Orthopea
Anestesia e Ortopedia

V CONGRESSO NAZIONALE ORTHOPEA

Qualità ed appropriatezza
Better and Faster

TRATTAMENTO DELLE INFEZIONI PROTESICHE: STATO DELL'ARTE

Paolo Viganò
Infettivologo
HMD - Castellanza

Milano 16-17 settembre 2021

CAPITOLO 1 | Il RIAP nel contesto del RIPI: aggiornamento e attività 2018-2019

riap

Registro Italiano ArtroProtesi

Report Annuale 2019

Compendio

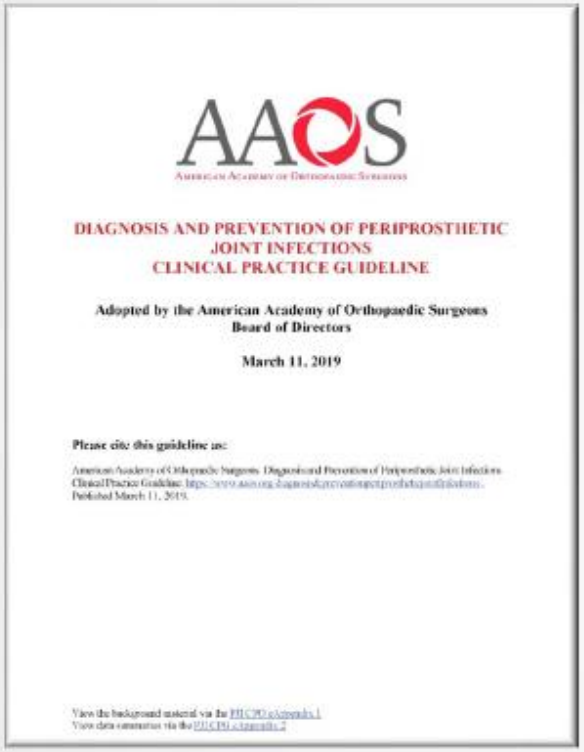
Figura 1.2. Partecipanti al RIAP (novembre 2019)

INFEZIONE PROTESI ORTOPEDICHE

Continuo incremento della chirurgia protesica
(Italia: oltre 175.000 protesi /anno)

→ Incremento delle protesi impiantate
in soggetti in età avanzata
e con fattori di rischio per infezioni

RIAP report annuale 2019



AAOS
American Academy of Orthopaedic Surgeons

DIAGNOSIS AND PREVENTION OF PERIPROSTHETIC JOINT INFECTIONS
CLINICAL PRACTICE GUIDELINE

Adopted by the American Academy of Orthopaedic Surgeons Board of Directors

March 11, 2019

Please cite this guideline as:

American Academy of Orthopaedic Surgeons. Diagnosis and Prevention of Periprosthetic Joint Infections Clinical Practice Guideline. https://www.aaos.org/diagnosisandpreventionofperiprostheticjointinfections. Published March 11, 2019.

View the background material via the PJI CPG eAppendix 1
View data summaries via the PJI CPG eAppendix 2

The American Academy of Orthopaedic Surgeons 2019 Clinical Practice Guideline on the Diagnosis and Prevention of Periprosthetic Joint Infections

Creighton C. Tubb, MD; Gregory G. Polkowski, MD; Wayne E. Moschetti, MD, MS; Bryan J. Pack, MD; Kathleen G. Beavis, MD; Robin Patel, MD; James D. Slover, MD; Matthew J. Kraay, MD; Christopher J. Palestro, MD; Stefan Riedel, MD; Mihra S. Taljanovic, MD; Karl Roberts, MD; Antonia Chen, MD, MBA; **AAOS Staff:** Jayson N. Murray, MA; Kyle Mullen, MPH; Patrick Donnelly, MA; Nicole Nelson, MPH; Mary DeMars; Kaitlyn Sevarino, MBA; Anne Woznica, MLIS, AHIP; Peter Shores, MPH

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American Academy of Orthopaedic Surgeons

AVOIDING ANTIMICROBIALS TWO WEEKS PRIOR TO OBTAINING INTRA-ARTICULAR CULTURE

- Limited evidence supports withholding antimicrobials for a minimum of two weeks prior to obtaining intra-articular culture to establish the diagnosis of PJI.

Strength of Recommendation: Limited 

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INITIATING ANTIMICROBIALS PRIOR TO OBTAINING INTRA-ARTICULAR CULTURE

- Moderate evidence supports avoiding administration of antimicrobials in patients suspected of having a periprosthetic joint infection until cultures have been obtained and a diagnosis has been established.

Strength of Recommendation: Moderate 

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Orthopea
Anestesia e Ortopedia

Linee Guida
SIOT

Giornale Italiano di Ortopedia e Traumatologia
2019;45:187-213; doi: 10.32050/0390-0134-203

Coordinamento del progetto ed elaborazione del documento

Giuseppe Sessa
Carlo L. Romanò

Gruppo di Lavoro multidisciplinare

Linea Guida SIOT
Diagnosi di infezione peri-protesica articolare ritardata o tardiva (tempo trascorso dall'intervento > 90 giorni)

SOCIETÀ ITALIANA
DI ORTOPEDIA
E TRAUMATOLOGIA

Definizione di Infezione Periprotesica Articolare

Infectious Disease Society of America
(IDSA, Osmon 2013)

International Consensus Meetings on musculoskeletal Infection
(Parvizi J. 2018)

European Bone and Joint Infection Society
(Renz N. EBJIS 2018)

Worldwide Association against Infection in Orthopaedics and Trauma
(Romanò CL WAIOT 2019)

SOCIETÀ ITALIANA
DI ORTOPEDIA
E TRAUMATOLOGIA

Definizione di Infezione Periprotesica Articolare

Condiviso l'assunto di base …

la definizione di Infezione Periprotesica Articolare

richiede una **valutazione combinata di più dati clinici e di diversi test diagnostici,**

ogni definizione è diversa:

- numero e tipologia dei diversi criteri diagnostici da considerare
- valori di riferimento differenti per lo stesso esame

