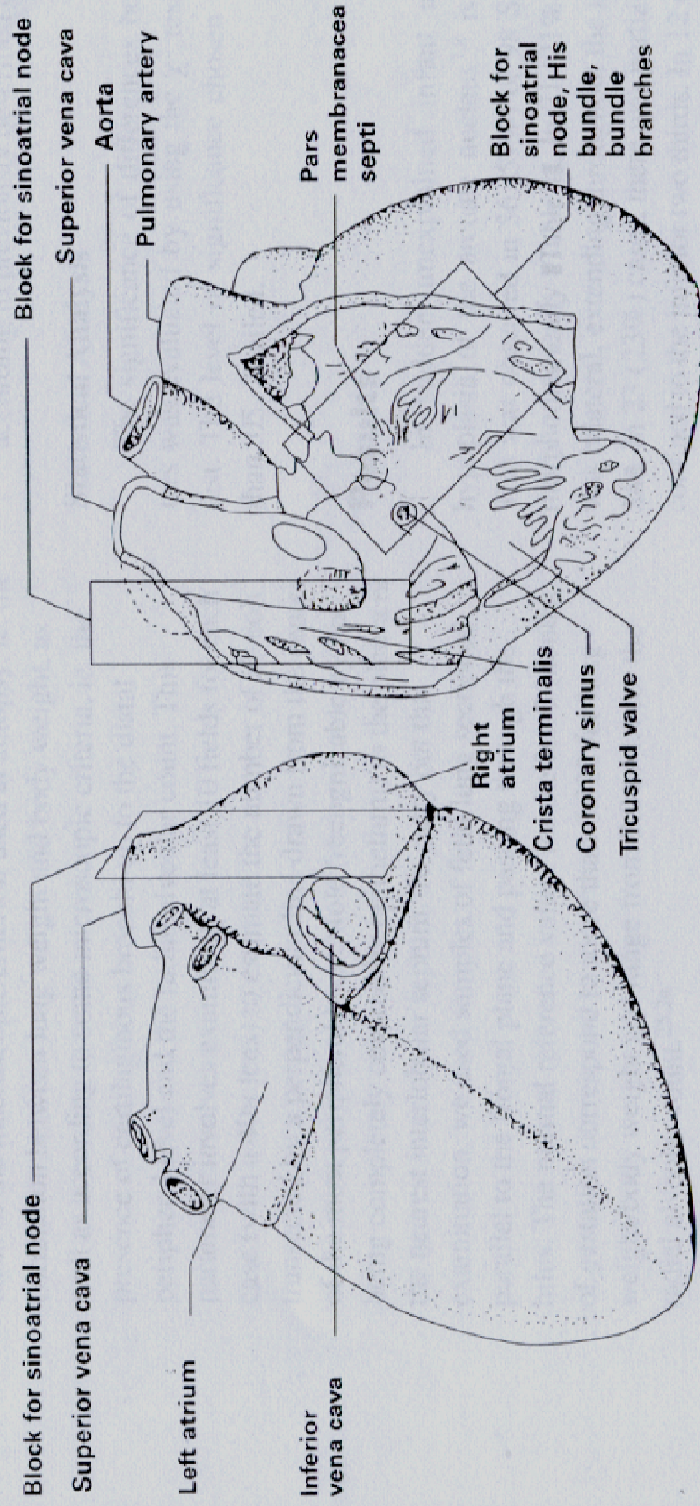
Right bundle branch

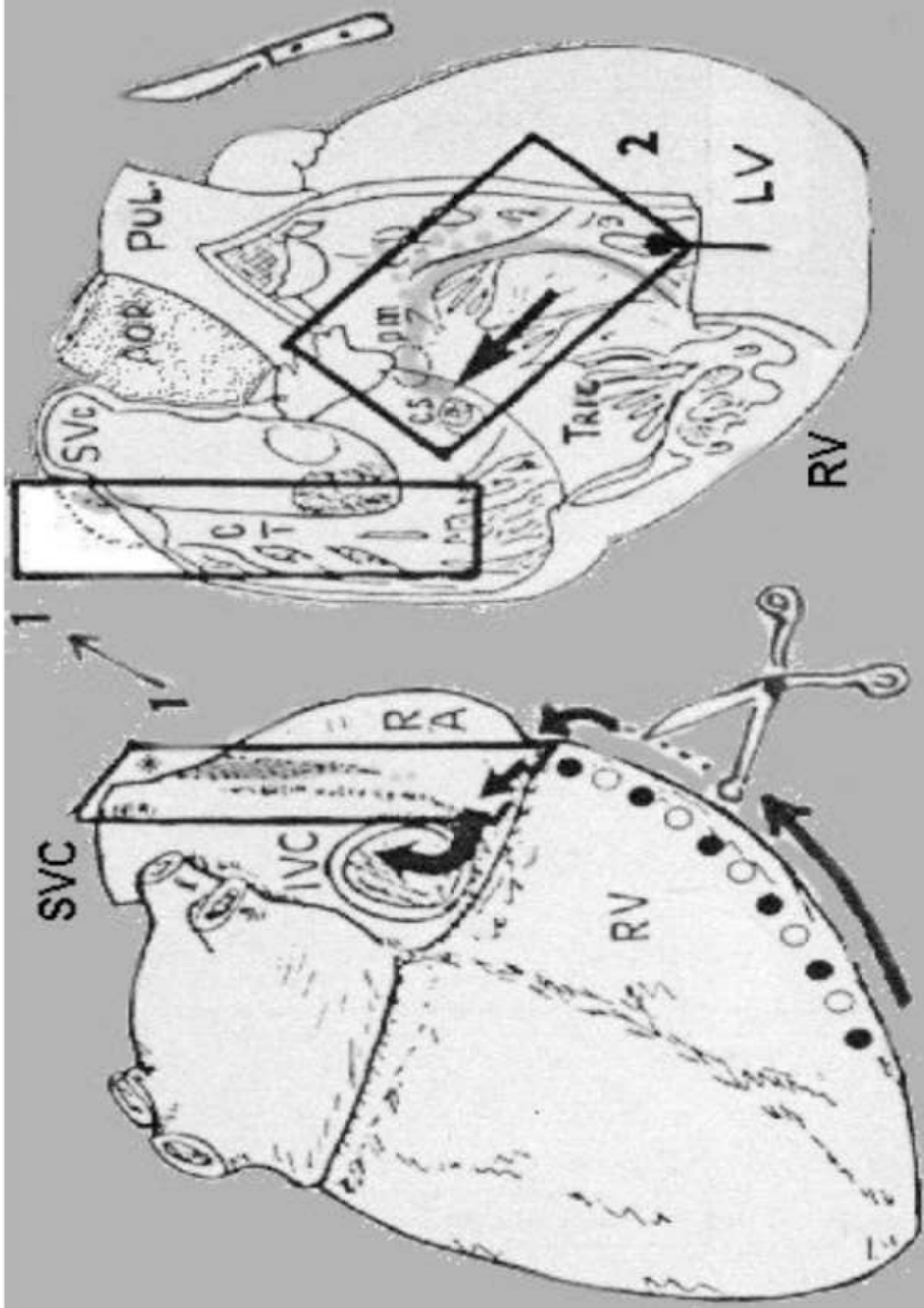
Atrioventricular node

Septal cusp of tricuspid valve

Septomarginal trabecula (Moderator band)

Papillary muscles





Block 1

R
A
R



INTERIOR



EXTERIOR



PERPENDIC.

Block 2



SEPTUM

post-inf.

-1-

↓

-6-

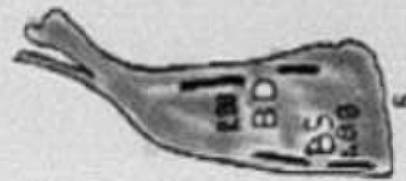
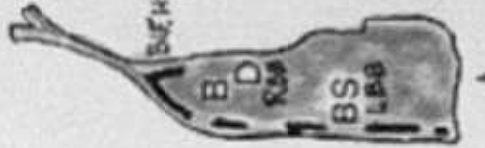


R. VENTR.

ant-sup.

