

Infektioner

AO Advanced Danmark 2022



Disclosure: No potential conflicts of interest

Faculty: Peter Max Halschou-Jensen
Overlæge, Traumesektionen
Herlev Hospital

I have no financial relationships with commercial entities that produce health-care related products.

Case

75-årig kvinde

Februar 2019 fjernet sarcom hø. lår



Case

5. maj 2020



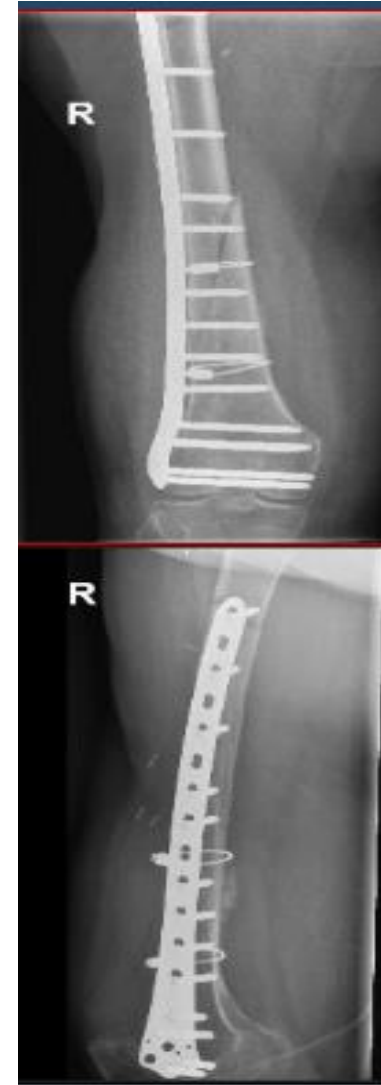
Case

7. maj 2020



Case

2. aug. 2020



4. aug. 2020

Case



Case

10 aug. 2020



Case

16 okt. 2020



To be continued...

Indhold (15 min.)

- Definition
- Incidens, klassifikation, risikofaktorer
- Behandling
- Take-home messages



Definition

Helt centralt for enhver diskussion ved morgenkonferencen!



Definition

CONFIRMATORY CRITERIAS

- Pussivning fra huddefekt eller tilstedeværelse af pus under operation
- Velkendte "positive mirror sign"
- Sårnedbrud med kommunikation til fremmedlegeme eller knogle
- Mikrobiologisk fund med to positive dyrkninger fra separate prøver
- Histopatologisk identifikation af svampe eller bakterier



ORIGINAL ARTICLE

OPEN

Diagnosing Fracture-Related Infection: Current Concepts and Recommendations

Geertje A. M. Govaert, MD, PhD,* Richard Kuehl, MD,† Bridget L. Atkins, MD,‡ Andrej Trampuz, MD,§ Mario Morgenstern, MD,|| William T. Obremskey, MD, MPH,¶ Michael H. J. Verhofstad, MD, PhD,** Martin A. McNally, MD, FRCS(Orth),‡ and Willem-Jan Metsemakers, MD, PhD†† on behalf of the Fracture-Related Infection (FRI) Consensus Group

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Definition

SUGGESTIVE CRITERIAS

- Biokemiske
- Billeddiagnostiske
- Rødme, varme, hævelse
- Palpationsømhed

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Incidens

- 5% af alle osteosynteser
- 0,5 – 2% lukkede frakturer
- 10 – 30% åbne frakturer



Klassifikation

- Early (0-2 weeks)
- Delayed (2-10 weeks)
- Late (>10 weeks)

