Infección de la Herida quirúrgica en la Cirugía Cardiaca. Tipos y Diagnóstico

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- Introducción
- Tipos de Infección de la Herida
- Diagnóstico

Infección Nosocomial en Cirugía Cardiaca

Infección de Herida o sitio quirúrgica

- ✓ Complicación grave
- ✓ Mortalidad del 7-80%
- ✓ Aumento de estancia hospitalaria
- ✓ Aumento de costes: 2.700-58.000$

- ✓ Ocurre en el 0,8-20%
- ✓ Mortalidad del 0-80%
- ✓ Paciente, Cirugía y microbiología como factores de riesgo intervienen de forma compleja

Liu Z, et al. Medicine (Baltimore). 2021 29;100(4):e24162

Jayakumar S, et al. Crit Care Clin. 2020 Oct;36(4):581-592.

Observational Study

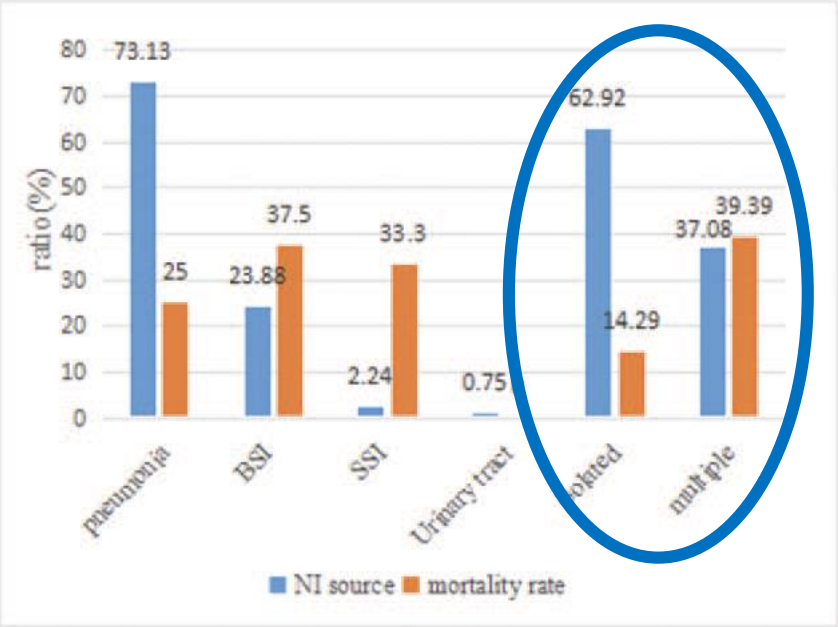
Medicine

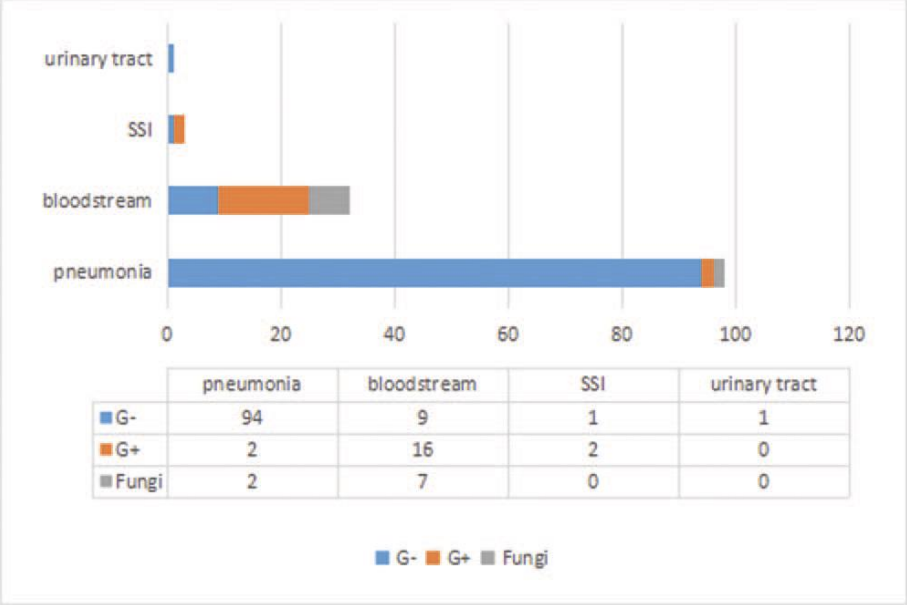
Clinical investigation of nosocomial infections in adult patients after cardiac surgery

