



**LE INFEZIONI INVASIVE DA
STREPTOCOCCUS PYOGENES: UPDATE 2024.**

Lunedì 10 Giugno 2024 – Ore 16.00-19.00

VIRTUAL EDITION



Fondazione IRCCS Ca' Granda
Ospedale Maggiore Policlinico

Sistema Socio Sanitario



Regione
Lombardia

La gestione clinica dell'infezione invasiva da *Streptococcus pyogenes* *Streptococcal NSTI e TTS nei pazienti adulti*

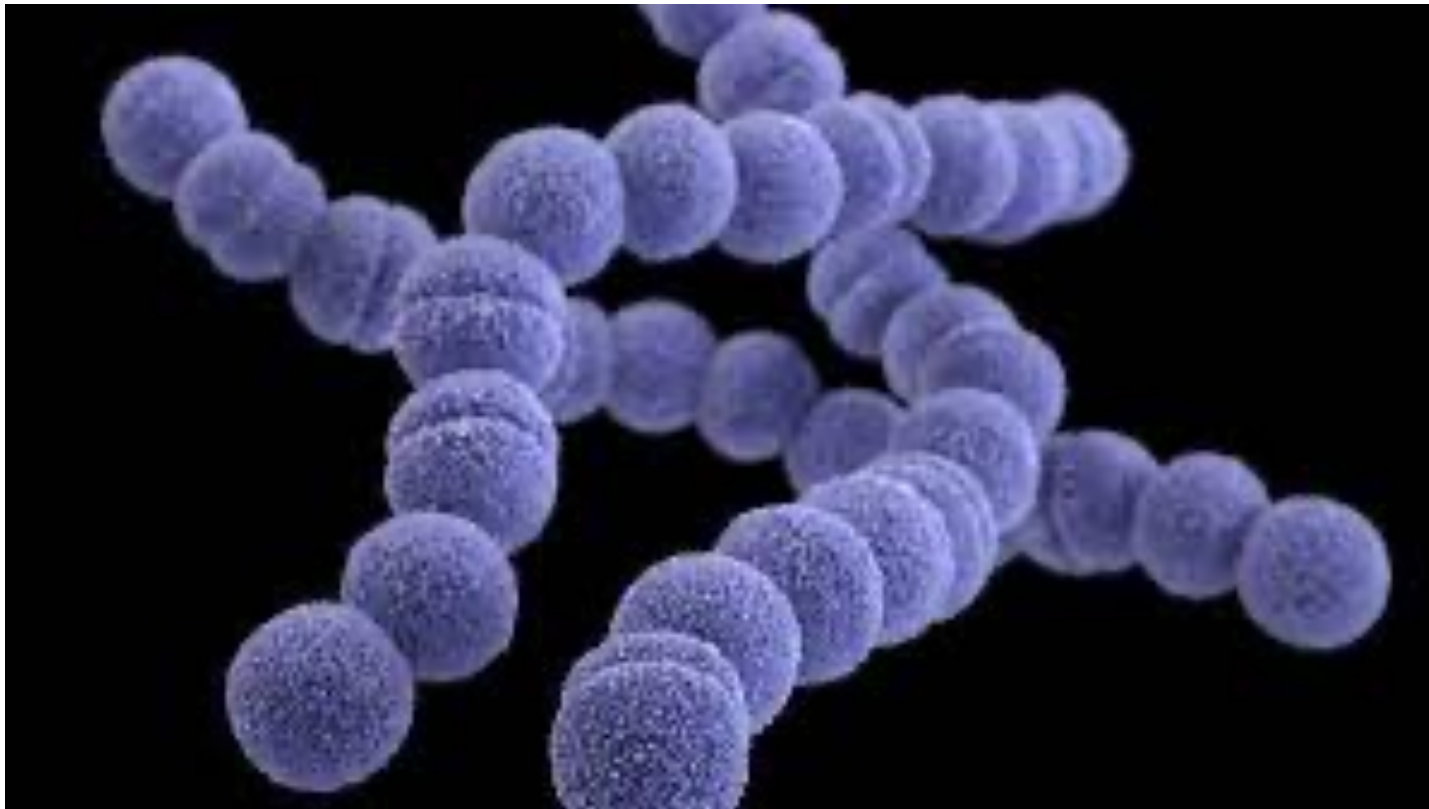
Davide Mangioni, SC Malattie Infettive
Ospedale Maggiore Policlinico di Milano

10 Giugno 2024

di cosa parlerò

- cosa intendiamo per iGAS ?
- iGAS SENZA Toxic Shock Syndrome
- iGAS CON Toxic Shock Syndrome
- il figlio/nipote/cugino di mia sorella ha lo streptococco...
lei cosa deve fare ?
(profilassi dei contatti)

cosa intendiamo per iGAS ?



cosa intendiamo per iGAS ?

1 - i come INVASIVE

- GAS = Group A Streptococcus
- Invasive GAS (iGAS) = detection of GAS from a normally sterile body site (blood, cerebrospinal fluid, joint aspirate, pericardial-peritoneal-pleural fluids, bone, endometrium, deep tissue or deep abscess, at operation or post- mortem) +/- from a normally non-sterile site (throat, sputum, vagina or wound) in combination with a severe clinical presentation



cosa intendiamo per iGAS?

1 - i come INVASIVE

- Diverse forme cliniche di iGAS
 - INFEZIONE NECROTIZZANTE DI CUTI E TESSUTI MOLLI
 - POLMONITE
 - POSTARTUM GAS INFECTION
 - BATTEREMIA
- TOXIC SHOCK SYNDROME (TSS) complica circa 1/3 dei casi di iGAS

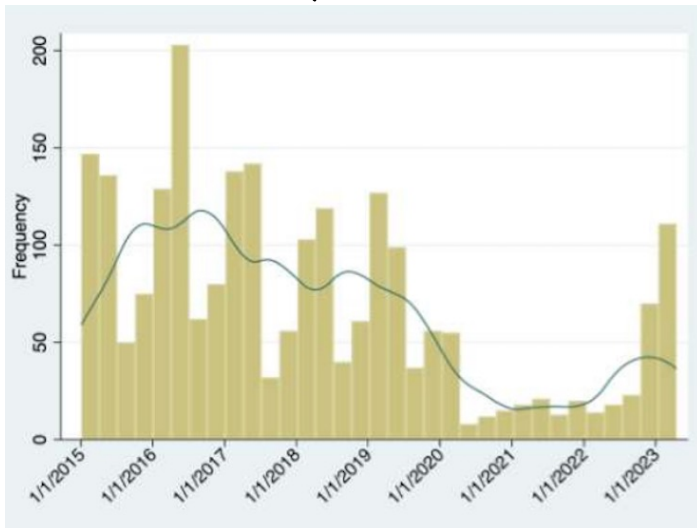
cosa intendiamo per iGAS?

II – CHE IMPATTO CLINICO?

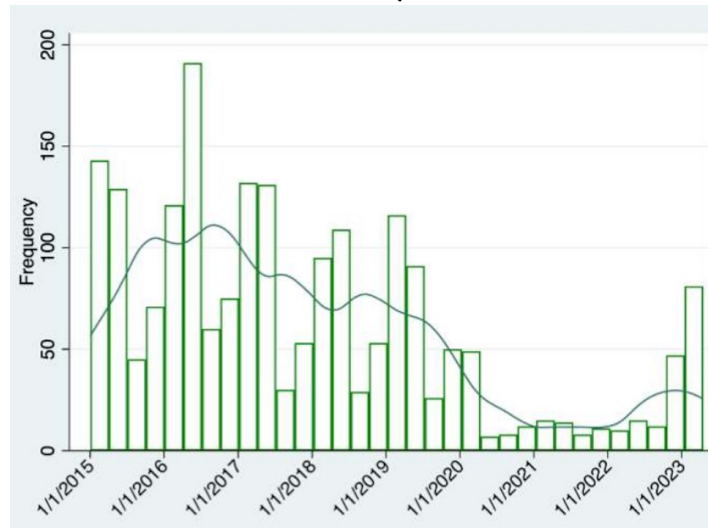
- Incidenza stimata iGAS 3.5 casi/100.000 persone (Paesi ad alto reddito)

Incrementata post-COVID-19

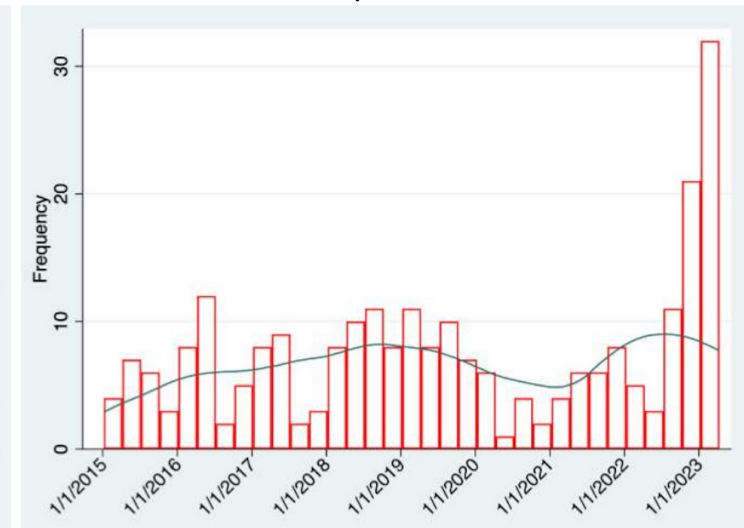
GAS



non iGAS



iGAS



Temporal trend by quarters of microbiologically-confirmed GAS cases between January 2015 and March 2023 in two University Hospitals in Milan, Italy

cosa intendiamo per IGAS?