SOCIETÀ ITALIANA
DI ORTOPEDIA
E TRAUMATOLOGIA

Definizione di Infezione Periprotesica Articolare

Limiti intrinseci propri di tutte le definizioni

tutti gli Autori segnalano

“sebbene l’utilizzo nella pratica clinica delle attuali definizioni sia utile o addirittura necessario, esistono casi nei quali le stesse definizioni non sono attendibili e, quindi, in un dato paziente, ***è sempre necessario utilizzare al meglio il proprio discernimento clinico per porre la diagnosi finale****.”*

Classificazione “temporale”

(non disponibile classificazione accettata a livello internazionale)

EARLY	- precoci:	primi 3 mesi (per alcuni prime 6 sett)
DELAYED	- ritardate:	tra 3 mesi e 2 anni
LATE	- tardive:	oltre 2 anni dall’intervento

Widmer AF., Clin Infect Dis 2001;33 Suppl12:S94-S106

REVIEW ARTICLE

Gli antibiotici dove arrivano?

Penetration of Antibacterials into Bone

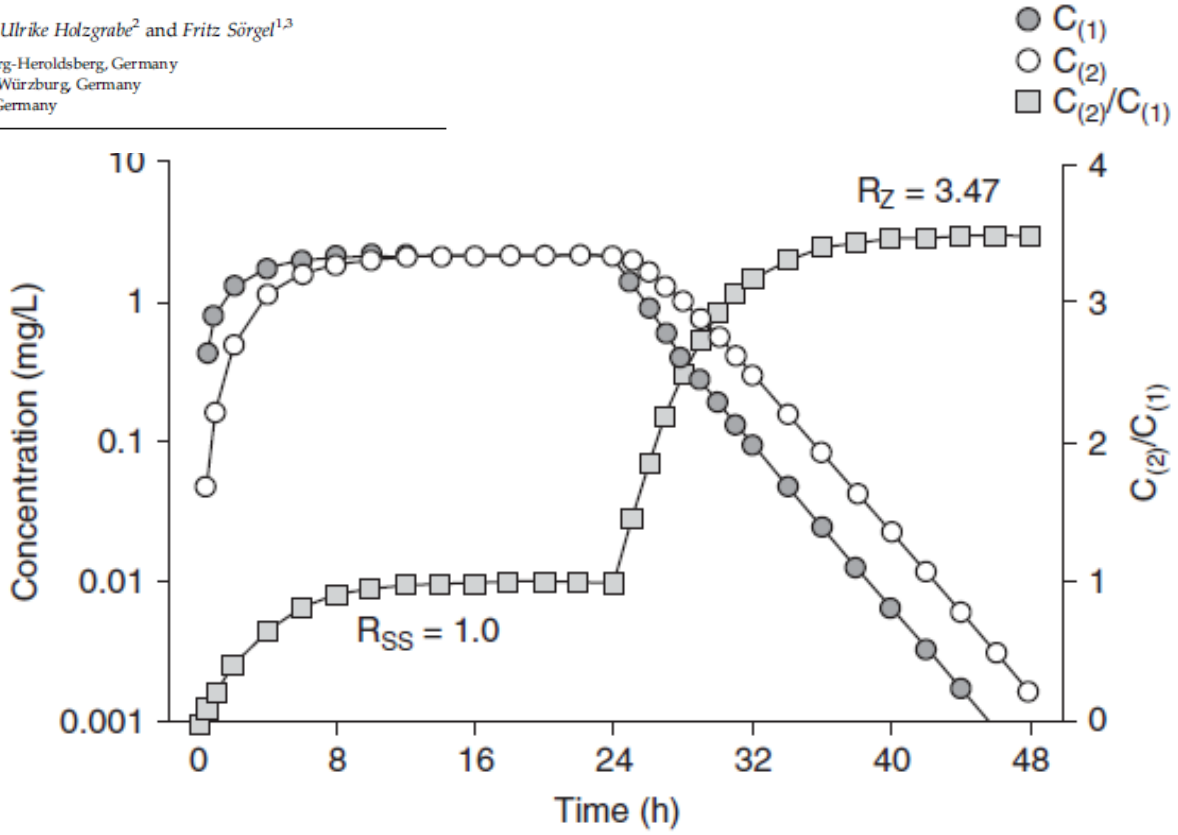
Pharmacokinetic, Pharmacodynamic and Bioanalytical Considerations

Cornelia B. Landersdorfer,[1] *Jürgen B. Bulitta,*[1] *Martina Kinzig,*[1] *Ulrike Holzgrabe*[2] and *Fritz Sörgel*[1,3]

1 IBMP-Institute for Biomedical and Pharmaceutical Research, Nürnberg-Heroldsberg, Germany
2 Institute of Pharmacy and Food Chemistry, University of Würzburg, Würzburg, Germany
3 Department of Pharmacology, University of Duisburg-Essen, Essen, Germany

Concentrazione
in plasma e osso dopo
infusione costante 24/h

C1: concentrazione
plasmatica
C2: concentrazione
ossea
R2 concentrazione
osso/plasma
in fase finale



REVIEW ARTICLE

Clin Pharmacokinet 2009; 48 (2): 89-124
0312-5963/09/0002-0089/$49.95/0

Gli antibiotici dove arrivano?

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Rapporti di concentrazione media osso/plasma:
(concentrazione ossea in mg/kg di osso totale)

Azitromicina: tra 0,3 e 1,2

Cefalosporine e Glicopeptidi: 0,15 e 0,3

Penicilline : tra 0,1 e 0,3

REVIEW ARTICLE

Clin Pharmacokinet 2009; 48 (2): 89-124
0312-5963/09/0002-0089/$49.95/0

Gli antibiotici dove arrivano?

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3 Department of Pharmacology, University of Duisburg-Essen, Essen, Germany

Cefalosporine e penicilline: rapporti di concentrazione significativamente più bassi ($p < 0,05$) rispetto a linezolid.