Zhengqin Liu, MD, Xiquan Zhang, MD, Qian Zhai, MD*

UCI: Enero 2018 al Diciembre 2018
Retrospectivo

1.360 pacientes
89 (5,64%) IN





	pneumonia	bloodstream	SSI	urinary tract
G-	94	9	1	1
G+	2	16	2	0
Fungi	2	7	0	0

Liu et al. Medicine (2021) 100:4

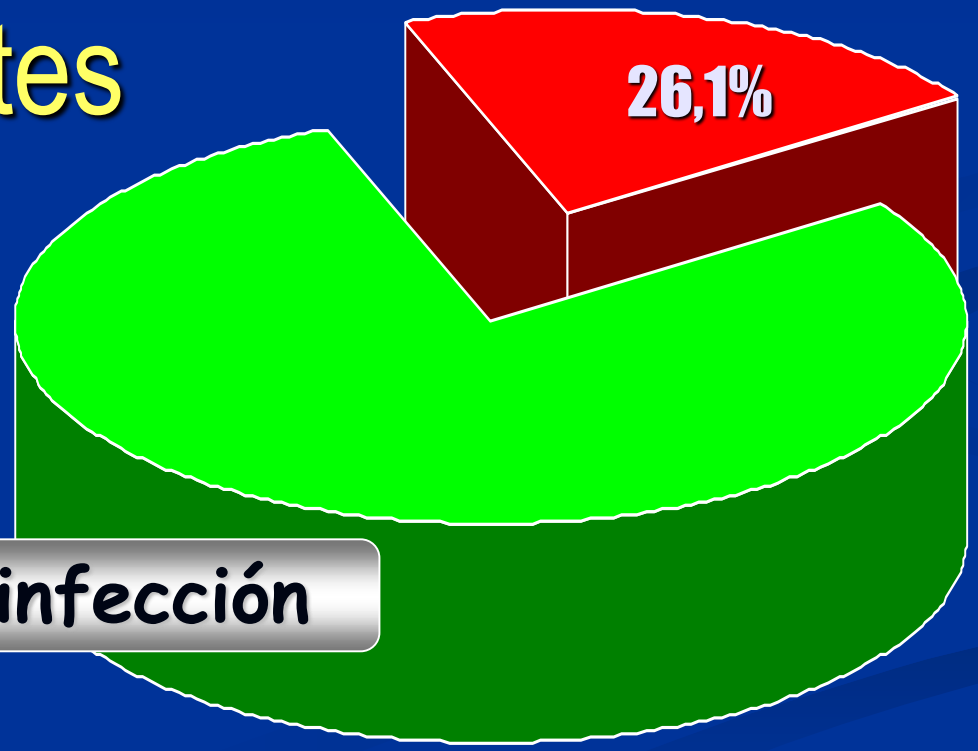
Infección Nosocomial

1 Junio 1999 al 31 Junio 2000

Prospectivo (ingres-30 días después del alta

134 con infección nosocomial

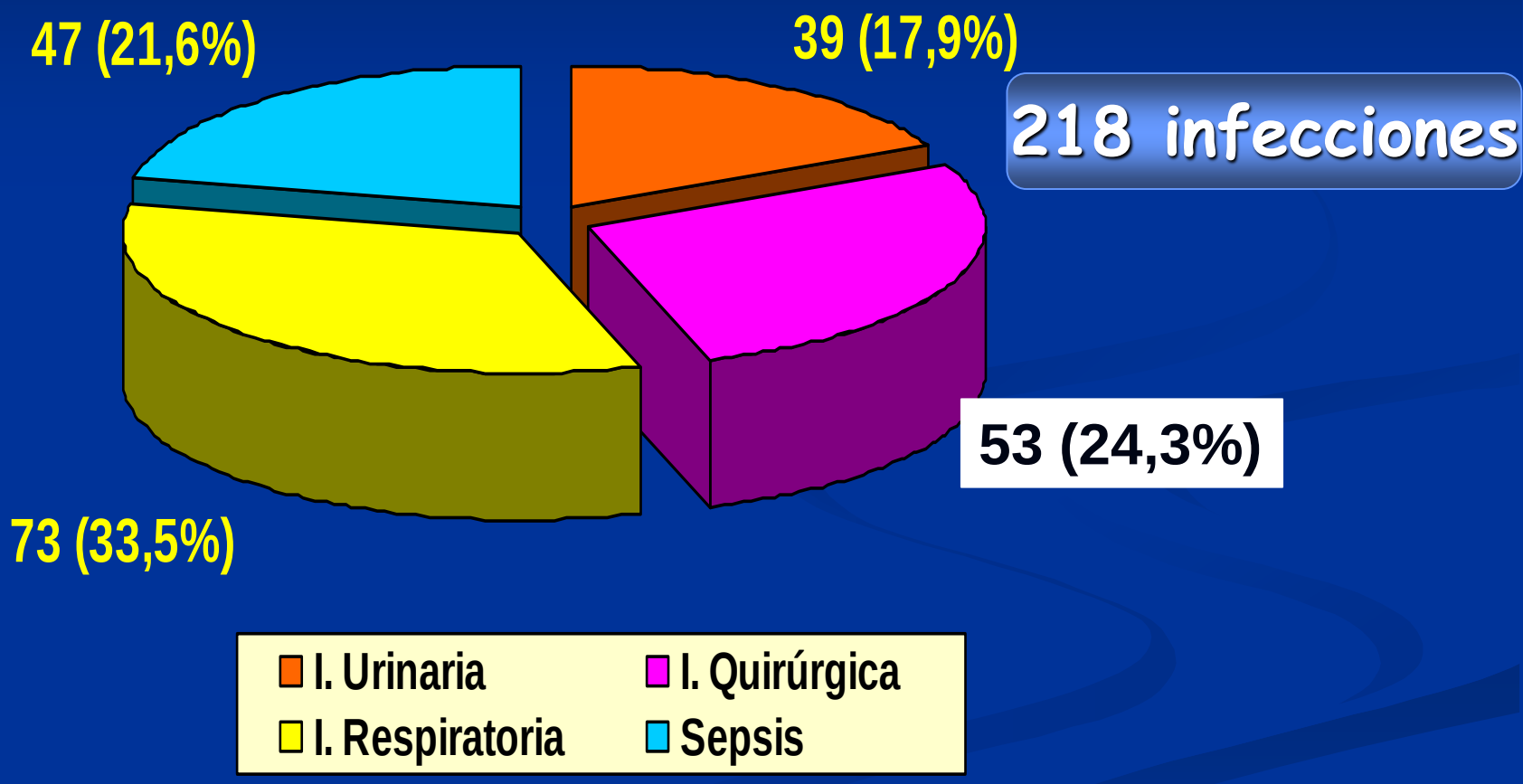
513 Pacientes



379 sin infección

Fernandez-Ayala M, Infect Control Hosp Epidemiol. 2006 Jan;27(1):85-8

Infección nosocomial por localización



Fernández-Ayala M, Infect Control Hosp Epidemiol. 2006 Jan;27(1):85-8

Surgical Site Infection During Hospitalization and After Discharge in Patients Who Have Undergone Cardiac Surgery