11 - CHE IMPATTO CLINICO?

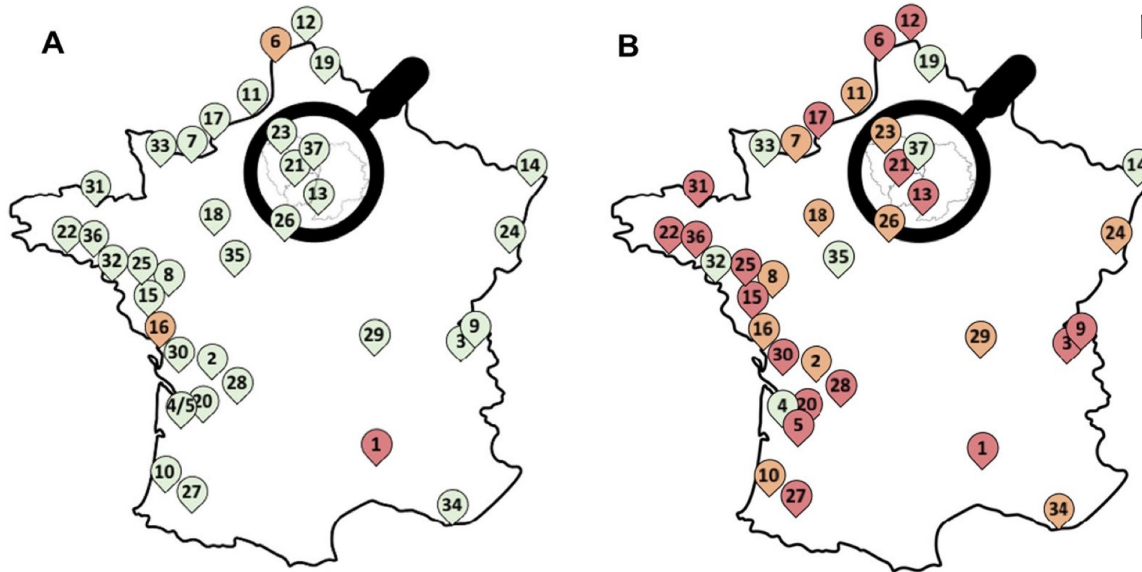
- Incidenza stimata iGAS 3.5 casi/100.000 persone (Paesi ad alto reddito)

Incrementata post-COVID-19

RESEARCH

Open Access

Invasive group A streptococcal infections requiring admission to ICU: a nationwide, multicenter, retrospective study (ISTRE study)



iGAS infections case rate in metropolitan's ICUs before and after COVID-19

Case rate > 1000: **red**, Case rate 500–1000: **orange**,

Case rate < 500: green

A Before COVID-19 (October 2018 to March 2019 and October 2019 to March 2020). **B** After COVID-19 (October 2022 to March 2023)

cosa intendiamo per IGAS ?

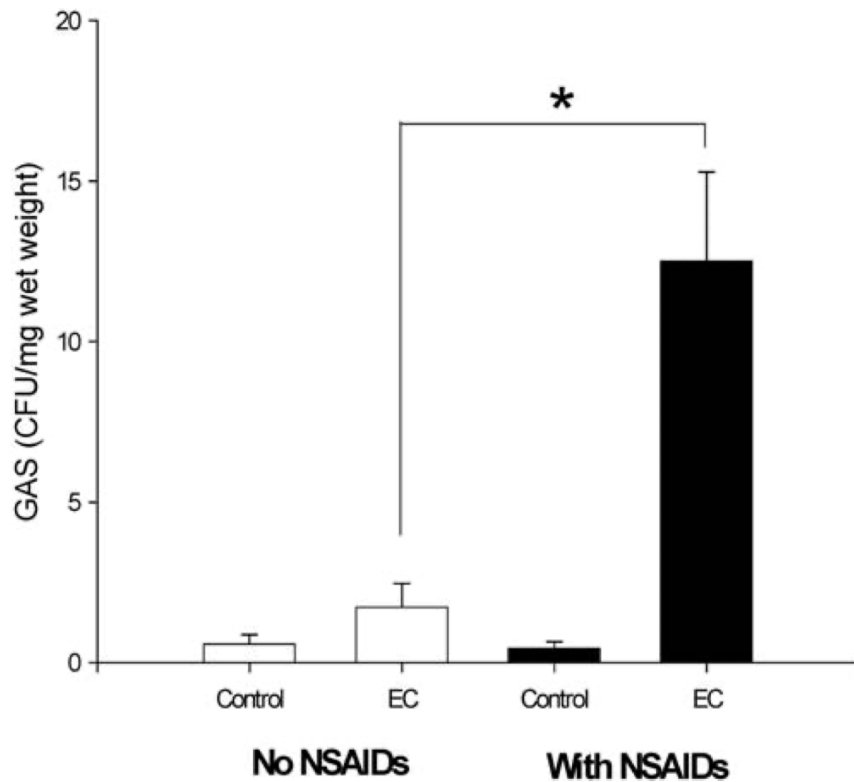
III - CI SONO DEI SOGGETTI PIÙ A RISCHIO ?

- NON è infezione dell'immunodepresso!! (in particolare la forma TSS)
- Principali fattori di rischio
 - Minor trauma, including injuries resulting in hematoma, bruising, or burns
 - Recent surgery
 - Intravenous drug use, Homelessness
 - Viral infection (eg, influenza, varicella)
 - Postpartum state
 - Obesity, Peripheral vascular disease, Diabetes mellitus
 - Corticosteroid use
 - Use of nonsteroidal anti-inflammatory drugs (NSAIDs)

cosa intendiamo per iGAS?

III - CI SONO DEI SOGGETTI PIÙ A RISCHIO?

- use of nonsteroidal anti-inflammatory drugs (NSAIDs)



- ✓ inhibit neutrophil function
- ✓ suppress fever
- ✓ augment cytokine release
- ✓ reduce the efficacy of antibiotics including penicillin or clindamycin



"To play it safe, I still take one aspirin every other day."

iGAS SENZA Toxic Shock Syndrome

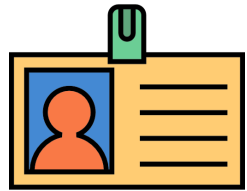
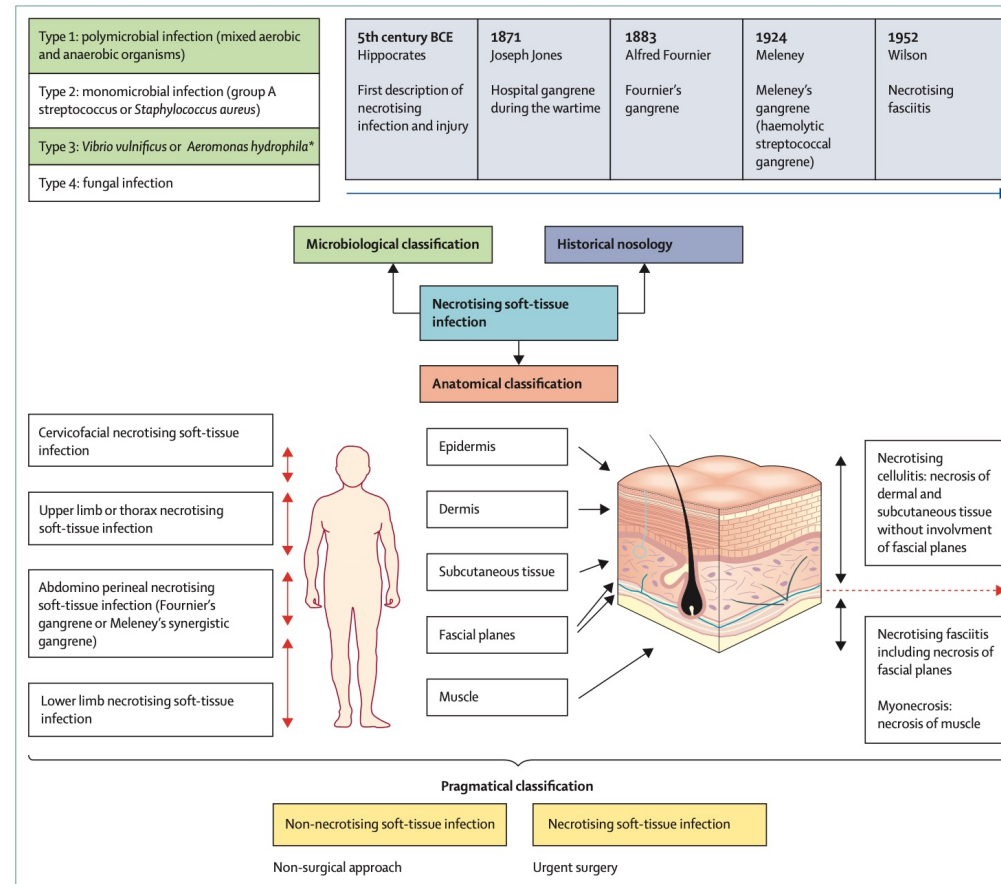
IGAS SENZA Toxic Shock Syndrome

