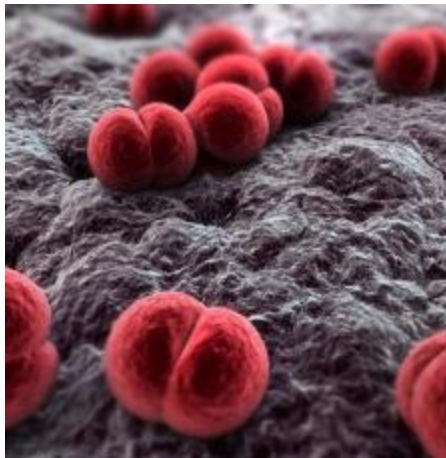


# Septic Arthritis due to *Neisseria meningitidis* in the Absence of Meningitis

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- Background Information
- Case Presentation
- Discussion
  - Literature Review
  - Pubmed Search
  - Proposed Treatment (experience based)
- Take home message

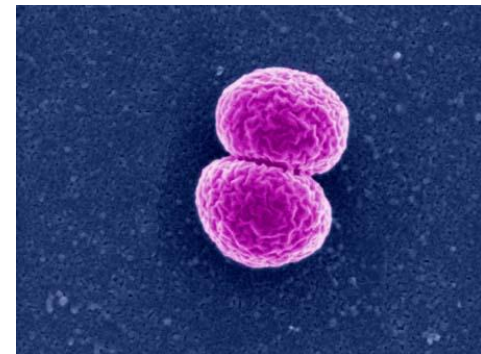
# Introduction

- Septic arthritis is inflammation of a joint space secondary to a microorganism.
- Route of infection
  - Hematogenous (usually)
  - Direct inoculation from an adjacent site of infected tissue or during trauma.
- Pathogenic organisms
  - *Staphylococcus aureus* (most common, 44 % of patients)
  - Streptococcal and other staphylococcal species
  - *E. coli* and *Pseudomonas* (neonates & patients with immunodeficiency)
  - *N. gonorrhoea* (young adults)



# *N. meningitidis*

- 2.5 to 6 per 100,000 in developing countries
- Presentation from meningitis to septicemia
- Arthritis associated with or after symptoms of acute meningitis has been reported since the 19<sup>th</sup> century
- Meningococcal arthritis is rare in the absence of meningitis or septicemia
- 1% isolated from synovial fluid
- Most cases involve the knee



# Case Presentation

- 46 year old female presented to the ED
- 24 hours onset of spontaneous painful swelling of the right elbow
- Returned from a trip to Mexico
- No recent illness or history of sick contacts
- No trauma to the elbow
  
- ROS: fever over the last few hours prior to admission, no chills, sweats or headache



- Physical examination
  - 100.6 °F otherwise normal vital signs
  - Right upper extremity
    - Minimal effusion
    - Swelling and warmth around the elbow
    - Motion limited secondary to pain
    - Lateral epicondyle tender to palpation
    - No ecchymosis or abrasion noted
  - Neurological exam
- Leukocytosis 17,900 with 74 % neutrophils
- ESR = 56; CRP = 7.1



# Xray



Small anterior fat pad sign indicative of effusion but no fracture or dislocation.



- Arthrocentesis
  - 96,000 nucleated cells; 60 % neutrophils & 20 % bands
  - 50,000 red blood cells
  - No crystals
  - Gram stain
    - Innumerable WBC's
    - Few gram negative diplococci
- Started on empiric vancomycin and piperacillin/tazobactam
- Arthrotomy with irrigation & debridement
- Intraoperative cultures grew *N. meningitidis*
- Blood and urine cultures negative
- Ceftriaxone one gram daily for four weeks
- Patient finished the course with no complications