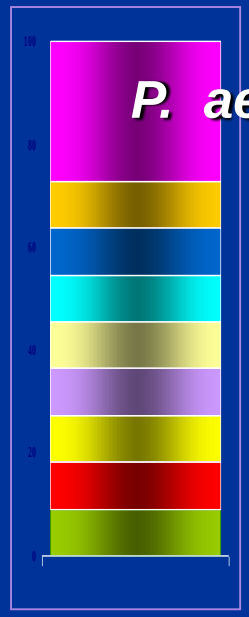
Marta Fernández-Ayala, MD; Daniel N. Nan, MD;
Concepción Fariñas-Álvarez, MD, PhD;
José M. Revuelta, MD, PhD;
Jesús González-Macías, MD, PhD;
M. Carmen Fariñas, MD, PhD

During a 13-month period, 513 patients who were scheduled to undergo cardiac surgery were prospectively observed for surgical site infection during hospitalization after surgery and for 1 month after hospital discharge. Fifty-three patients showed evidence of surgical site infection (during hospitalization for 31 patients and after discharge for 22). Multivariate analysis identified that risk factors for surgical site infection differed between infections that occurred during hospitalization and those that occurred after discharge.

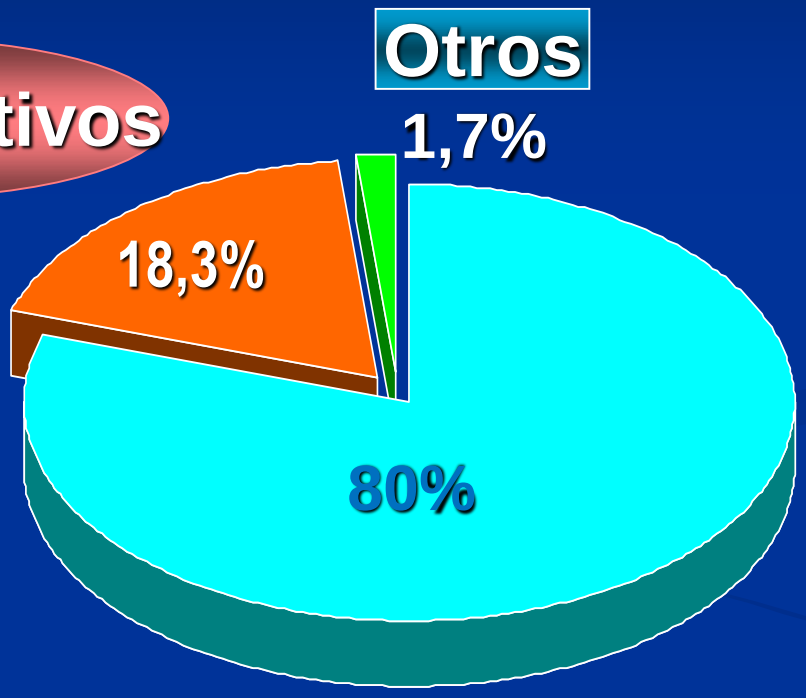
Infect Control Hosp Epidemiol 2006; 27:85-88

MICROORGANISMOS-ISQ

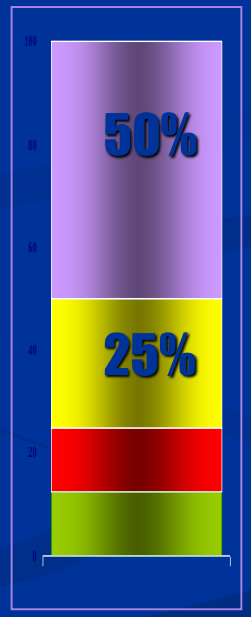
(60 AISLAMIENTOS)



Gramnegativos



Grampositivos



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types of surgical site infection after cardiac surgery

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RESULTS BY YEAR

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types of surgical site infection after cardiac surgery

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10 results

Page 1 of 1

RESULTS BY YEAR

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2021 2022

RESULTS BY IMPACT FACTOR

1 Cite Share

Surgical site infection after open and laparoscopic **surgery** in children: a systematic review and meta-analysis.

Alganabi M, Biouss G, Pierro A.

Pediatr Surg Int (IF: 1.83; **Q3**). 2021 Aug;37(8):973-981. doi: 10.1007/s00383-021-04911-4. Epub 2021 May 1.