I - INFEZIONE NECROTIZZANTE DI CUTE E TESSUTI MOLLI

IGAS è uno dei (principali)
patogeni responsabili

Coinvolte soprattutto le
estremità (AAII > AASS)
e testa-collo

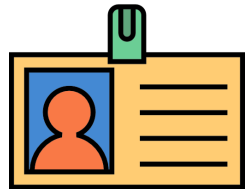
Evoluzione a TTS in circa
50% dei casi



IGAS SENZA Toxic Shock Syndrome

1 - INFEZIONE NECROTIZZANTE DI CUTE E TESSUTI MOLLI

- Diagnosi clinica !!



Suspected necrotizing soft tissue infection (NSTI)

- ≥ 2 SIRS criteria

PLUS ≥ 1 sign, symptom, imaging, or intraoperative finding concerning for NSTI

- Pain that extends past margin of apparent infection
- Severe pain out of proportion to physical findings
- Rapid clinical progression (e.g., rapidly spreading erythema)
- Crepitus
- Skin discolouration or necrosis
- Tense edema with foul smelling grayish or brown wound discharge
- CT or MRI findings of gas in soft tissue or other NSTI imaging feature/s
- Skin infection with features of toxic shock syndrome

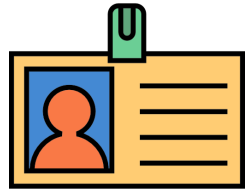


Osowicki J, Clin Microbiol Infect 2024

Hua C, Lancet Infect Dis 2023

IGAS SENZA Toxic Shock Syndrome

I - INFEZIONE NECROTIZZANTE DI CUTE E TESSUTI MOLLI



- Diagnosi clinica !!

- IMAGING

Qualsiasi esame che faccia ritardare l'intervento deve essere evitato

- ECOGRAFIA con sonda lineare: utile per differenziare un quadro di cellulite da una fascite
 - TC: utile per confermare la presenza di gas nei tessuti, delineare la sede dell'infezione, in particolare se sospetto una fonte intra-addominale (es: perforazione)

- FINGER TEST

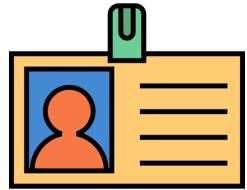
Si effettua un'incisione di circa 2 cm a livello della sede interessata dalla lesione e viene approfondito il dito tra i tessuti: in presenza di NSTI non c'è sanguinamento né resistenza e si può osservare il fenomeno del "dishwater pus" (secrezione sieropurulenta e maleodorante)

IGAS SENZA Toxic Shock Syndrome

1 - INFEZIONE NECROTIZZANTE DI CUTE E TESSUTI MOLLI

- Diagnosi clinica !!

Se il finger test è positivo, il debridement deve essere iniziato subito

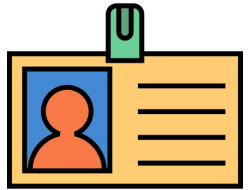


Cortesia Dott.ssa Abbruzzese, Dott. Artale

IGAS SENZA Toxic Shock Syndrome

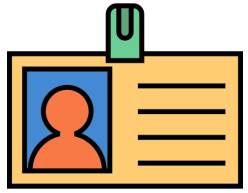
II - POLMONITE

- 2 principali manifestazioni cliniche
 - Polmonite multilobare
 - Empliema pleurico (sin > dx)
- Batteriemia secondaria in circa 80% dei casi



IGAS SENZA Toxic Shock Syndrome

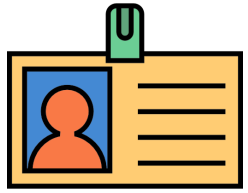
III - POSTARTUM GAS INFECTION



- Soprattutto nelle 48-72h post-partum (ma fino al 20% dei casi al travaglio o alla rottura delle membrane)
- Presentazione classica con febbre e forte dolorabilità addominale
- GAS è uno dei molti patogeni responsabili

IGAS SENZA Toxic Shock Syndrome

IV - BATTERIEMIA



- Secondaria a foci IGAS
 - Infezione necrotizzante di cute – tiss molli
 - Post-partum GAS infection
 - Vie respiratorie inferiori (polmonite) o superiori (ascessi peritonsillari/faringite suppurativa)
- Secondaria a foci non-IGAS (più frequente !!)
 - Cute-tessuti molli, infezione di ferita chirurgica, ustioni
 - Lesioni cutanee di varicella-zoster
- Primary BSI (rara)

IGAS CON Toxic Shock Syndrome

IGAS CON Toxic Shock Syndrome

1 - È DAVVERO COSÌ GRAVE?

- È piuttosto frequente (in pazienti con IGAS)
 - Complica 1/3 dei casi di IGAS (50% delle infezioni necrotizzanti di cute-tiss molli)
 - Focus sconosciuto in fino al 45% dei casi di TSS
- È molto grave
 - Mortality rate 30-80% (adulti > bambini)
 - Mortalità streptococcal TSS > staphylococcal TSS
 - Più associato a foci non bonificabili (infezioni profonde cute-tiss molli)
 - Più frequente in soggetti anziani o con comorbidità

iGAS CON TOXIC SHOCK SYNDROME

1 - È DAVVERO COSÌ GRAVE?

RESEARCH

Open Access

Invasive group A streptococcal infections requiring admission to ICU: a nationwide, multicenter, retrospective study (ISTRE study)

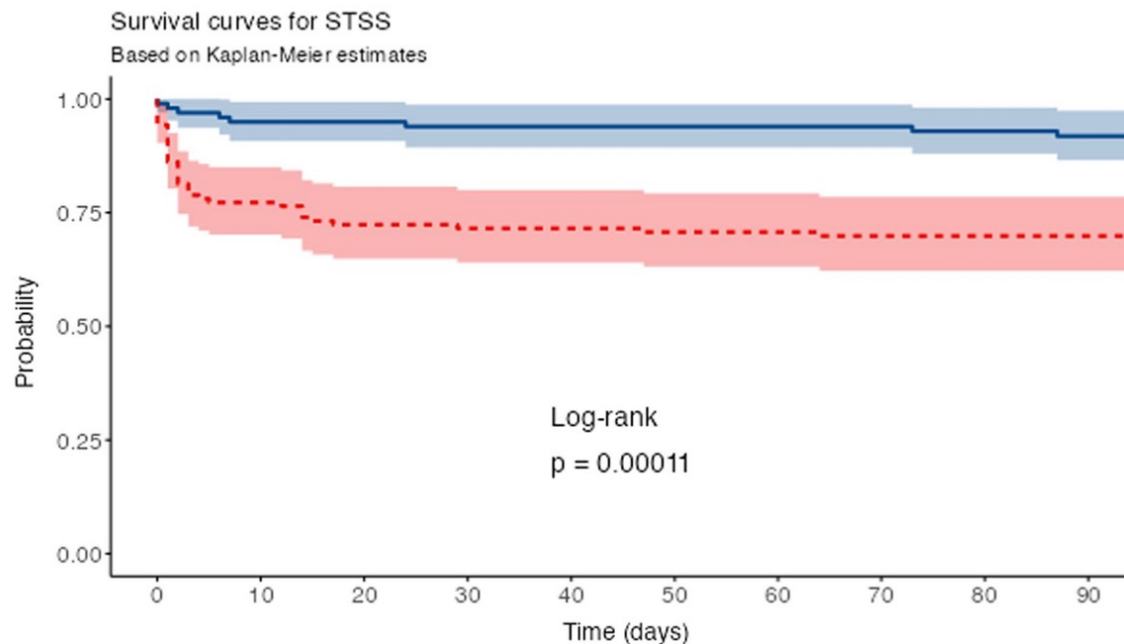


Table 3 Factors associated with ICU mortality for iGAS infections

Variables	Multivariate analysis		
	OR	CI95%	p value
Diabetes	3.92	1.42–10.79	0.008
Immunosuppression	4.02	1.03–15.59	0.044
STSS	5.75	1.71–19.22	0.005
Invasive mechanical ventilation	6.08	1.71–21.60	0.005
Acute kidney injury	4.85	1.05–22.42	0.043