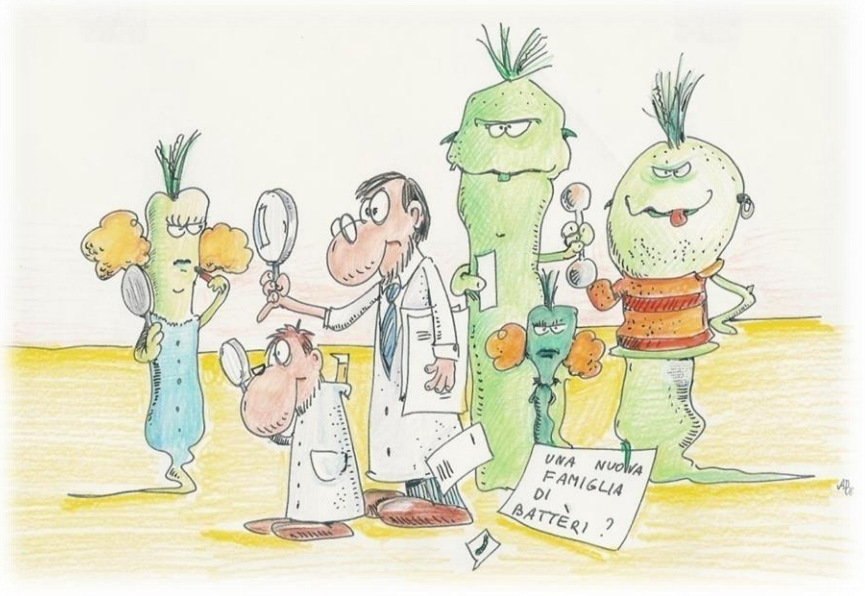
Per 20 di 25 diversi farmaci, i rapporti erano più alti per l'osso spugnoso che per l'osso corticale.

Maggiore estensione della penetrazione ossea per chinoloni, macrolidi e linezolid rispetto a ß-lattamici.

… e non solo

Antibioticoresistenza

Biofilm



Resistenza agli antibiotici

… MDR – XDR – PDR

(multi, estesa, pan)

Storicamente: prerogativa degli isolati nosocomiali

Attualmente: diffuse anche in comunità

→estrema difficoltà in “terapia empirica”

… e non solo!

Stefani S., Curr Med Chem – Antiinfective Agents 2005;4:235-57

Aspetti microbiologici: cosa è cambiato?

Produzione di biofilm

Vasta gamma di patogeni

(più o meno virulenti, ma spesso poliantibiotico resistenti)

Bassa predittività
della diagnostica microbiologica tradizionale

Orthopea
Anestesia e Ortopedia

Microorganismi e biofilm

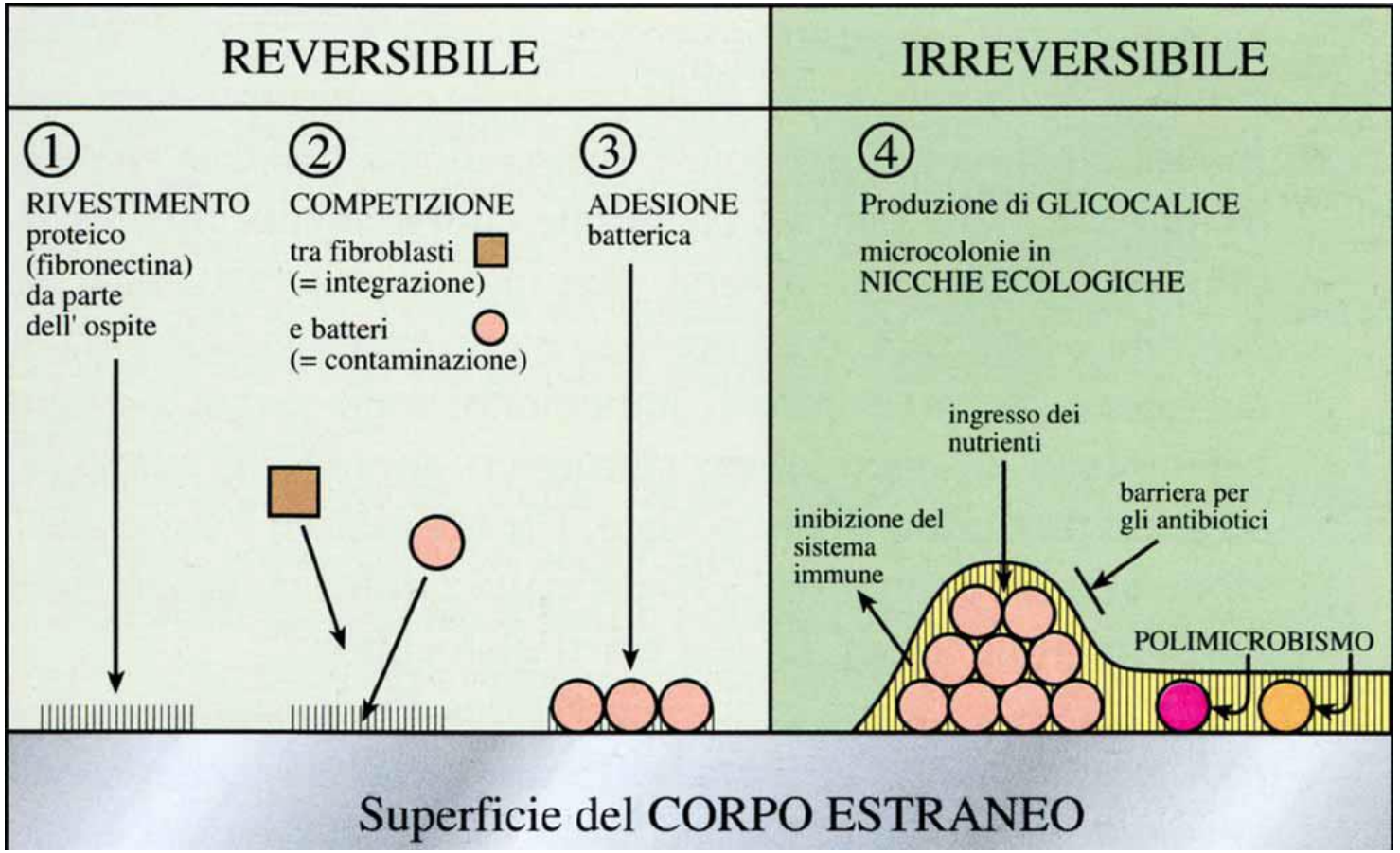
adattamento della comunità
batterica a condizioni ostili