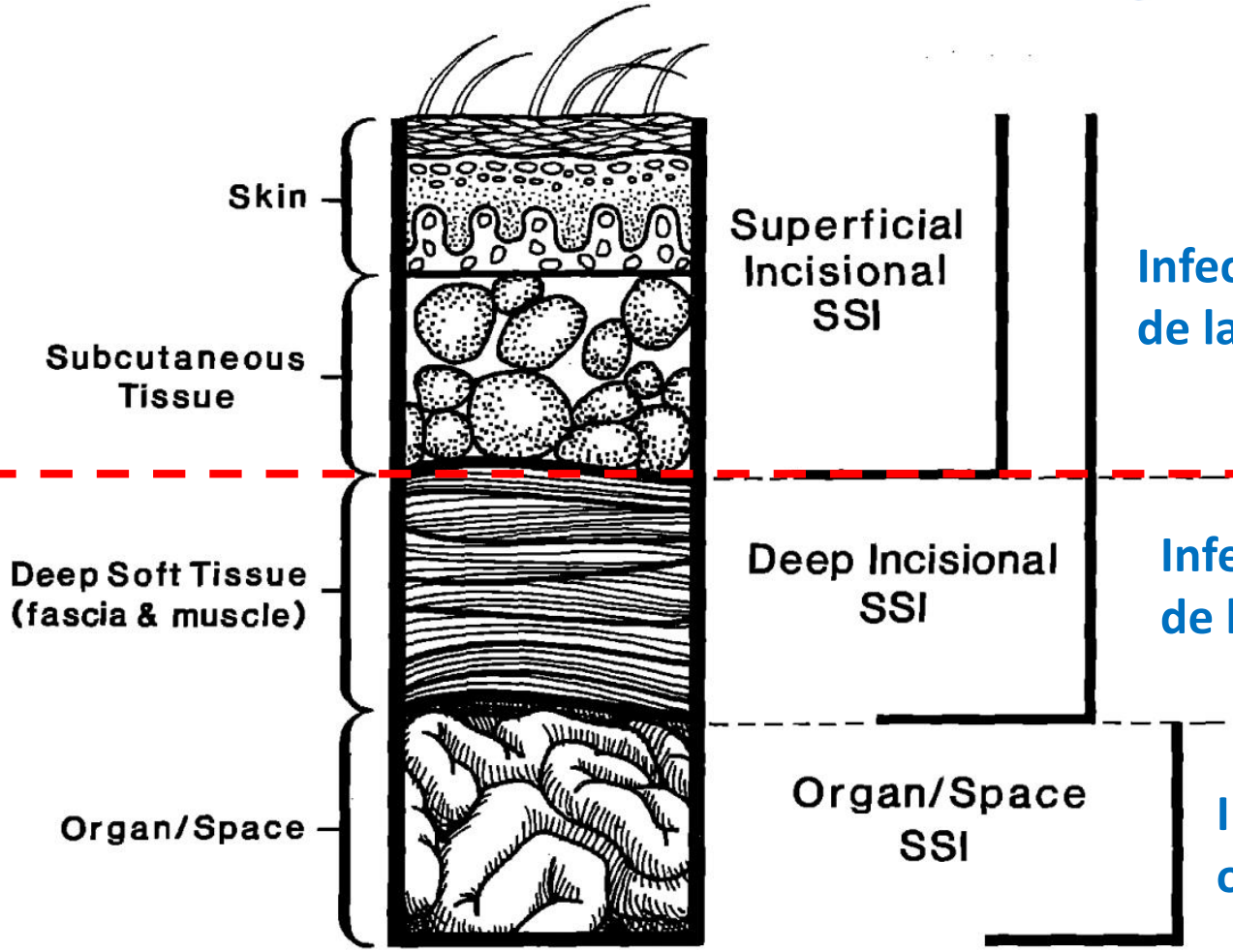
PMID: 33934183

Surgical site infections (SSIs) are the most common healthcare-associated infections in patients undergoing **surgery**. ...There was no significant difference in operative time of any of the other **procedures**. There was no significant difference in LOS bet ... >>>

¿Tipo de Infección de la herida quirúrgica en cirugía cardiaca?

Historia..

Tipos según la localización



Infección Superficial de la Incisión

Infección Profunda de la Incisión

Infección de órgano o espacio

Fig. 1. Schematic of the anatomy of SSIs and their appropriate classifications.

Horan TC, Gaynes RP et al; Infect Control Hosp Epidemiol, 1992. CDC definiciones

SSI-SURGICAL SITE INFECTION

SIP/SIS-Superficial incisional surgical site infection

A superficial incisional SSI (SIP or SIS) must meet the following criterion:

Infection occurs within 30 days after the operative procedure

and

involves only skin and subcutaneous tissue of the incision

and

patient has at least *1* of the following:

a. purulent drainage from the superficial incision
b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision
c. at least *1* of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, *and* superficial incision is deliberately opened by surgeon and is culture positive or not cultured. A culture-negative finding does not meet this criterion.
d. diagnosis of superficial incisional SSI by the surgeon or attending physician.

DIP/DIS-Deep incisional surgical site infection

A deep incisional SSI (DIP or DIS) must meet the following criterion:

Infection occurs within 30 days after the operative procedure if no implant[1] is left in place or within 1 year if implant is in place and the infection appears to be related to the operative procedure

and

involves deep soft tissues (eg, fascial and muscle layers) of the incision

and

patient has at least *1* of the following:

a. purulent drainage from the deep incision but not from the organ/space component of the surgical site
b. a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured when the patient has at least *1* of the following signs or symptoms: fever (>38°C), or localized pain or tenderness. A culture-negative finding does not meet this criterion.
c. an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination
d. diagnosis of a deep incisional SSI by a surgeon or attending physician.

Am J Infect Control 2008;36:309-32.

CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting

Teresa C. Horan, MPH, Mary Andrus, RN, BA, CIC, and Margaret A. Dudeck, MPH
Atlanta, Georgia

Superficial

There are 2 specific types of superficial incisional SSI:

- *Superficial incisional primary (SIP):* a superficial incisional SSI that is identified in the primary incision in a patient who has had an operation with 1 or more incisions (eg, C-section incision or chest incision for coronary artery bypass graft with a donor site [CBGB]).
- *Superficial incisional secondary (SIS)*: a superficial incisional SSI that is identified in the secondary incision in a patient who has had an operation with more than 1 incision (eg, donor site [leg] incision for CBGB).