Statistical significance ($p < 0.05$)

CI confidence interval, ICU intensive care unit, OR odds ratio, STSS streptococcal toxic shock syndrome

IGAS CON Toxic Shock Syndrome

II - COME SI RICONOSCE? DIAGNOSI CLINICA

- Shock (settico) con MOF* a rapida evoluzione (ore !!)
+
- Sintomi della forma di IGAS sottostante
+/-
- Sintomi simil-influenzali (mialgia, nausea, vomito, diarrea) in 20%
- Rash eritematoso scarlattiniforme diffuso (può desquamare) in 10%

* Insufficienza renale nel 100% entro 48-72h (nel 50% precede ipotensione), PLTpenia/DIC, ARDS, danno epatico, miocardiodepressione

Suspected necrotizing soft tissue infection (NSTI)

- ≥ 2 SIRS criteria

PLUS ≥ 1 sign, symptom, imaging, or intraoperative finding concerning for NSTI

- Pain that extends past margin of apparent infection
- Severe pain out of proportion to physical findings
- Rapid clinical progression (e.g., rapidly spreading erythema)
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- Skin discolouration or necrosis
- Tense edema with foul smelling grayish or brown wound discharge
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- Skin infection with features of toxic shock syndrome

Suspected toxic shock syndrome (TSS)

- Hypotension (including symptomatic postural hypotension)
 - In infants and children: this criteria may be met by features of shock such as tachycardia, tachypnea, delayed peripheral perfusion, and temperature instability.

PLUS multiorgan involvement characterized by ≥ 2 of the following

- Mucocutaneous features (erythematous skin rash, conjunctiva, mouth, vagina)
- Gastrointestinal – severe vomiting and/or diarrhea
- Altered mental state
- Renal impairment
- Impaired liver function
- Thrombocytopenia
- Coagulopathy
- Acute respiratory distress syndrome
- (Suspected NSTI)

IGAS CON TOXIC SHOCK SYNDROME

II - COME SI RICONOSCE? DIAGNOSI CLINICA



Fig. 1 Palmar desquamation occurring a few days after STSS

IGAS CON Toxic Shock Syndrome

II - COME SI RICONOSCE? DIAGNOSI CLINICA



medscape.com



Fig. 2 Muscle necrosis (black) of a thigh during surgical debridement in a patient with toxic streptococcal toxic shock syndrome due to *S. pyogenes* necrotizing fasciitis

IGAS CON Toxic Shock Syndrome

II - COME SI RICONOSCE? DIAGNOSI DIFFERENZIALE

- Staphylococcal TSS
- Sepsì da Strep pneumoniae
- Sepsì da gram neg
- Meningococcemia/meningite meningococcica
- leptospirosi
- Malattia di Kawasaki (pazienti pediatrici)



Pazienti sani, diversi fattori di rischio (recente SSTI, chirurgia, utilizzo di tamponi interni)

IGAS CON Toxic Shock Syndrome

III - COME SI GESTISCE ?

- Gestione multidisciplinare !!



Chirurgo
d'urgenza

Rianimatore

Urgentista

Infettivologo

IGAS CON Toxic Shock Syndrome

III - COME SI GESTISCE?

- Bonifica chirurgica



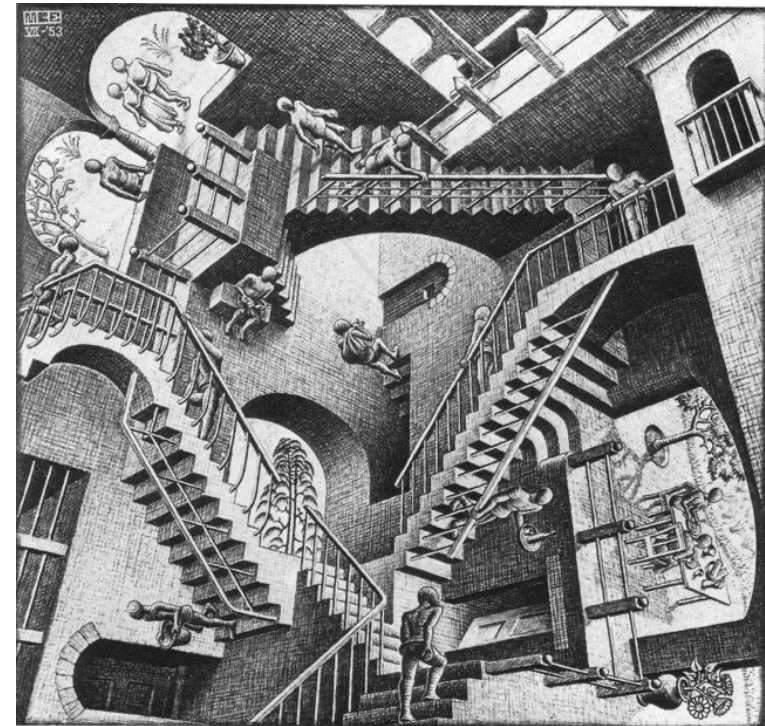
(grazie Hayato)

IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE ?

- Gestione della sepsi/shock
 - capillary leak syndrome > necessità di grandi quantità di liquidi (fino a 10-20L/die!) + vasopressori
 - Insufficienza renale acuta > necessità CRRT
 - Miocardiodepressione da sepsi
 - Danni iatrogeni (es. ischemia periferica da vasopressori)
 - Infezioni secondarie (es. in sede di fasciotomie, VAP, ...)

(da fare in terapia intensiva)



iGAS CON Toxic Shock Syndrome

III - COME SI GESTISCE ?

- Terapia antibiotica - concetti generali

Inibitore sintesi parete cellulare (BETA LATTAMICO) + inibitore sintesi proteica (es. CLINDAMICINA)

- perchè il BETA LATTAMICO ?

- sensibilità GAS a penicillina nel 100% (NON NECESSARIO ATTENDERE ANTIBIOGRAMMA !!)
- sono battericidi

- Perché la CLINDAMICINA ?

- Inibisce la produzione di tossine
- Non risente dell'effetto inoculo (iGAS = deep-seated infection)
- è associata a una maggior effetto post-antibiotico di penicillina

iGAS CON Toxic Shock Syndrome

III – COME SI GESTISCE ?

- Terapia antibiotica – concetti generali

NON effetto additivo/sinergico tra PENICILLINA e CLINDAMICINA in vitro ma...

Effectiveness of adjunctive clindamycin in β -lactam antibiotic-treated patients with invasive β -haemolytic streptococcal infections in US hospitals: a retrospective multicentre cohort study



- In the iGAS cohort: adjunctive clindamycin associated with lower in-hospital mortality (6.5% versus 11%; adjusted odds ratio 0.44 [95% CI 0.23-0.81])
- In iGAS patients without shock or necrotizing fasciitis: the survival benefit was maintained (2.6% versus 6.1%; aOR 0.40 [95% CI 0.15-0.91])