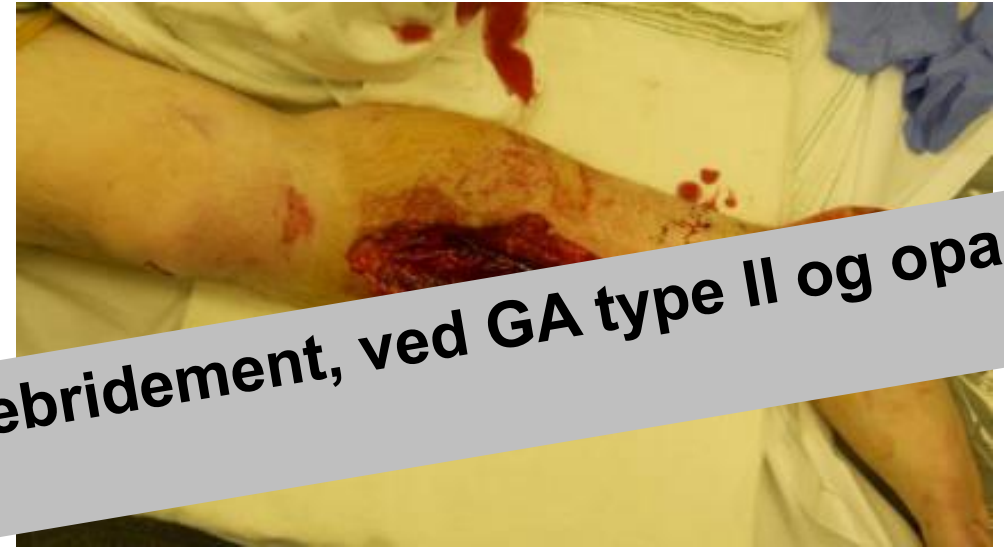
*Willeneger and Roth
classification*

Risikofaktorer

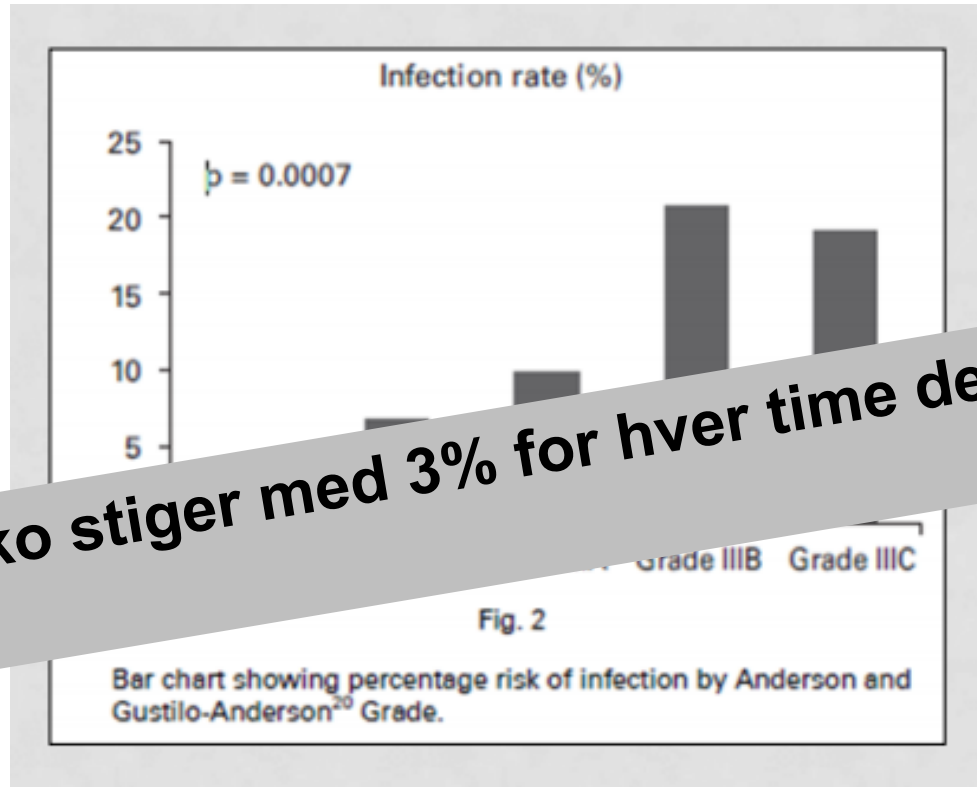
- Fraktur relaterede
- Patient relaterede
- Procedure relaterede

Fraktur relateret

Åbne frakturer x 10-20



Risiko stiger med 3% for hver time der går til debridement, ved GA type II og opad



Hull, JBJ, 2014

■ TRAUMA
Delayed debridement of severe open fractures is associated with a higher rate of deep infection