→ progressiva scomparsa delle sostanze nutritive
→ batteri in fase a lenta crescita o di dormienza
→ aumentata resistenza alla killing
di molti antibiotici attivi
sulle cellule in divisione

INFEZIONI PERSISTENTI E CRONICHE

Hall-Stoodley L., Cellular Microbiol 2009; 11:1034-43

Formazione del biofilm



Gristina AG, Orthop Clin North Am 1984 July;15(3):517-35

Inoltre …

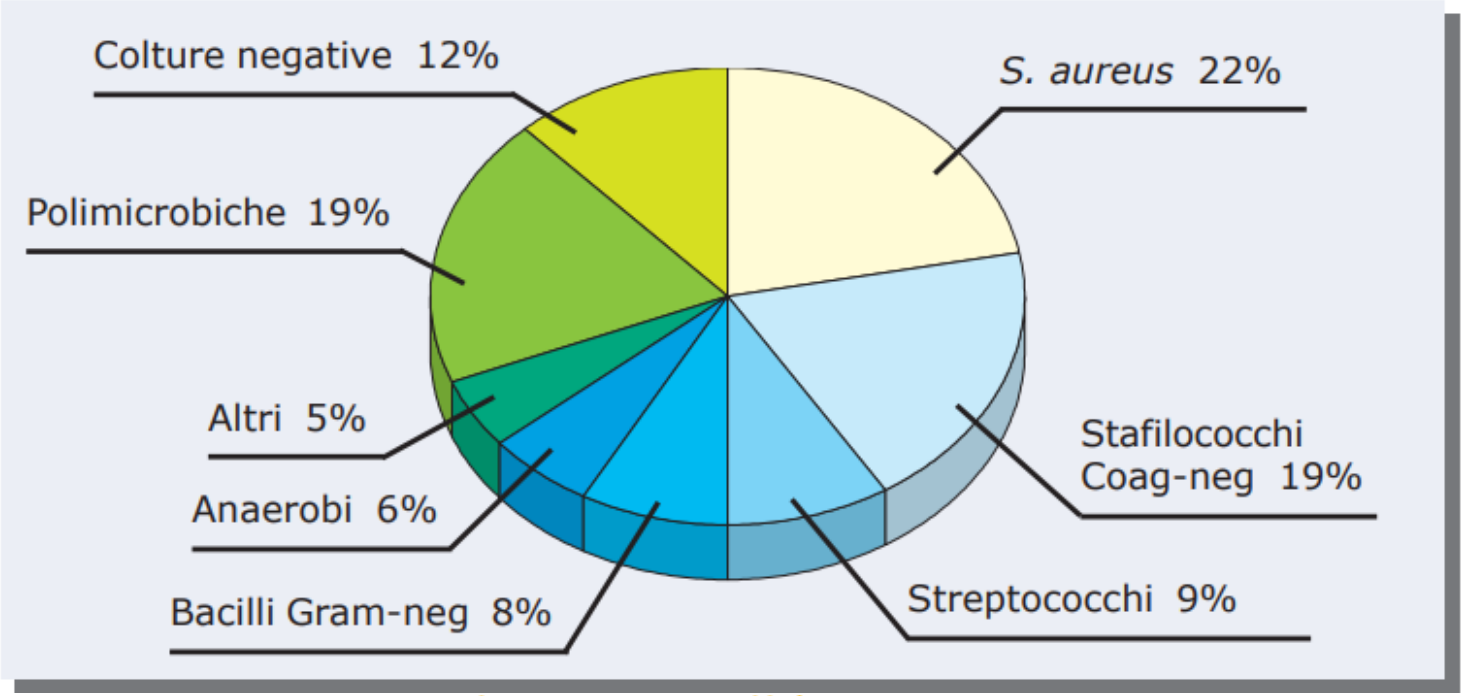
Comorbidità

Scarsa compliance

Aumentata “residenza” della protesi
→ maggior rischio di infettarsi

Cercate il colpevole!

Figura 1. Distribuzione percentuale dei patogeni isolati in 462 casi (1,8%) di infezioni protesiche occorrenti fra il 1969 ed il 1991 su un totale di 26505 interventi di artroplastica totale dell'anca o del ginocchio. (Dati adattati da Berbari *et al* 1998[11]).



Lazzarini L., De Lalla F.: Trends Med 2003; 3 (2):75-82

CMR
Journals.ASM.org

Orthopea
Anestesia e Ortopedia

Prosthetic Joint Infection

Aaron J. Tande,[a] Robin Patel[a,b]

Colture negative

PJIs diagnosticate con metodi non microbiologici

7-15% dei casi di infezione

- precedente terapia antibiotica
- inappropriati metodi microbiologici

Diagnosi a 3 anni e mezzo dopo impianto

Aaron J. Tande and Robin Patel Clin. Microbiol. Rev. 2014, 27(2):302. DOI: 10.1128/CMR.00111-13

Terapia antibiotica mirata

Microrganismi	Antibiotici
Staphylococcus aureus meticillino-sensibile*	Oxacillina ± rifampicina Amoxicillina/acido clavulanico ± rifampicina Ciprofloxacina, levofloxacina oppure moxifloxacina ± rifampicina Cotrimossazolo oppure minociclina ± rifampicina Clindamicina
Staphylococcus aureus meticillino-resistente	Teicoplanina oppure vancomicina ± rifampicina Linezolid ± rifampicina Daptomicina
Streptococcus spp.	Amoxicillina ± rifampicina Levofloxacina oppure moxifloxacina ± rifampicina Ceftriaxone ± rifampicina
Enterobacteriaceae	Ciprofloxacina oppure levofloxacina ± rifampicina Ceftriaxone
Pseudomonas aeruginosa	Cefepime oppure ceftazidime Ciprofloxacina oppure levofloxacina Piperacillina/tazobactam Meropenem oppure imipenem

*Minociclina oppure fluorochinoloni o cotrimossazolo in caso di sensibilità *in vitro*.