IGAS CON Toxic Shock Syndrome

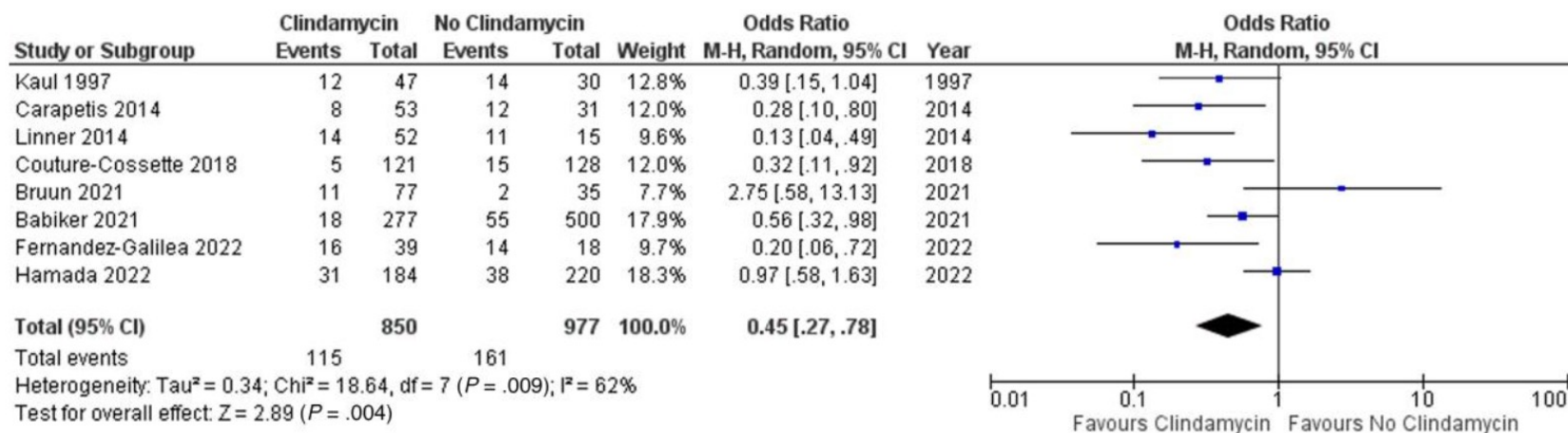


Figure 1. Meta-analysis of the effect of clindamycin treatment on mortality in invasive Group A streptococcal infections. Event rates from Linnér et al and Bruun et al are not directly reported in the text but could be back-calculated from the provided frequencies of clindamycin treatment and mortality in combination with the univariate odds ratios of their association. Abbreviation: CI, confidence interval.

IGAS CON Toxic Shock Syndrome

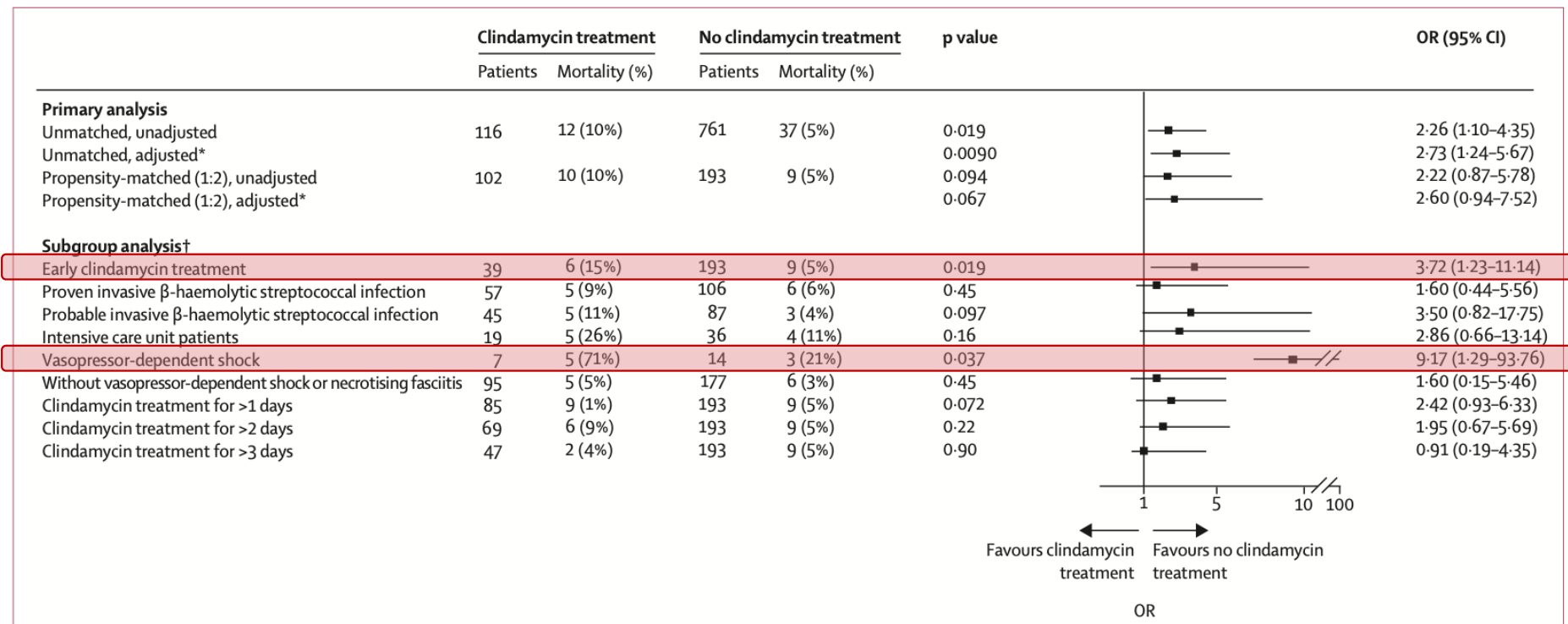


Figure 5: OR of in-hospital mortality in patients with invasive non-group A/B β -haemolytic streptococcal infection treated with versus without adjunctive clindamycin

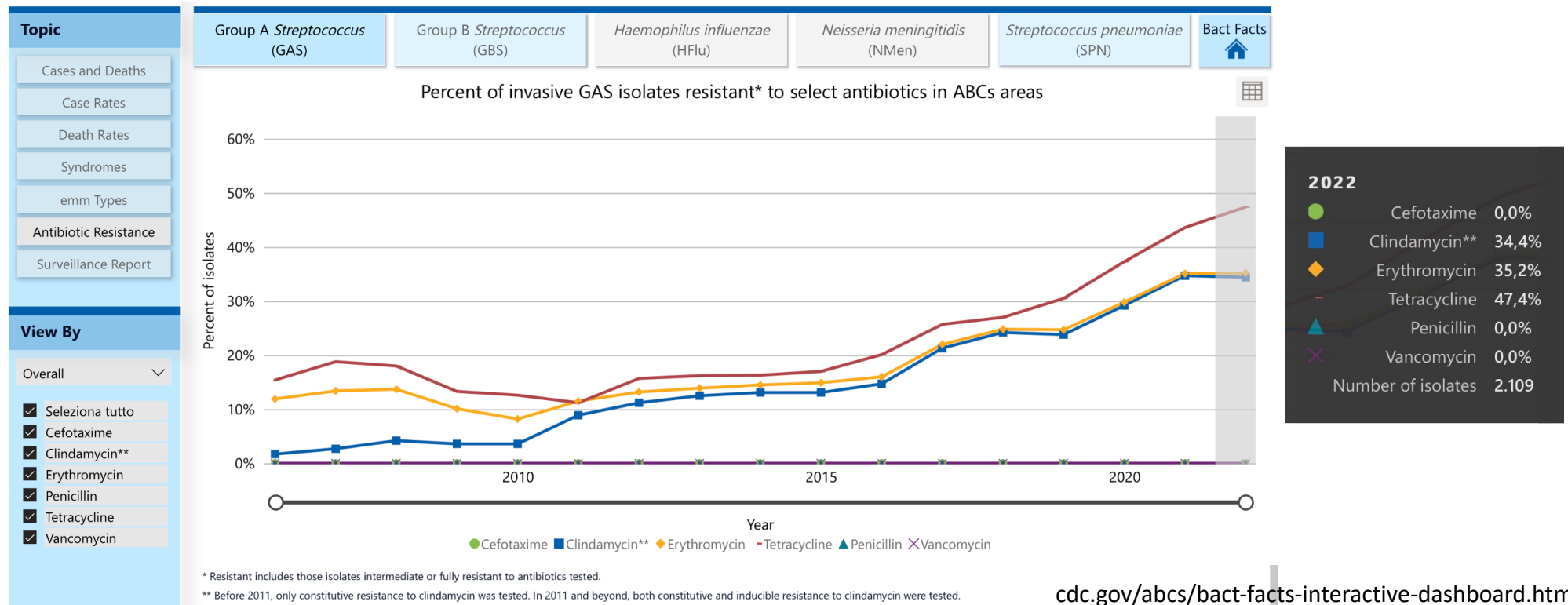
The ORs (95% CIs) of in-hospital mortality in the primary analysis, by propensity matching and adjustment status, and in subgroup analyses of propensity-matched patients in the invasive group A β -haemolytic streptococcal infection cohort. OR=odds ratio. *Adjusted for proven invasive β -haemolytic streptococcal infection, vasopressor-dependent shock, and intensive care unit status.

†All subgroup analyses were propensity-matched.

IGAS CON TOXIC SHOCK SYNDROME

III - COME SI GESTISCE ?

- Alternative a clindamicina (?)



IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE ?

- Alternative a clindamicina (?)