Rabih, N Engl J Med, 2004
McGraw, JBJS, 1988
Obremskey, J.Orth.Trauma, 2003
Perren, JBJS, 2002

Patient relateret

- Fedme
- Rygning
- Diabetes
- Tidligere infektion i samme region

Ortega, Trauma-Ort., 2014

Trauma-Orthopaedics

Posttraumatic orthopaedic wound infections:
a current review of the literature

Gil R. Ortega and Ashleigh A. Ortega

Procedure relateret

- Håndvask
- Steril teknik
- Klargøring af operationsfelt
- Trafik på OP
- Operationens varighed

Harrop, J Am Acad Ortop., 2012

Contributing Factors to Surgical Site Infections

James S. Harrop, John C. Styliaras,
Yinn Cher Ooi, Kristen E. Radcliff,
Alexander R. Vaccaro,
and Chengyuan Wu

J Am Acad Orthop Surg February 2012 ;
20:94-101.;

Ortega, Trauma-Ort. 2014

Trauma-Orthopaedics

Posttraumatic orthopaedic wound infections:
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Selv få bakterier kan gøre stor skade...

- **Study from 1956.**
- **Injected 7,500,000 CFU *S. aureus* in skin of human volunteers = only 50% infected, all resolved**
- **< 100 CFU onto an implant in humans = 100% infected, did not resolve**

EXPERIMENTAL STAPHYLOCOCCAL INFECTIONS IN THE SKIN OF MAN

By Stephen D. Elek

St. George's Hospital Medical School, University of London, London, England

The concept of virulence of a microbe is relative to a given host species. The fact that an organism is capable of setting up lesions in 1 experimental animal cannot be used as a basis for comparing the virulence of microbial strains in relation to another species of host. The traditional approach of using any convenient laboratory animal in virulence studies may yield completely fallacious findings if different metabolic products in other species of animals contribute to varying degrees of virulence in those species. There is evidence that the virulence of coagulase positive staphylococci does vary when tested on rabbits, mice, or other animals, but there is no information concerning the existence of similar differences in man (Frappier *et al.*, 1955).

The carrier rate of coagulase-positive staphylococci and their distribution in dust, clothing, and elsewhere is very high, but clinical staphylococcal infection in man is comparatively rare. This suggests that either a minority of nasal strains are endowed with special virulence or that the circumstances of the infection determine the occurrence of disease. Since virulence testing on animals could not be expected to provide the correct answer, it was decided to compare a number of nasal strains with staphylococci isolated from human lesions by injecting volunteers intradermally. All the strains tested were coagulase-positive but, as the other biological properties of such material have frequently been described, no further details were regarded as relevant. Virulence testing in man being necessarily restricted in extent, our primary aim was to establish, within the limitations of the approach, whether or not differences in the resulting lesions could be demonstrated between randomly selected nasal strains of *Staphylococcus pyogenes* and other strains obtained from human lesions, and therefore presumed to be virulent. The indicator effect chosen was pus formation. Since staphylococci typically produce purulent lesions, the minimum inoculum surviving and progressing to pus formation can be used as the basis of comparison between the virulence to man of different strains.

Experiments on man with *Staph. pyogenes* have been carried out before (Garré, 1885; Bumm, 1885; and Bockhart, 1887), but only to show that they cause disease. No information was available concerning the minimal pus-forming dose or concerning differences between strains. Since the number of volunteers available was insufficient to test an adequate number of strains with different sizes of inocula it was decided to determine the minimal pus-forming dose for a strain freshly isolated from a severe lesion and then to compare the effects of the same dose of nasal and of some further known pyogenic strains. If the hypothesis that only a minority of nasal strains are virulent is correct, these strains would be expected not to cause pus formation at that dose.

A strain obtained from an abscess of the neck was injected in varying dilu-

85

Hvordan var det nu med aktuelle case...?