Profunda

There are 2 specific types of deep incisional SSI:

- *Deep incisional primary (DIP)*: a deep incisional SSI that is identified in a primary incision in a patient who has had an operation with one or more incisions (eg, C-section incision or chest incision for CBGB); and
- *Deep incisional secondary (DIS):* a deep incisional SSI that is identified in the secondary incision in a patient who has had an operation with more than 1 incision (eg, donor site [leg] incision for CBGB).

Am J Infect Control 2008;36:309-32.c

Infección de órgano o espacio

Journal of Infection (2014) **68**, 21–22

ELSEVIER

EDITORIAL COMMENTARY

Diagnosing surgical site infection after cardiac surgery

Jan J. van Wingerden, Academic Medical Centre, University of Amsterdam.*

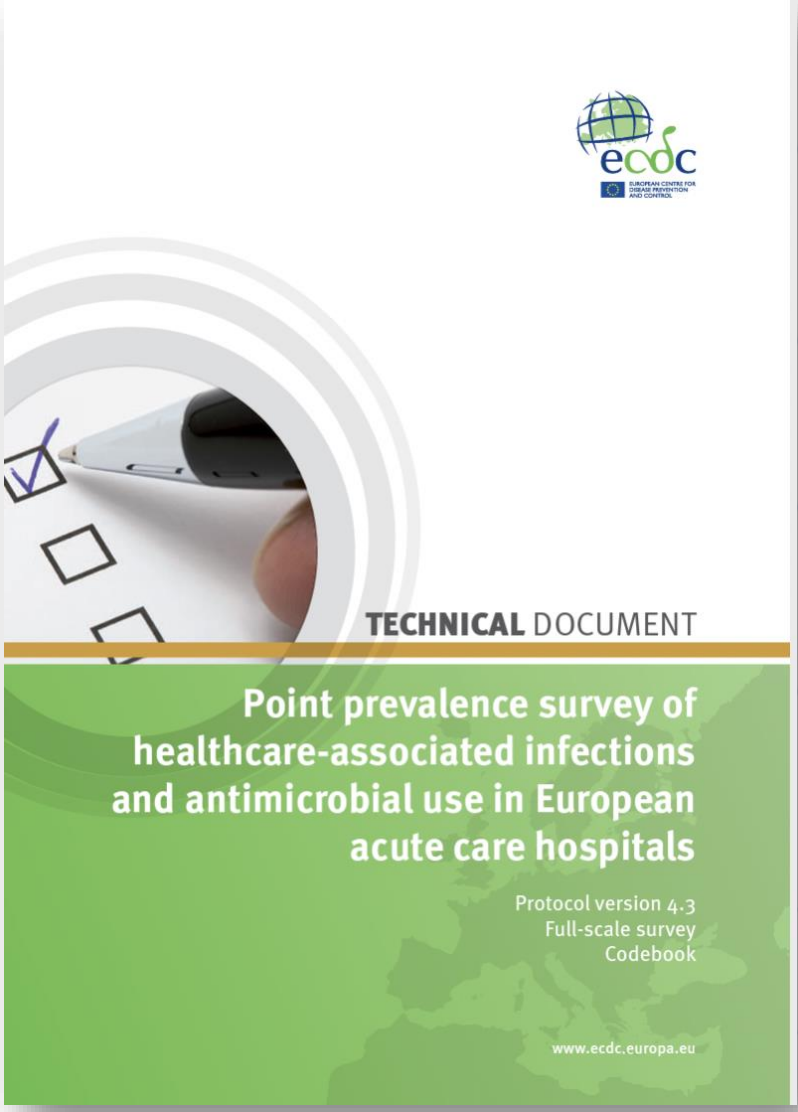


Table 1 ECDC case definition of a surgical site infection (SSI) of an organ/space.[1]

Organ/space (SSI-O)
Infection occurs within 30 days after the operation if no implant is left in place, *or* within one year if an implant is in place and the infection appears to be related to the operation *and* the infection involves any part of the anatomy (e.g. organs and spaces) other than the incision that was opened or manipulated during an operation, *and* at least *one* of the following: • purulent drainage from a drain that is placed through a stab wound into the organ/space; • organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space; • an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination; • diagnosis of organ/space SSI made by a surgeon or attending physician.

Surgical Site Infections in Cardiac Surgery

Shruti Jayakumar, MBBS[a], Ali Khoynezhad, MD, PhD, FHRS[b], Marjan Jahangiri, MBBS, MS, FRCS (CTh)[a,*]

St. George´s Hospital, Londres

Superficial Sternal Wound Infections incidencia: 8%

Deep Sternal Wound Infections Incidencia: 0,75% al 1,8%)

Harvest Site Infections Incidencia: 15,4%

Coronary artery bypass graft surgery (CABG) has the added risk of harvest site infections at conduit surgical sites, which involve the leg for long saphenous vein harvests or the forearm for radial artery harvests. Leg wounds are the most common site of infection in CABG patients with infection rates of up to 15.4%.[9] Open saphenous vein harvesting is associated with an increased risk of harvest site infections compared with endoscopic harvesting.[10]

Anderson DJ, et al. Strategies to prevent surgical site infections in acute care hospitals: 2014 update. Infect Control Hosp Epidemiol. 2014 Jun;35(6):605-27.