Clinical Infectious Diseases

VIEWPOINTS



Infectious Diseases Society of America



HIV medicine association



OXFORD



Should Linezolid Replace Clindamycin as the Adjunctive Antimicrobial of Choice in Group A Streptococcal Necrotizing Soft Tissue Infection and Toxic Shock Syndrome? A Focused Debate

CLINDAMICINA PROS:

- Ampia letteratura a supporto (OR 0.4-0.45 vs no clindamicina)
- Resistenza a clindamicina quando usata con penicillina non correla con outcome clinico (low-quality evidence, necessari altri studi)

CLINDAMICINA CONS:

- Resistenza in aumento > timore di minore efficacie
- Associata ad aumentato rischio di CDI

Cortés-Penfield N, Clin Infect Dis. 2023

IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE ?

- Alternative a clindamicina (?)

Clinical Infectious Diseases

VIEWPOINTS



Should Linezolid Replace Clindamycin as the Adjunctive Antimicrobial of Choice in Group A Streptococcal Necrotizing Soft Tissue Infection and Toxic Shock Syndrome? A Focused Debate

LINEZOLID PROS:

- Non segnalate resistenze
- Estende spettro di attività su MRSA (alternativa a vancomicina senza nefrotossicità)
- NON associato a rischio di CDI

LINEZOLID CONS:

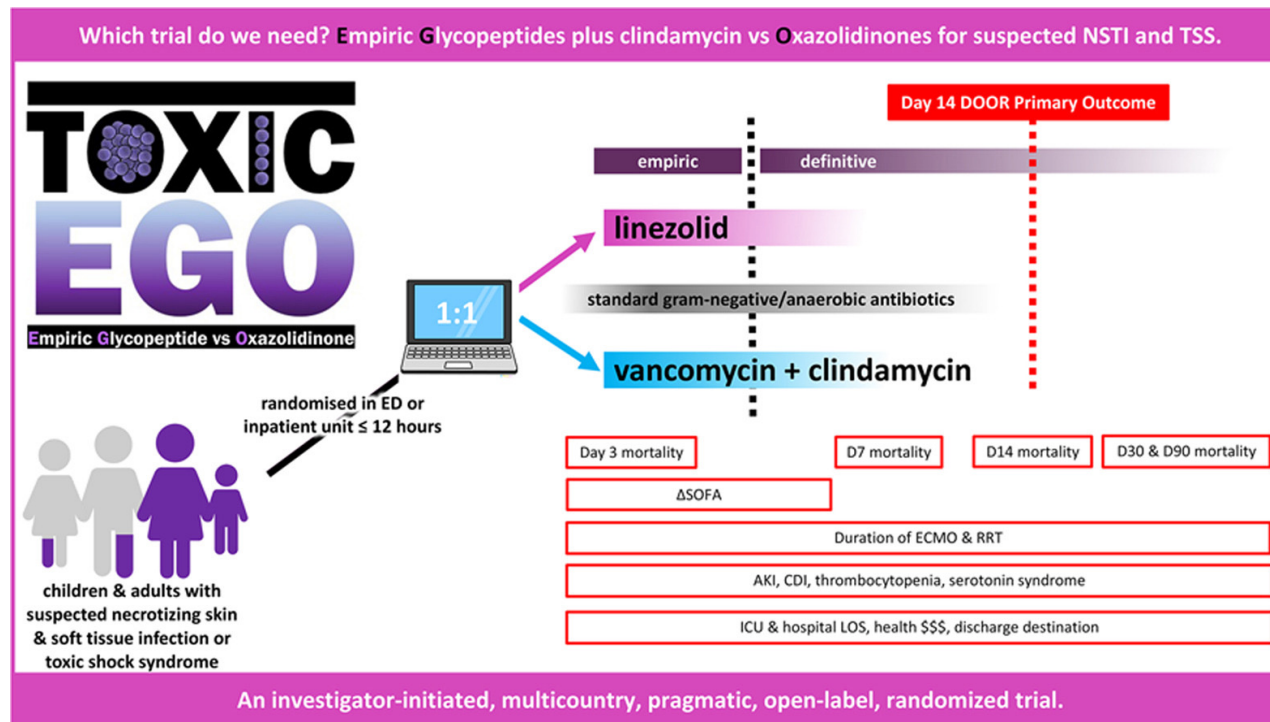
- Pochi studi comparativi vs CLINDA (in 2 studi non dimostrata differenza)
- Maggior costo
- (aggiungo: interazioni tra farmaci)

Cortés-Penfield N, Clin Infect Dis. 2023

IGAS CON TOXIC SHOCK SYNDROME

III - COME SI GESTISCE ?

- ... ne riparliamo tra qualche anno



IGAS CON Toxic Shock Syndrome

III - COME SI GESTISCE ?

- Terapia antibiotica – schemi terapeutici
 - **TERAPIA EMPIRICA** infezione necrotizzante dei tessuti molli / shock settico:
 - PIPERACILLINA/TAZOBACTAM (LD 4.5g > MD 18g) + DAPTOMICINA (10mg/kg) + CLINDAMICINA (900mg q8h)
 - **TERAPIA MIRATA** streptococcal TSS:
 - PENICILLINA G (24MU/die: 6MU in 6h q6h alternando sodica e potassica o sec. elettroliti) + CLINDAMICINA (900mg q8h)
 - Resistenza a clindamicina > LINEZOLID (LD 600mg > MD 600mg in 12h q12h)

IGAS CON Toxic Shock Syndrome

III – COME SI GESTISCE ?



- Terapia antibiotica – durata della terapia

Tempistica non definita, non studi a riguardo

- TERAPIA ANTI-TOSSINA (clindamicina/linezolid):
 - Fino a stabilità clinica ed emodinamica
- TERAPIA BETA-LATTAMICI
 - Assenza di deep seated infection (molto raro!!): ~ 2 settimane
 - deep seated infection (es. infezione necrotizzante): 2 settimane da ultima positività del colturale da debridement

IGAS CON Toxic Shock Syndrome

III – COME SI GESTISCE ?



- Terapia di supporto – IVIG (intravenous immunoglobulins)
 - RAZIONALE
 - to boost antibody levels via passive immunity in the setting of overwhelming infection
 - Several mechanisms: opsonization of GAS for phagocytic killing, neutralization of streptococcal toxins, inhibition of T cell proliferation, inhibition of inflammatory cytokines such as TNF-alpha and interleukin 6
 - INIZIO PRECOCE (giorno 1), VARI SCHEMI DI UTILIZZO
 - 1 g/kg on day 1, followed by 0.5 g/kg on days 2 and 3 [uptoDate]
 - 1 g/kg on day 1, if no improvement consider a further 1 g/kg on days 2 [NSH]
 - 2g/kg singola somministrazione (Australian National Blood Authority)

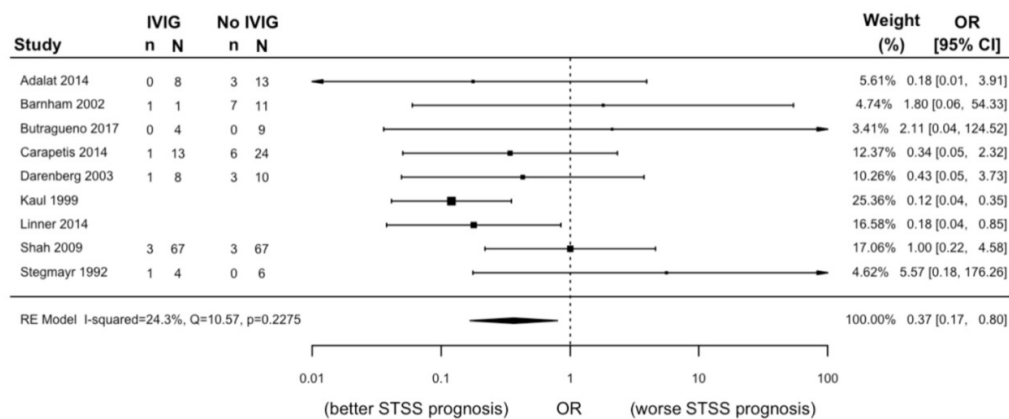
IGAS CON TOXIC SHOCK SYNDROME

III - COME SI GESTISCE ?