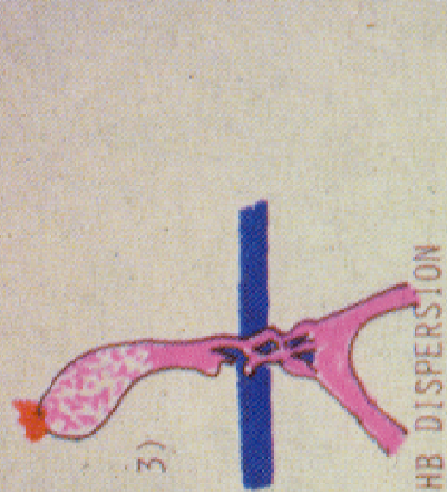
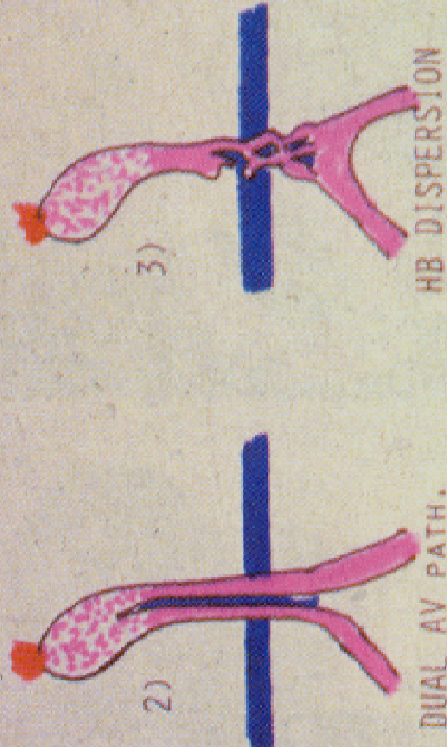
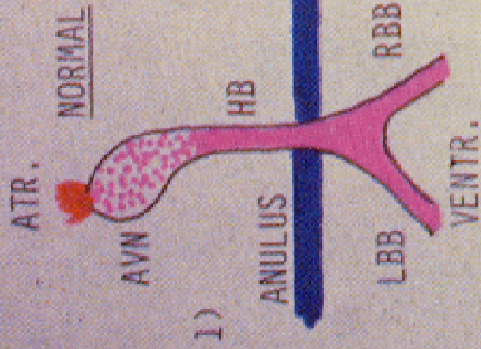