Review Article

Deep Sternal Wound Infection: Diagnosis, Treatment and Prevention

Priscilla Hui Yi Phoon, MBBS, MMed (Anaesthesia), FANZCA, MClinUS[*,†], Nian Chih Hwang, MBBS, FFARCSI, GDAcu[*,†,1]

[*]Department of Anaesthesiology, Singapore General Hospital, Singapore
[†]Department of Cardiothoracic Anaesthesia, National Heart Centre, Singapore

Table 2. Classification of Mediastinitis[a] in Patients Undergoing Cardiopulmonary Bypass

Class	Description
Type I	Mediastinitis presenting within 2 weeks after operation in the absence of risk factors[b]
Type II	Mediastinitis presenting at 2 to 6 weeks after operation in the absence of risk factors
Type IIIA	Mediastinitis type I in the presence of one or more risk factors
Type IIIB	Mediastinitis type II in the presence of one or more risk factors
Type IVA	Mediastinitis type I, II, or III after one failed therapeutic trial[c]
Type IVB	Mediastinitis type I, II, or III after more than one failed therapeutic trial
Type V	Mediastinitis presenting for the first time more than 6 weeks after operation

[a] Wound infection associated with sternal osteomyelitis with or without infected retrosternal space. [b] Risk factors identified in three or more major studies. Currently accepted incremental risk factors for mediastinitis are diabetes, obesity, and the requirement of immunosuppressive agents. [c] Failed therapeutic trial includes any surgical intervention with intent to treat mediastinitis.

Oakley, Wright. Ann Thorac Surg 1996

Table 1

Anatomical Classification of Sternal Wound Infections[20]

Sternal Wound Infection	Type	Tissue Involvement	Classification
Superficial sternal wound infection (Above fascial layer)	1	Skin and subcutaneous tissue	Superficial wound infection
Deep sternal wound infection (Below fascial layer)	2a	Retrosternal tissue and bone not involved	Deep incisional infection
	2b	Retrosternal tissue	Mediastinitis
	2c	Retrosternal tissue and bone	
	2d	Frank osteitis	

J Cardiothorac Vasc Anesth. 2020 Jun;34(6):1602-1613

Índice

- Introducción
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Definición IHQ / CDC

- Criterios clínicos
  - Exudación purulenta
  - Signos inflamatorios
  - Dehiscencia
- Criterios microbiológicos
  - Cultivos
- Opinión del cirujano o médico que lo atiende

Am J Infect Control 2008;36:309-32.c

Diagnóstico microbiológico: Cultivos

- ✓ Muestras obtenidas con torunda

  ¡¡ Puede NO diferenciar Colonización-Infección !!

- ✓ Punción-Aspiración de exudados
  - ✓ Imprescindible para cultivo de "anaerobios"
- ✓ Biopsia de tejidos

Mediastinitis. DIAGNÓSTICO

A. CLINICA: PI: 1-416 días. Sepsis sin signos de localización. Curso fulminante o forma larvada. Apariencia anormal de la herida operatoria o inestabilidad esternal o dehiscencia.

B. LABORATORIO: Leucocitosis DI. Hemocultivos positivos **50-60%.**

C. RADIOLOGIA: RX: ensanchamiento mediastínico
TAC**: S:** 67-100% **E:** 33-71%.

D. Gammagrafía con leucocitos marcados con Indio o Tecnecio. **S:** 65% **E:** 100%

E. La aspiración con aguja del mediastino. S: 65% E: 100% .

Mediastinitis post-esternotomía

Clínica de sospecha
Fiebre, exudado esternal...

Hemograma, gram y cultivo del exudado de herida esternal,
Hemocultivos
Valorar punción-aspiración del mediastino para cultivos

Técnicas de Imagen:
- Radiografía de Tórax
- TAC
- Gammagrafía (Leucocitos marcados ^{111}In, HM-PAO ^{99m}Tc)

Sospecha fuerte o Confirmación de Mediastinitis

Resultados negativos
- Descartar otras causas de fiebre
- Infección esternal superficial?

Tratamiento antibiótico empírico

Cirugía

Tratamiento antibiótico específico

Confirmación de Mediastinitis

Limpieza quirúrgica

Método abierto

Método cerrado

Review Article

Deep Sternal Wound Infection: Diagnosis, Treatment and Prevention

Priscilla Hui Yi Phoon, MBBS, MMed (Anaesthesia), FANZCA, MClinUS[*,†], Nian Chih Hwang, MBBS, FFARCSI, GDAcu[*,†,1]

[*]*Department of Anaesthesiology, Singapore General Hospital, Singapore*
[†]*Department of Cardiothoracic Anaesthesia, National Heart Centre, Singapore*

1. Positive microbial culture taken from mediastinal tissue or fluid.
2. Evidence of mediastinitis during surgery or on histopathological examination.
3. At least one of the following clinical features
   (a) Fever >38°C,
   (b) Chest pain, or
   (c) Sternal instability

+

Al menos 1 de los siguientes:
1. Secreción mediastínica purulenta,
2. Hemocultivos o cultivos del exudado mediastínico positivos
3. Evidencia radiológica de ensanchamiento del mediastino.