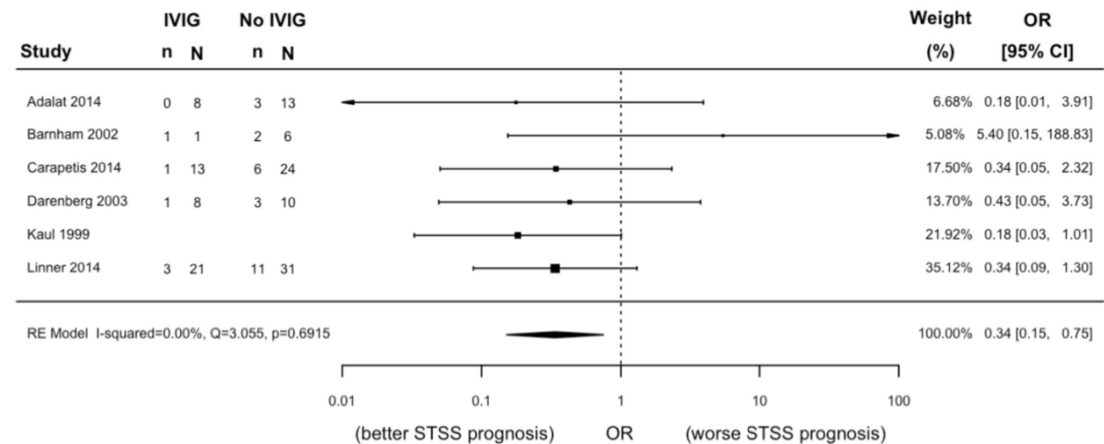
- Terapia di supporto - IVIG (intravenous immunoglobulins)



all STSS patients



subset of STSS patients treated with clindamycin



IGAS CON Toxic Shock Syndrome

III – COME SI GESTISCE ?

- Terapia di supporto – HBO (Hyperbaric Oxygen therapy) ?



Cochrane Database of Systematic Reviews

Adjunctive hyperbaric oxygen for necrotizing fasciitis (Review)

Selection criteria

We included all randomized and pseudo-randomized trials (trials in which an attempt at randomization has been made but the method was inappropriate, for example, alternate allocation) that compared the effects of HBOT with the effects of no HBOT (no treatment or sham) in the treatment of children and adults with necrotizing fasciitis.

Data collection and analysis

We planned independent data collection by two review authors using standardized forms.

Main results

We found no trials that met the inclusion criteria.

IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE ?

- Terapia di supporto – HBO (Hyperbaric Oxygen therapy) ?

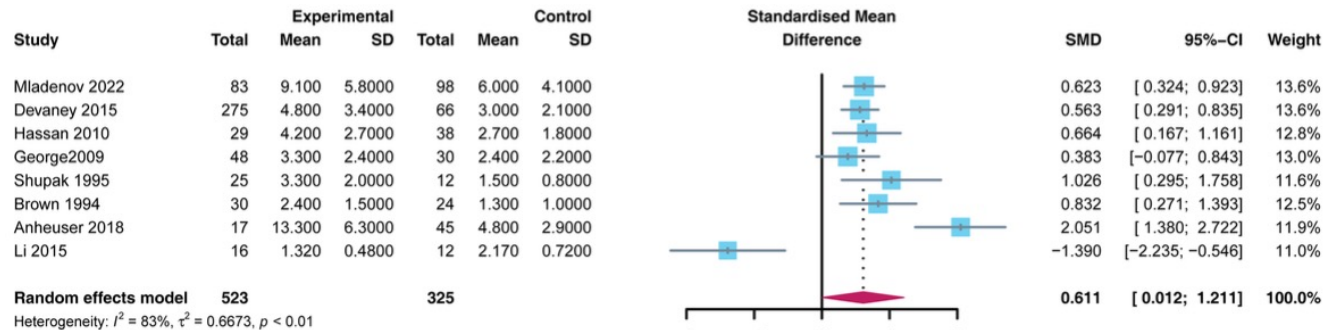
REVIEW

Open Access

The effect of hyperbaric oxygen therapy on the clinical outcomes of necrotizing soft tissue infections: a systematic review and meta-analysis



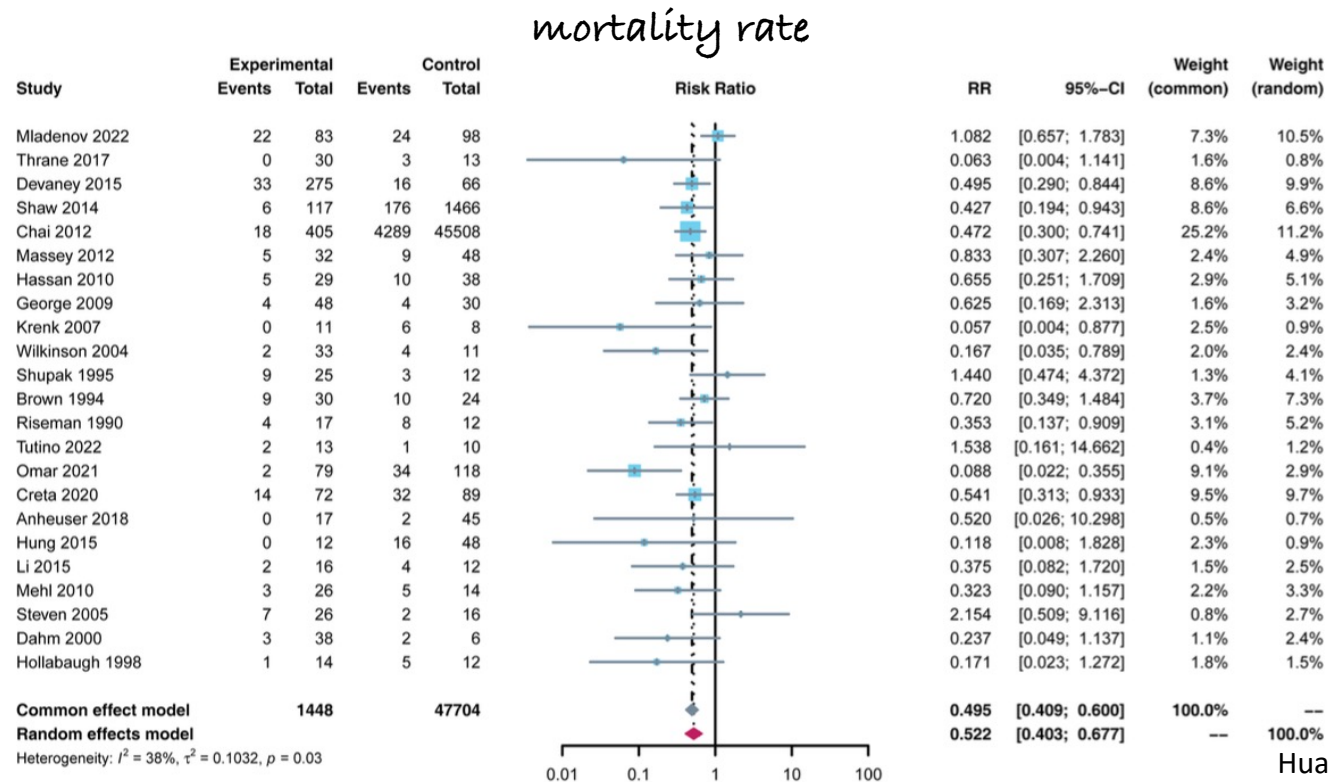
number of debridement



IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE ?

- Terapia di supporto – HBO (Hyperbaric Oxygen therapy) ?