L. VENTR.



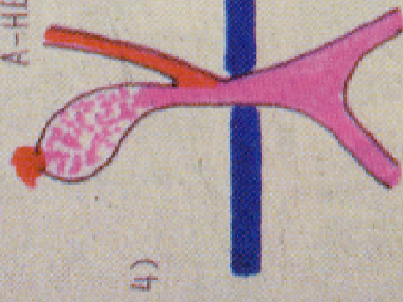
SERIAL SECTIONS

SPECIALIZED FIBERS ORDINARY

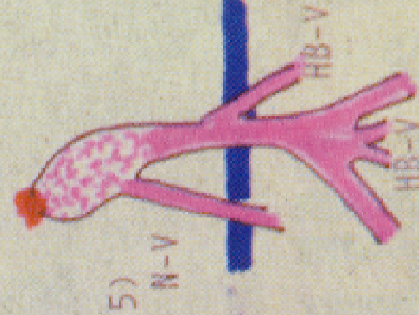


VIE A-V DUPLICI E ACCESSORIE

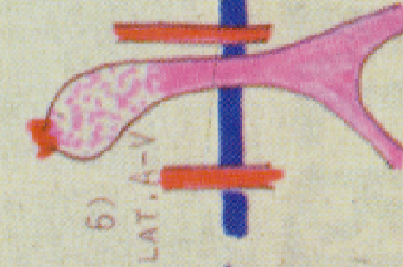
ACCESSORY PATHWAYS
JAMES'
A-HB



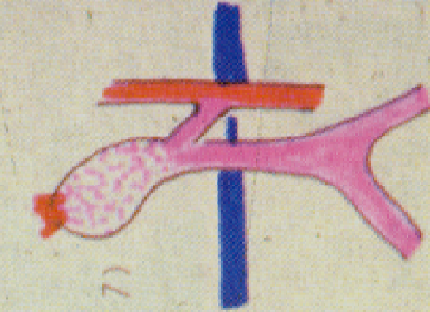
MAHAIM'S



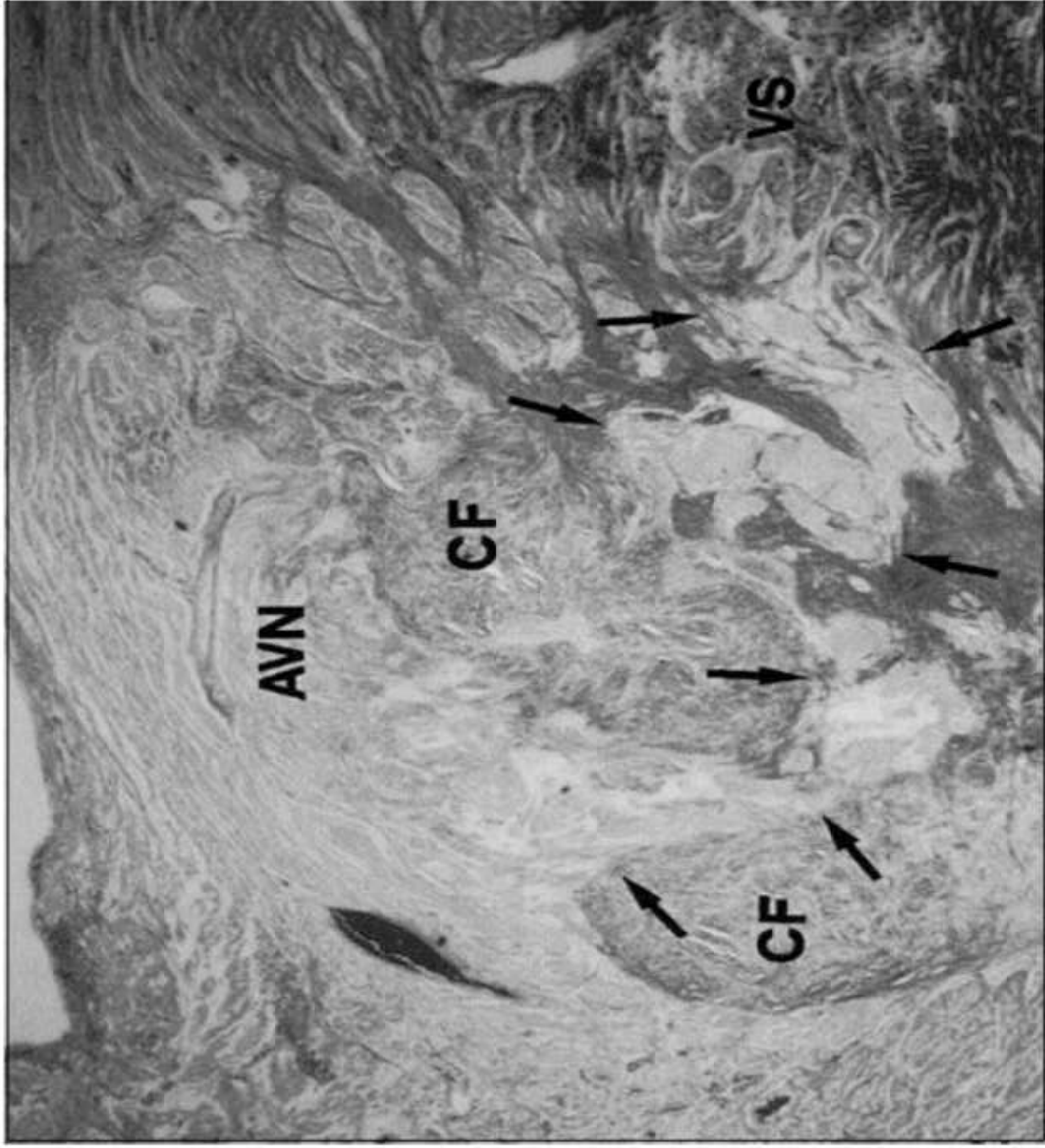
KENT'S



COMBINED
KENT-MAHAIM



MAHAIM FIBERS



KENT FIBERS