Esposito S. Infection 2009; 37:478-496

JB&JS REVIEWS

Periprosthetic Joint Infection

A Review of Antibiotic Treatment

Ryan Miller, DO
Carlos A. Higuera, MD
Janet Wu, PharmD
Alison Klika, MS
Maja Babic, MD
Nicolas S. Piuzzi, MD

Investigation performed at the Cleveland Clinic, Cleveland, Ohio

Abstract

» A team approach among orthopaedic surgeons, infectious disease specialists, and patients is of paramount importance when treating periprosthetic joint infections (PJIs). Treatment usually includes various surgical approaches along with antibiotic treatment.

» Antibiotic selection requires a multifactorial decision that depends on the organism that is identified, its antibiotic-resistance profile, the extent of the infection, and factors associated with the host.

» Antibiotic duration is dependent on surgical intervention and the type of organism. Typically, patients are treated for 6 weeks after debridement, antibiotics, and implant retention (DAIR) and for 4 to 6 weeks after single-stage and 2-stage revision arthroplasty.

JBJS REVIEWS 2020;8(7):e19.00224 • http://dx.doi.org/10.2106/JBJS.RVW.19.00224

Miller R. : Journal of Bone and Surgery Reviews 2020;8(7):e19.00224. doi:10.2106/JBJS.RVW.19.00224

TABLE I Common Organisms by Timing of Patient Presentation After Surgery and Symptoms

Timing from Surgery	Timing of Symptoms	Organisms Expected*
Early/delayed: <12 months from prosthesis implantation	Not relevant	*Staphylococcus aureus*, CoNS, enterobacteriaceae, streptococci
Late: ≥12 months from prosthesis implantation	Acute: ≤4 weeks of symptoms	*S. aureus*, streptococci, enterobacteriaceae, CoNS
	Chronic: >4 weeks of symptoms	CoNS, culture-negative infections, *Cutibacterium acnes*, *S. aureus*, streptococci

*CoNS = coagulase-negative Staphylococcus.

Miller R. : Journal of Bone and Surgery Reviews 2020;8(7):e19.00224. doi:10.2106/JBJS.RVW.19.00224

TABLE II Relative Antibiotic Concentrations and Properties*

Antibiotic	Spectrum of Activity	Average Cancellous Bone Concentration	Average Joint Concentration	Drug-Drug Interactions†	Major Adverse Effects
Flucloxacillin	MSSA	+++	NA	Mild	Nausea, vomiting, diarrhea, jaundice, and hepatitis
Cephalexin	Streptococcus spp., MSSA, enterobacteriaceae	–	+	Mild	Nausea, vomiting, diarrhea, confusion, jaundice, and arthralgia
Clindamycin	Anaerobic gram-positive and gram-negative organisms, including Bacteroides, MRSA, MSSA, *Streptococcus pyogenes*, and *Streptococcus pneumoniae*	+++	++	Mild	Severe diarrhea, metallic taste, rash, and jaundice
Doxycycline	Staphylococcus spp., *Streptococcus pneumoniae*, *Streptococcus pyogenes*, rickettsial infections, and *Borrelia burgdorferi*	+++	NA	Mild	Ultraviolet sensitivity, tooth discoloration for those who are <8 years old, and pill esophagitis

Miller R. : Journal of Bone and Surgery Reviews 2020;8(7):e19.00224. doi:10.2106/JBJS.RVW.19.00224

Trimethoprim-sulfamethoxazole	*Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus pneumonia,* and enterobacteriaceae	++	−	Moderate: warfarin	Hypersensitivity reactions, nephrotoxicity, agranulocytosis, hemolysis, and jaundice
Fluoroquinolones	Staphylococcus spp., Streptococcus spp., enterobacteriaceae, and Pseudomonas (ciprofloxacin and levofloxacin)	+++	+++	Moderate: QT-prolonging medications	QT prolongation, confusion, and tendon inflammation and rupture
Rifampin	Staphylococcus spp.	+++	NA	High: linezolid, clindamycin, warfarin, and estrogen derivatives	Renal failure, hepatic test abnormalities, anemia, nausea, gastroesophageal reflux, and adrenocortical insufficiency
Linezolid	Staphylococcus spp., VRE, and Streptococcus spp.	+	+	Moderate: SSRIs	Diarrhea, headache, anemia, serotonin syndrome, pancytopenia, and optic neuropathy

*MSSA = methicillin-sensitive *Staphylococcus aureus,* NA = not available, MRSA = methicillin-resistant *S. aureus,* VRE = vancomycin-resistant Enterococcus, SSRIs = selective serotonin reuptake inhibitors, and MIC_{90} = minimum inhibitory concentration at which growth is inhibited in 90% of isolates. − indicates <1 concentration-to-MIC_{90} ratio, + indicates between 1 and 2 concentration-to-MIC_{90} ratio, ++ indicates >2 to 5 concentration-to-MIC_{90} ratio, and +++ indicates >5 concentration-to-MIC_{90} ratio. MIC_{90} for *S. aureus* from Clinical and Laboratory Standards Institute, 2018. The included fluoroquinolones are levofloxacin and moxifloxacin. †Drug-drug interactions: mild is defined as few drug interactions or mild severity of interactions that do exist, moderate is defined as some drug interactions or somewhat serious interactions, and high is defined as multiple drug interactions with serious outcomes that may occur.