J Cardiothorac Vasc Anesth. 2020 Jun;34(6):1602-

Journal of
Clinical Medicine

MDPI

Review

Prevention, Diagnosis and Management of Post-Surgical Mediastinitis in Adults Consensus Guidelines of the Spanish Society of Cardiovascular Infections (*SEICAV*), the Spanish Society of Thoracic and Cardiovascular Surgery (*SECTCV*) and the Biomedical Research Centre Network for Respiratory Diseases (*CIBERES*)

Emilio Bouza [1], Arístides de Alarcón [2], María Carmen Fariñas [3], Juan Gálvez [4], Miguel Ángel Goenaga [5], Francisco Gutiérrez-Díez [6], Javier Hortal [7], José Lasso [8], Carlos A. Mestres [9], José M. Miró [10], Enrique Navas [11], Mercedes Nieto [12], Antonio Parra [13], Enrique Pérez de la Sota [14], Hugo Rodríguez-Abella [15], Marta Rodríguez-Créixems [1], Jorge Rodríguez-Roda [16], Gemma Sánchez Espín [17], Dolores Sousa [18], Carlos Velasco García de Sierra [19], Patricia Muñoz [1] and Martha Kestler [1,*]

J. Clin. Med. 2021, 10, 5566.

Páginas de 9-14

1. Do Surveillance Cultures Performed at the Time of Mediastinal Wound Closure Allow Predicting the Risk of Mediastinitis and Anticipate the Aetiology?

2. Is Radiologically Guided Needle Aspiration Convenient in Patients from Whom Parasternal or Retrosternal Purulent Collection Is Performed?

3. What Interpretation Should Be Given to Cultures Derived from Superficial Wounds or Fistulous Tracts in Cases of Suspected Mediastinitis?

4. What Is the Value of Anticipating the Diagnosis of Mediastinitis from Routine Cultures of Pacemaker Wires?

5. Does the Information Regarding Any Microorganism Identified from Samples Not Necessarily Sterile, Cultures Grown during Patient's Progress and Samples Different from the Original One Have Any Value?

6. What Is the Significance of Positive Blood Cultures in Patients with Suspected Mediastinitis?

7. What Is the Value of Molecular and Other Non-Culture-Based Methods in the Diagnosis ofMediastinitis?

8. What Aetiology-Related Determinations Are Possible in Patients with Conventional Negative Bacterial Cultures?

9. Imaging Tests in the Diagnosis of Post-Surgical Mediastinitis

- *9.1. What Is the Diagnostic Value of a Plain X-ray for the Diagnosis of Mediastinitis?*
- *9.2. What Is the Diagnostic Value of a Computed Tomography Scan?*

10. Are Imaging Tests Necessary When There Is a Clear Diagnosis of Mediastinitis?

MICROBIOLOGÍA

	Recommendation	Grade of Evidence/Strength of Recommendation
1	Interpretation of bacterial culture results different from the original mediastinal tissue samples or blood cultures, and must be performed on a case-by-case basis. Their potential significance will depend on the type of isolated microorganism, the collection site and the clinical picture.	*Evidence level 3. Strong recommendation, low quality of evidence*
2	Presence of significant bacteraemia, with no other clear origin in the 90 days after surgery, is potentially indicative of mediastinitis, particularly when the isolate is *S. aureus*.	*Evidence level 2+. Strong recommendation, low quality of evidence*
3	There is not enough evidence yet to recommend the routine use of non-culture-based methods for the diagnosis of mediastinitis.	*Evidence level 3. Strong recommendation, low quality of evidence*
4	Recommendations for the diagnostic approach in mediastinitis with classic negative culture cases should include: specific serological tests (*Coxiella* and *Bartonella*), deep mediastinal samples for 16S and 18S (panbacterial and panfungal, respectively) PCRs and cultures in special media for *Mycoplasma* spp., *Ureaplasma* spp., *Legionella* spp., *Nocardia* spp., Fungi and Mycobacteria.	*Evidence level 3. Strong recommendation, low quality of evidence*

PRUEBAS DE IMAGEN

1	Plain X-rays are of limited use for the diagnosis of mediastinitis. We do not recommend their use as the first-choice diagnostic imaging test.	*Evidence level 2+. Strong recommendation, moderate quality of evidence*
2	We recommend performing a CT scan as the first-choice diagnostic imaging technique in post-surgical mediastinitis. Scans should be performed two weeks after the surgery, when gas or normal collections of the immediate post-surgery period should not be present.	*Evidence level 2+. Strong recommendation, moderate evidence quality*
3	We do not recommend a routine use of MRI, as there are few available data and wires can cause artefacts.	*Evidence level 3. Strong recommendation, low quality of evidence*
4	Nuclear medicine techniques may be a useful tool in the study of sternum osteomyelitis. There is not enough evidence to recommend the routine use of PET-CT in patients with suspected mediastinitis. However, it may be useful in cases with suspected chronic infection, as well as for monitoring response to treatment.	*Evidence level 2+. Strong recommendation, moderate quality of evidence*
	We recommend performing a CT scan whenever there are signs of infection, despite the scarce information in the literature on this topic.	*Evidence level 3. Strong recommendation, low quality of evidence*

Suppurative Mediastinitis After Open-Heart Surgery: A Case-Control Study Covering a Seven-Year Period in Santander, Spain

M. Carmen Fariñas, F. Galo Peralta, J. M. Bernal, J. M. Rabasa, J. M. Revuelta, and J. González-Macías

From the Infectious Diseases Unit, Department of Internal Medicine, and the Department of Cardiovascular Surgery, Hospital Universitario "Marqués de Valdecilla," Universidad de Cantabria, Santander, Spain

Clinical Infectious Diseases
1995;20:272–9

Postsurgical Mediastinitis: A Case-Control Study

P. Muñoz, A. Menasalvas, J. C. L. Bernaldo de Quirós, M. Desco, J. L. Vallejo, and E. Bouza

From the Services of Clinical Microbiology and Infectious Diseases, Experimental Medicine, and Cardiac Surgery, Hospital General Universitario ''Gregorio Marañón,'' Madrid, Spain