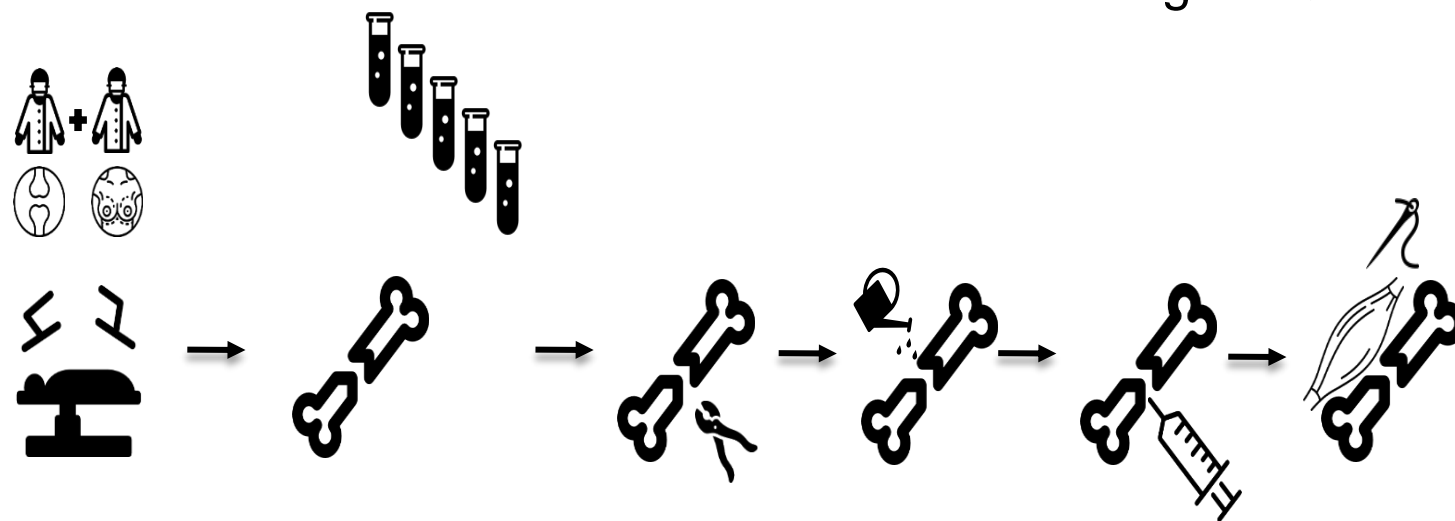
Infektion?

Behandling

One-stage-surgery

- á la Oxford

- Fjerne fremmedlegemer
- Prøvetagning
- Revision af inficeret knogle
- Skylle med saltvand
- Intraossøst "bone void filler" med antibiotika
- Primær lukning af bløddele



Behandling

Antibiotikabehandling

- Efter revision
 - Empirisk IV AB:
 - Dicloxaccilin 1g x 4
 - Benzylpenicillin 2 MIE x 4
 - AB optimeret efter D+R
 - **Én uges IV og 5 ugers tablet – OVIVA trial**
 - Pt. kontrolleres i ambulatoriet
 - Optimere øvrige medicinske lidelser...



Europe PMC Funders Group
Author Manuscript
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N Engl J Med. 2019 January 31; 380(5): 425–436. doi:10.1056/NEJMoa1710926.

Oral versus Intravenous Antibiotics for Bone and Joint Infection

A full list of authors and affiliations appears at the end of the article.
* These authors contributed equally to this work.

Tilbage til casen...

19. okt. 2020



Tilbage til casen...

25. okt. 2020: OP med sek. Suture og ny VAC

30. okt. 2020: OP, forværret inf. fornyet bløddelsrevision og VAC



4. nov. 2020: OP med skift af VAC

Tilbage til casen...

Flyttes til Herlev – operation ala Oxford

9. nov. 2020 OP



Tilbage til casen...

11. jan. 2021

3 mdr's IV AB



Tilbage til casen...

Seneste kliniske billede 23. feb. 2022

23. marts 2022 Afsluttet uden tegn på
infektion.
Helet med let hypergranulation.



Take-home messages

Definition:

Confirmatory criterias (pus, «mirror», sårnedbrud, D+R, histopatologi)

Suggestive criterias (Biokemi, billeddiagnostik, rødme, varme, hævelse, smerter)

Behandling – one stage...

Kompromiløs revsion til vitalt væv

AB efter prøvetagning

OVIVA trial

Multidisciplinær indsats og omsorg

?