Miller R. : Journal of Bone and Surgery Reviews 2020;8(7):e19.00224. doi:10.2106/JBJS.RVW.19.00224

CLINICAL REVIEW

For the full versions of these articles see bmj.com

Diagnosis and management of prosthetic joint infection

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Cite this as: *BMJ* 2009;338:b1773
doi:10.1136/bmj.b1773

Le "Revisione sistematiche"

Box 1 Definitions of prosthetic joint infection

No uniform case definitions exist for prosthetic joint infection, but widely accepted definitions include any of the following[6 7 9-12 w6 w14]:

- Purulence around a prosthesis at arthrotomy or arthroscopy
- Presence of one or more sinus tract communicating with the joint
- Histological features of infection
- Isolation of an indistinguishable organism from at least two deep culture samples ("indistinguishable" refers to widely performed laboratory characterisation of an organism; in most cases this will be identification of the genus and species, plus antibiotic susceptibilities[13]). Isolation of a virulent organism, such as *Staphylococcus aureus*, *Escherichia coli*, or *Candida* spp, in one deep tissue sample is regarded by some as sufficient to confirm the diagnosis.[7]

Early prosthetic joint infection

Early prosthetic joint infection is most widely defined as deep infection of an arthroplasty occurring within three months of joint replacement. Subsequent presentation is divided into delayed (3-12 months after index surgery) or late (>12 months).[8 9 11 14]

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

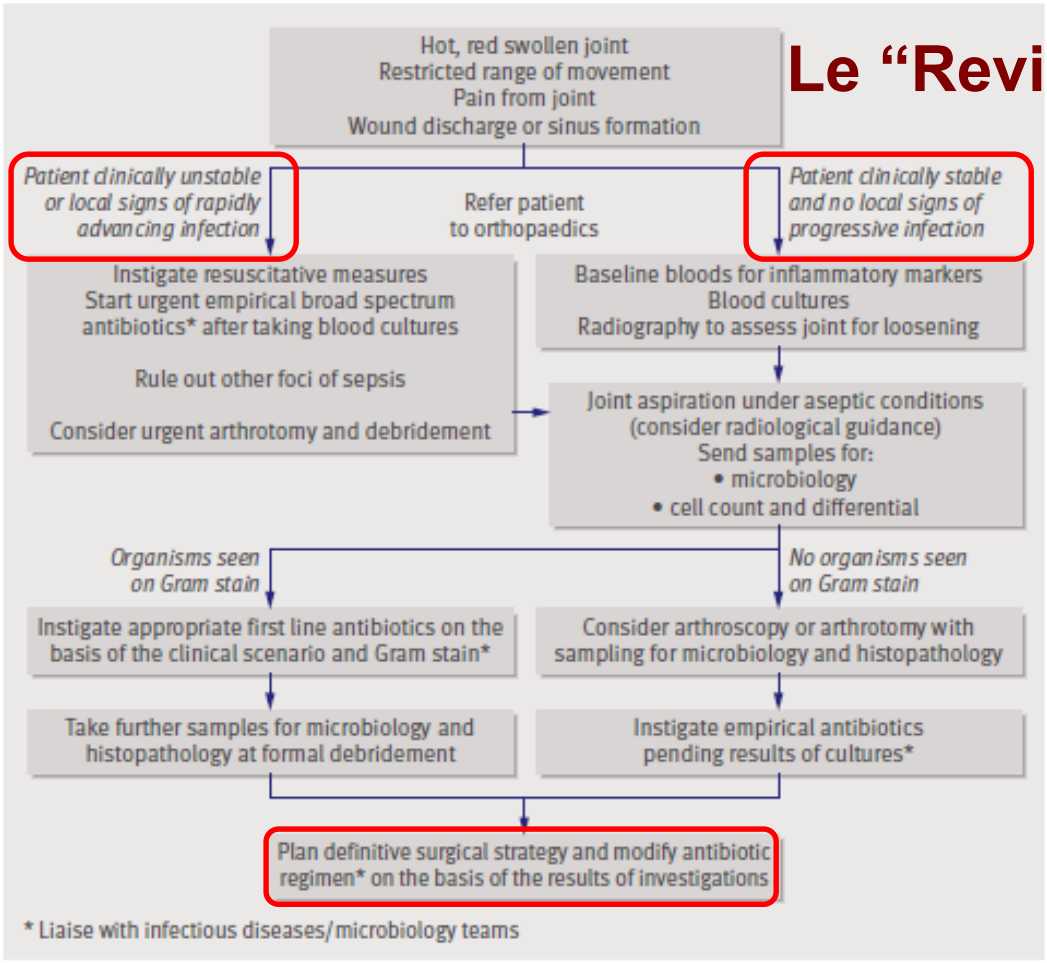

Fig 1 | Algorithm outlining diagnostic and therapeutic interventions in the management of early prosthetic joint infection

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

Box 2 Common risk factors for prosthetic joint infection

Patient factors

Systemic

Advanced age[9]

Obesity[5 9 15 w8]

Diabetes mellitus[9 15]

Steroids[9]

Malignancy[6]

Rheumatoid arthritis[5]

Local

Previous arthroplasty on the same joint[5 9 w38]

Arthroplasty undertaken to treat a fracture[5]

Type of joint replaced (for example, risk is greater for the knee than the hip)[2]

Perioperative wound complications,[9] including superficial wound infection,[6 w12] haematoma, or persistent wound drainage[16]

Operative factors

A score ≥3 6 on the American Society of Anesthesiologists score[w39]

Duration of operation >75th centile for the procedure or longer than three hours[6 w39]

Wound classed as contaminated or dirty[6 w39]

No systemic antibiotic prophylaxis

No antibiotic cement[5]

Patients with the first three operative factors are at greatest risk of developing infection at the surgical site

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le "Revisione sistematiche"