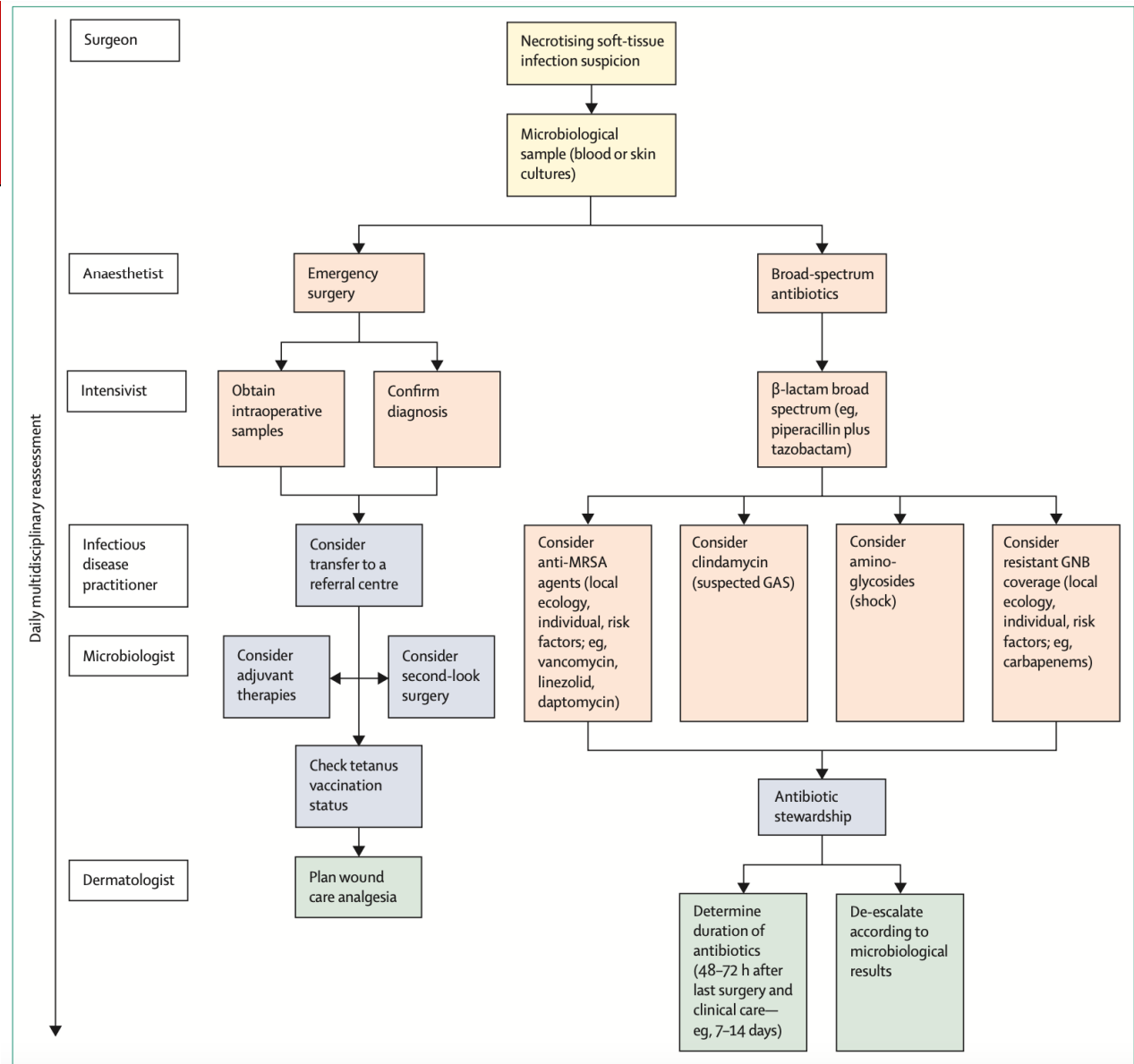
IGAS CON TOXIC SHOCK SYNDROME

III – COME SI GESTISCE: UNA SINTESI

Table 1 Summary of the seven Rs of managing toxic shock syndrome

1. Recognition	• Early recognition • Recognition that not all TSS cases meet case definition
2. Resuscitation	• Aggressive fluid support • Respiratory and inotrope support
3. Removal of source of infection	• Surgical debridement of wounds, drainage of abscesses • Removal of tampons in staphylococcal TSS
4. Rational choice of antibiotics	• Appropriate empiric antibiotic choice • Consider need for MRSA cover
5. Role of adjunctive treatment	• Clindamycin • Intravenous immunoglobulin
6. Review progress	• Continued search for focus requiring surgical intervention • Rationalise antibiotic choice and duration
7. Reduce risk of secondary cases in close contacts	• Heightened index of suspicion • Consider chemoprophylaxis in close contacts of streptococcal TSS

III - COME SI GESTISCE: UNA SINTESI



Hua C, Lancet Infect Dis 2023

Figure 4: Proposed algorithm for multidisciplinary and multimodal management of necrotising soft-tissue infections

profilassi dei contatti

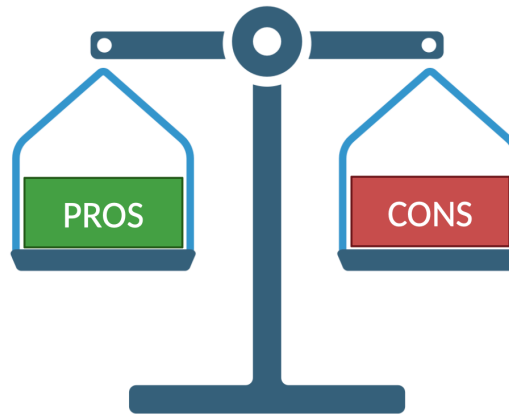


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1 - CHI PROFILASSARE ?

- Approccio ottimale non definito

IGAS molto contagioso > contatti stretti di soggetti con iGAS a rischio di colonizzazione/infezione da strain virulento (rischio iGAS x200-2000 !!)



Rischio assoluto iGAS comunque basso

Rischio decisamente più basso per contatti di non-iGAS

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1 - CHI PROFILASSARE ?

- Da considerare
 - Entità dell'esposizione (close family members, patients who are kissing or sleeping in the same bed, and who spend many hours daily with an infected individual)
 - Durata dell'esposizione (rischio da 7 giorni pre- a 24h post-inizio di terapia attiva)
 - Status immunologico dei contatti (>75y, immunosuppressed, pregnant ≥ 37 w or women ≤ 28 days of giving birth, persons who have had recent surgery or have any type of open wound)

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1 - COME PROFILASSARE ?

- PENICILLINA 250mg q6h (o amoxicillina 1g q8h) per 10 giorni
- CLINDAMICINA 20mg/kg/die suddiviso in 3 somministr.
(max 900mg/die) per 10 giorni
- AZITROMICINA 500mg/die per 5 giorni

Table 1. Summary of public health actions for close contacts of iGAS cases in household settings

Risk assessment of household contact	Defined as	Action required
A) High risk	• older persons (≥75 years) • pregnant women ≥37 weeks • women within 28 days of giving birth • neonates (up to 28 days old) • individuals who develop chickenpox with active lesions within 7 days prior to diagnosis of iGAS infection in the index case or within 48 hours after commencing antibiotics by the iGAS case, if exposure ongoing	Offer antibiotic prophylaxis only to the high risk contact. Administer as soon as possible (within 24 hours, and preferably same day) and not beyond 10 days after iGAS diagnosis in the index case. 'Warn and inform' letters for close contacts; letter can also be copied to the contact's GP.
B) Symptomatic: iGAS* symptoms	Symptoms suggestive of iGAS	Urgent medical review
	If 2 or more confirmed or probable iGAS cases are identified in the household	Offer antibiotic prophylaxis to the whole household within a 10-day period of iGAS diagnosis in the index case.
C) Symptomatic: GAS symptoms [^]	Symptoms suggestive of localised GAS infection	GP assessment and treatment if indicated. 'Warn and inform' letters for close contacts; letter can also be copied to the contact's GP.
Risk assessment of household contact	Defined as	Action required
D) All other close contacts	Those not reporting symptoms at the time of the risk assessment and not in a high risk group.	Maintain a low threshold of suspicion. A 30-day period of surveillance should be established. Use 'warn and inform' letters to advise all other close contacts to be alert to the signs and symptoms of GAS infection and seek medical attention if they develop a febrile illness or any clinical manifestation of GAS within 30 days of diagnosis in the index case. Letter can also be copied to the contact's GP.

* High fever, severe muscle aches or localised muscle tenderness +/- a high index of suspicion of invasive disease.

[^] Sore throat, fever, minor skin infections, scarlatiniform rash.

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Nella tabella di seguito sono sintetizzate le azioni di sanità pubblica da attuarsi nei contatti stretti di scarlattina e iGAS come descritte anche nel paragrafo precedente (tratta da *UK guidelines for the management of contacts of invasive group A streptococcus (iGAS) infection in community settings* - Marzo 2023)

Risk assessment	Definizione	Azione
	- persone di età ≥ 65 anni	
Alto rischio	- donne in gravidanza alla ≥ 37 settimana - donne nei primi 28 giorni dal parto - neonati nei primi 28 giorni dal parto - soggetti con varicella sintomatica insorta nei 7 giorni precedenti la diagnosi nel caso indice	offerta dell'antibiotico-profilassi entro le 24 ore (preferibilmente il giorno stesso) e non oltre i 10 giorni dalla diagnosi nel caso indice
	- soggetti HIV + - soggetti diabetici	
	sintomi suggestivi per iGAS	visita medica urgente
iGAS sintomatici	in caso di 2 o più casi confermati o probabili di iGAS nello stesso nucleo familiare	offerta dell'antibiotico-profilassi a tutti i conviventi entro i 10 giorni dalla diagnosi nel caso indice
GAS sintomatici	sintomi suggestivi per GAS	- visita medica e impostazione terapia - informativa ai contatti familiari e/o alla scuola



Fondazione IRCCS Ca' Granda
Ospedale Maggiore Policlinico

Sistema Socio Sanitario



Regione
Lombardia

La gestione clinica dell'infezione invasiva da *Streptococcus pyogenes* *Streptococcal NSTI e TTS nei pazienti adulti*

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