We report the results of a case-control study of postsurgical mediastinitis (PSM) that we conducted from 1985 to 1993. The incidence of PSM was 2.2% (81 of 3,711 cases who underwent sternotomy); we analyzed the findings for 73 cases and 73 controls. Univariate analysis revealed that the risk factors for PSM were emergency surgery (27% of cases vs. 13% of controls), New York Heart Association functional class IV (46.5% vs. 21.9%), heart transplantation (12% vs. 0), and coronary artery bypass graft (CABG) surgery (60% vs. 41%). The incidences of fever, reoperation for bleeding, pacemaker placement, use of vasoactive drugs, prolonged mechanical ventilation, use of central lines, and treatment in the intensive care unit were also higher for cases. Multivariate analysis identified the following independent risk factors for PSM: reoperation (risk ratio [RR], 9.2), need for vasoactive drugs (RR, 3.5), CABG surgery (RR, 3.2), and fever that persisted after the third postsurgical day (RR, 406). The related mortality was 13.7%, and death was significantly more frequent among cases (17.7%) than among controls (2.7%). Multivariate analysis identified the following independent risk factors for mortality: bacteremia (RR, 21.5), the use of an intraaortic balloon (RR, 14.9), advanced age (RR, 1.14 per year), and prolonged mechanical ventilation (RR, 1.1 per day).

Clinical Infectious Diseases
1997;25:1060–4

INFECTIOUS DISEASES UNIT

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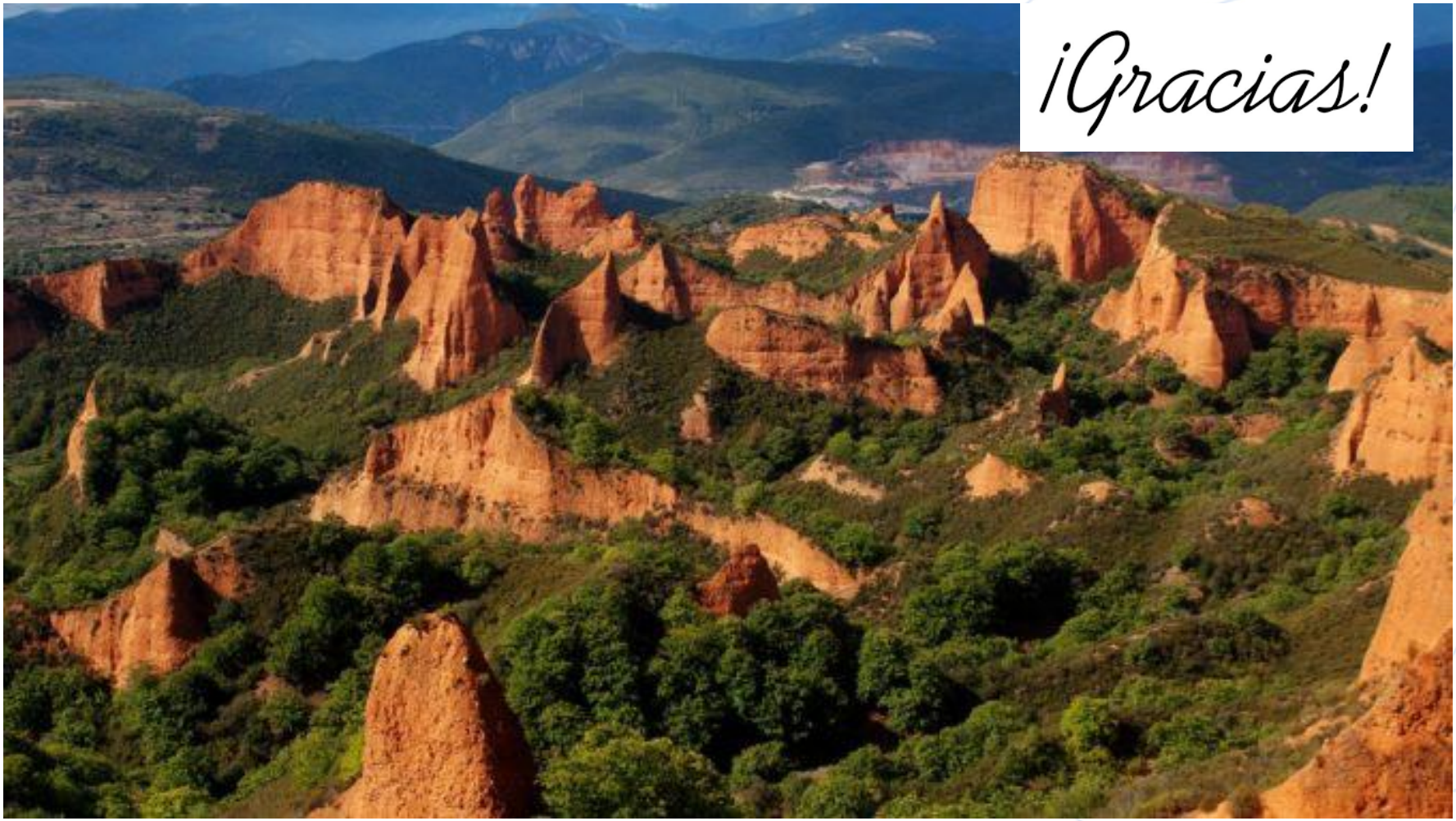
¡Gracias!