Table 1 | Organisms that commonly cause prosthetic joint infection

Infecting organism	Frequency of pathogen	Suggested intravenous antibiotic*	Suggested oral antibiotic*
Gram positive			
Coagulase negative staphylococci	13-37%[2 7 10 15 17 19 w2 w28]	Glycopeptide[9 10 w27]	Rifampicin plus another agent, such as ciprofloxacin, fusidic acid, trimethoprim, or doxycycline, according to sensitivities[8 9 15 18 20 w4]
Meticillin sensitive *Staphylococcus aureus*	20-62%[7 9 10 17-19 w2 w28]	Flucloxacillin or ceftriaxone[8 10 12]	
Meticillin resistant *S aureus*	2-49%[4 7 9 10]	Glycopeptide[9 10 w27]	Rifampicin combinations as above, according to sensitivities
			Linezolid[w36 w37]†
Streptococcus spp	4-27%[4 7 10 17 w2]	Penicillin or ceftriaxone[8 10 w19]	Amoxicillin or cefalexin[10 19 w19]
Enterococcus spp	6-13%[7 9 10 w3]	Penicillin or glycopeptide with or without an aminoglycoside[10 w40]	Amoxicillin[8 10] or linezolid[w36 w37]†
Diphtheroids (*Corynebacteria* spp, *Propionibacteria* spp)	6-20%[7 10]	Glycopeptide[10]	Rifampicin combinations as above, or ampicillin[10]
Gram negative			
Enteric Gram negative bacilli	2-15%[4 7 10 17]	Ceftriaxone[10]; carbapenem with or without aminoglycoside[10]	Ciprofloxacin[8 10]
Pseudomonas spp	1-4%[7 12]	Ceftazidime,[8 10] carbapenem, or ticarcillin with or without aminoglycoside	Ciprofloxacin[8 10]

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

Table 1 | Organisms that commonly cause prosthetic joint infection

Infecting organism	Frequency of pathogen	Suggested intravenous antibiotic*	Suggested oral antibiotic*
Others			
Anaerobes	1-8%[10 17]	Carbapenem[10]	Clindamycin[8] or metronidazole[10]
Mycobacteria	<1%-6%[14 w7]	A combination of agents (usually including rifampicin) on the basis of the antimicrobial susceptibility profile of the organism; seek microbiology advice	
Fungi	<1%[10]	Common approaches include amphotericin or fluconazole, but seek microbiology advice	Common approaches include fluconazole or itraconazole, but seek microbiology advice
Polymicrobial infections			
≥2 organisms	4-56%[9 10 17 w2 w25]	Consider co-amoxiclav[8]; select treatment on the basis of the combination of pathogens and sensitivities[w25]	
Culture negative infections			
No pathogen identified	11-26%[8 9 18 w2]	Glycopeptide with or without carbapenem or cephalosporin[21]	Consider standard combination, such as rifampicin plus ciprofloxacin

*All suggested regimens should be tailored according to sensitivities obtained from the microbiology laboratory and should be prescribed after consideration of comorbidities (such as renal or hepatic dysfunction), potential hypersensitivity or side effects (such as rash, nausea, nephrotoxicity), and drug interactions (such as rifampicin and warfarin). Oral therapy generally requires combination regimens; rifampicin should never be used as monotherapy, owing to a high rate of selection for resistance.
†Patients receiving linezolid should be monitored with regular full blood counts and advised about the risk of peripheral or optic neuropathy.

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

Table 2 | Characteristics of biofilms relevant to prosthetic joint infection

Characteristic	Relevance to pathophysiology	Clinical correlates
Genetic diversity: small colony variants[w17]	Subpopulations of organisms exist as slow growing phenotypic variants	Organisms may look atypical in vitro, so can confound laboratory diagnosis Slow growth increases the risk of antibiotic failure and justifies the use of prolonged treatment[11]
Polysaccharide matrix	Extracellular slime; distributes nutrients and facilitates communication between cells	Microenvironment favours persistence of organisms and may inhibit bacterial killing and phagocytosis; justifies use of prolonged antibiotic regimens incorporating rifampicin[12 20]
Adherence to surfaces	Whole population of infecting organisms may be adherent to prosthetic material	Can significantly reduce yield from bacterial culture of synovial fluid; therefore, periprosthetic and tissue samples are also needed to confirm diagnosis[7 w14]
Quorum sensing[w16]	Genetic interactions between populations of cells	Antibiotic resistance is conferred by sharing of genetic resistance determinants; this characteristic is one reason for using combined oral antibiotic regimens[8]

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

Table 3 | Characteristics of patients appropriate for different management approaches to prosthetic joint infection

Surgical strategy	Patient characteristics
Debridement, antibiotics, and implant retention	No loosening of prosthesis; adequately functioning joint[10 12 w19]
	Healthy soft tissue envelope[8 19 w18]
	Short duration of symptoms[8 19 24 w19] (although recent studies also support this approach in some patients with more chronic disease)[w18]
	Clearly characterised bacteriology, and highly antibiotic-susceptible organism(s), such as penicillin susceptible *Streptococcus* spp[w19]
One stage revision arthroplasty	Unstable implant but intact soft tissue[8]
	Organism susceptible to antibiotics[8 w19]
	More complex surgery contraindicated because of comorbidity

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Le “Revisione sistematiche”

Table 3 | Characteristics of patients appropriate for different management approaches to prosthetic joint infection

Surgical strategy	Patient characteristics
Two stage revision arthroplasty	Unstable implant[8]
	Considerable damage to soft tissue[8 19]
	Resistant or difficult to treat organism,[6 22] such as meticillin resistant *Staphylococcus aureus*, vancomycin resistant enterococci, and fungi
	Long established infection
	Failure of previous attempt at debridement and retention[3]
Removal of prosthesis or arthrodesis	Serious comorbidity
	Repeat surgery unacceptable to the patient or deemed unsafe[8]
Amputation	Last resort in the context of uncontrolled symptoms from the joint, including intractable pain or profuse discharge from sinuses that does not respond to antibiotic suppression
	Uncontrolled systemic sepsis
	Mechanical joint failure not amenable to salvage,[w41] or severe soft tissue damage not amenable to reconstruction
	Other options declined by the patient

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Consigli da fornire al Medico di Medicina Generale

- secrezione dalla ferita
- eritema sopra l'articolazione
- gonfiore, dolore o limitazione funzionale

prontamente indagati per l'infezione dell'articolazione protesica

Inviare immediatamente a un'équipe ortopedica

- marcatori di flogosi
- emocolture
- artrocentesi

Le radiografie standard possono essere normali,
ma l'allentamento della protesi pone il sospetto di infezione

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

Consigli da fornire al Medico di Medicina Generale

Immediata collaborazione
con **Microbiologo e Infettivologo**

No antibiotici empirici fino al referto delle colture

Terapia antibiotica, immediatamente dopo emocolture,
se presenti segni di compromissione sistemica

Tentativo di mantenere la protesi:

sbrigliamento chirurgico dei tessuti molli infetti
intorno all'articolazione più 3-6 mesi di antibiotici,
con due antibiotici tra cui Rifampicina

Matthews PC, BMJ 2009 338:b1773 doi:10.1136/bmj.b1773

La terapia antibiotica “soppressiva”

The Journal of Arthroplasty 35 (2020) 1154–1160

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Systematic Review & Meta-Analysis

The Role of Long-Term Antibiotic Suppression in the Management of Peri-Prosthetic Joint Infections Treated With Debridement, Antibiotics, and Implant Retention: A Systematic Review

Michael-Alexander Malahias, MD, PhD [a], Alex Gu, BS [a], Evan C. Harris, BS [b], Marco Adriani, MD [a], Andy O. Miller, MD [c], Geoffrey H. Westrich, MD [a], Peter K. Sculco, MD [a,*]

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[c] Infectious Diseases & Internal Medicine, Hospital for Special Surgery, New York, NY

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La terapia antibiotica “soppressiva”

7 articoli di bassa qualità (livello III o IV)

437 casi di PJI trattati

- chirurgicamente con DAIR (Debridement, Antibiotics, Implant retention)
- poi con SAT (Suppressive Antibiotic Treatment)

  - assenza di infezione nel 75% (318/424) dei pazienti
  - reintervento per qualsiasi causa nel 6,7%

- Effetti avversi: 15,4%
- Effetti avversi che hanno portato all'interruzione di SAT: 4,3%.

Non differenze significative dei tassi di fallimento di DAIR con SAT.

tra infezioni acute (post-operatoria o ematogena, con insorgenza dei sintomi 4 settimane)
e infezioni croniche (insorgenza dei sintomi >4 settimane)

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La terapia antibiotica “soppressiva”

Influenza di:

posizione anatomica (anca vs ginocchio)

microrganismi.

sulla percentuale di successo di DAIR con SAT

Nessun dato conclusivo dalla letteratura

Solo prove di bassa qualità per quanto riguarda l'effetto terapeutico di DAIR combinato con SAT: **impossibili conclusioni definitive**.

Sono necessari **studi prospettici di alta qualità** per comprendere

- efficacia
- sicurezza di SAT

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La terapia antibiotica “soppressiva”

Interruzioni del trattamento antibiotico per effetti collaterali:
poche 4,3%

Effetti collaterali dopo DAIR con SAT:
molti 15,4%

Per molti soggetti con Infezione di Protesi Articolare, evidente:
- Fragilità di fondo e complessità
- Terapie disponibili non ottimali

S. aureus sembra un importante fattore per il rischio di fallimento

Non dati sufficienti per stabilire quali pazienti trarrebbero beneficio da DAIR con SAT post-operatorio

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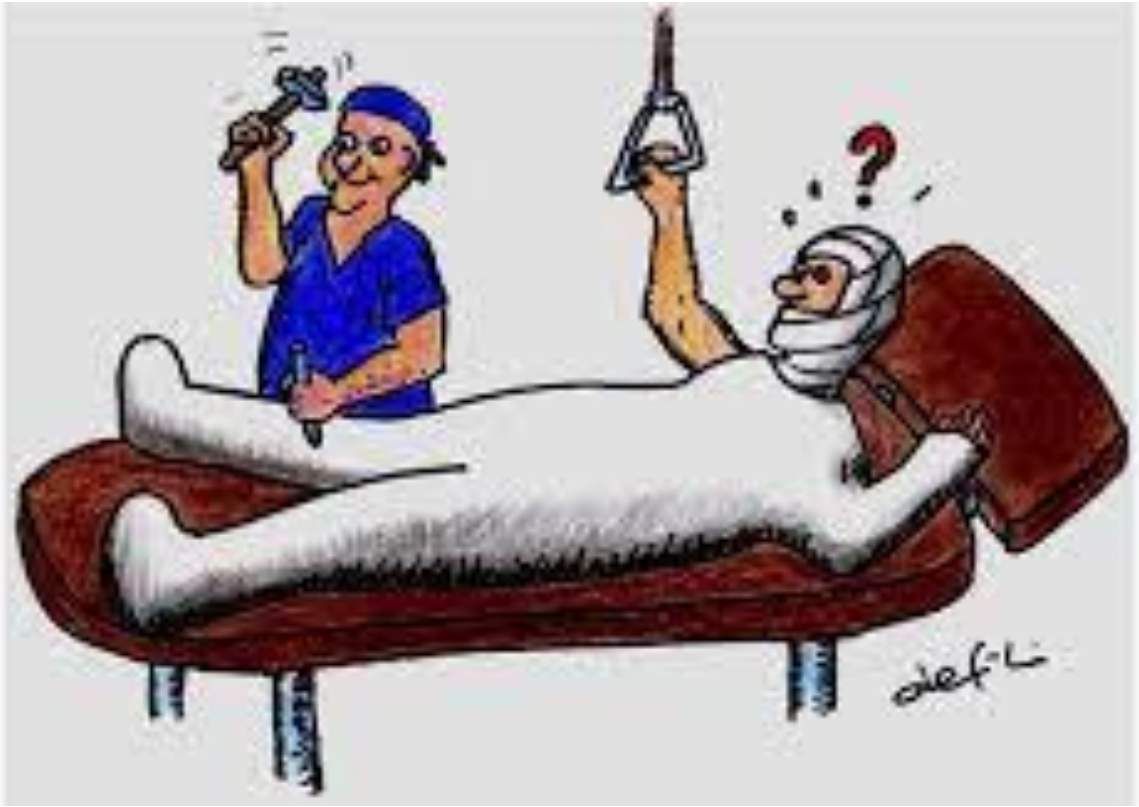
Necessari
studi epidemiologici policentrici

Epidemiologia locale
puntualmente aggiornata

Stretta collaborazione
clinici - microbiologi



BUON LAVORO!