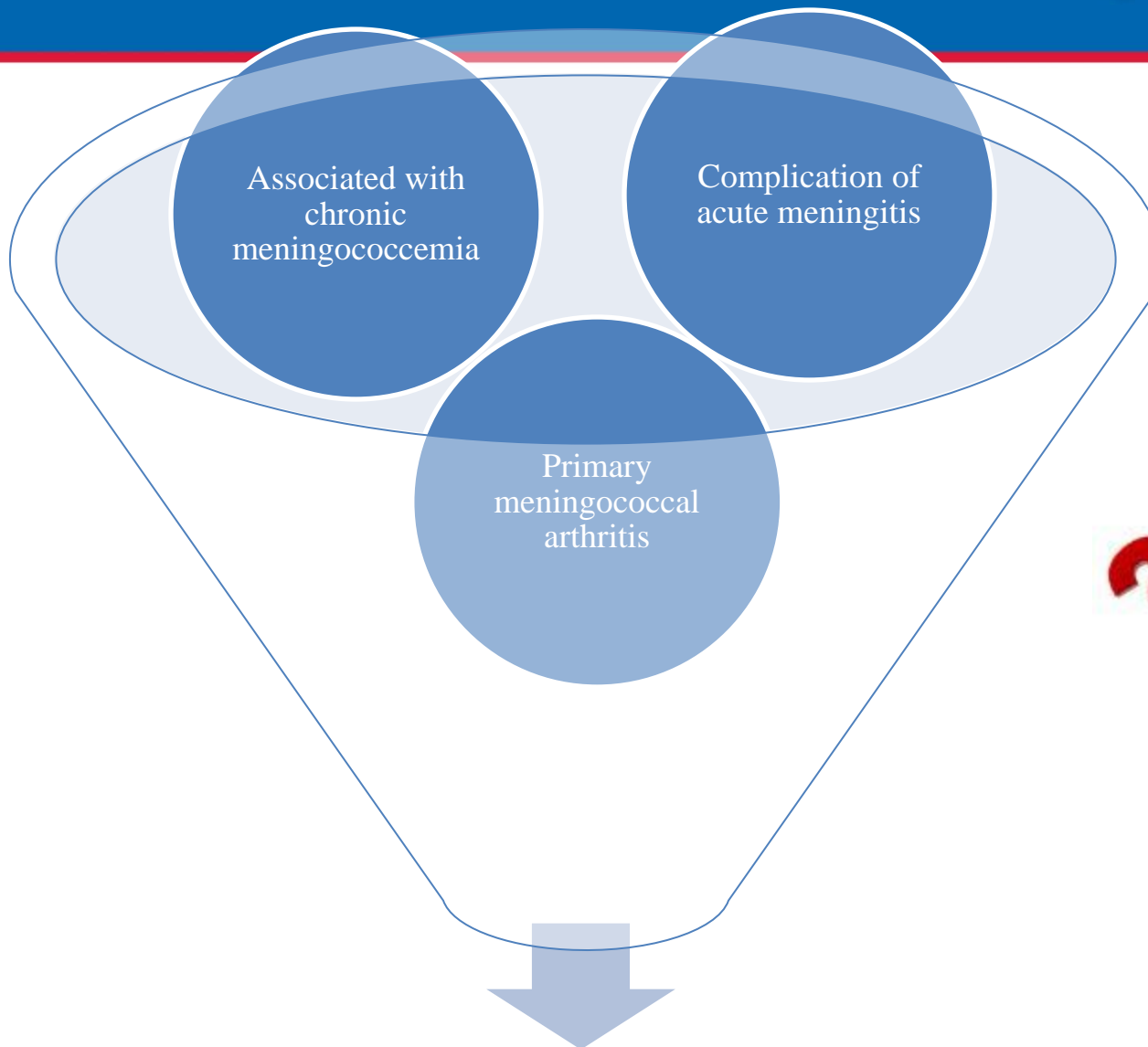


# Discussion

- *N. meningitidis* is an airborne pathogen usually transmitted from close contacts or living situations such as in college campuses and barracks
- *Clinical scenarios*
  - Meningitis (50% )
  - Meningococemia
  - Pneumonia
  - Epiglottitis
  - Otitis media
  - Conjunctivitis
  - Urethritis
  - Pericarditis
  - Arthritis



- Young age
  - most occur in infants
  - 2<sup>nd</sup> peak young adults mainly in military recruits/college dormitories
- Close contact with an individual with meningococcal disease
- Overcrowding
- Complement and properdin deficiencies
- Asplenia
- AIDS
- Multiple Myeloma



Three clinical scenarios for arthritis

# Primary Meningococcal Arthritis

- Bacterial isolation from synovial fluid without concomitant meningococemia or meningitis

## Proposed Mechanism of Pathogenesis

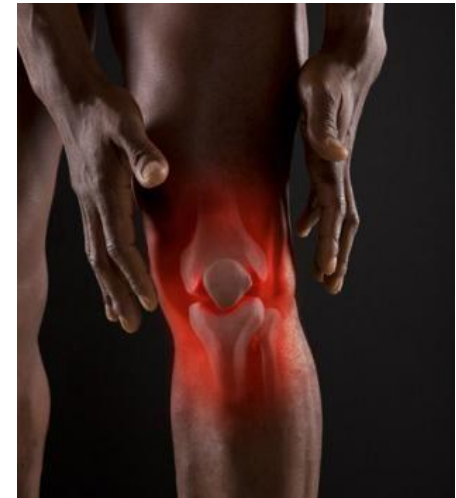


Blood stream infection with bacterial invasion of  
the synovium  
(Based on 40% of patients having positive blood  
cultures)

- Preceding Symptoms:
  - Upper respiratory symptoms (50% of cases)
  - Maculopapular rash (30%)

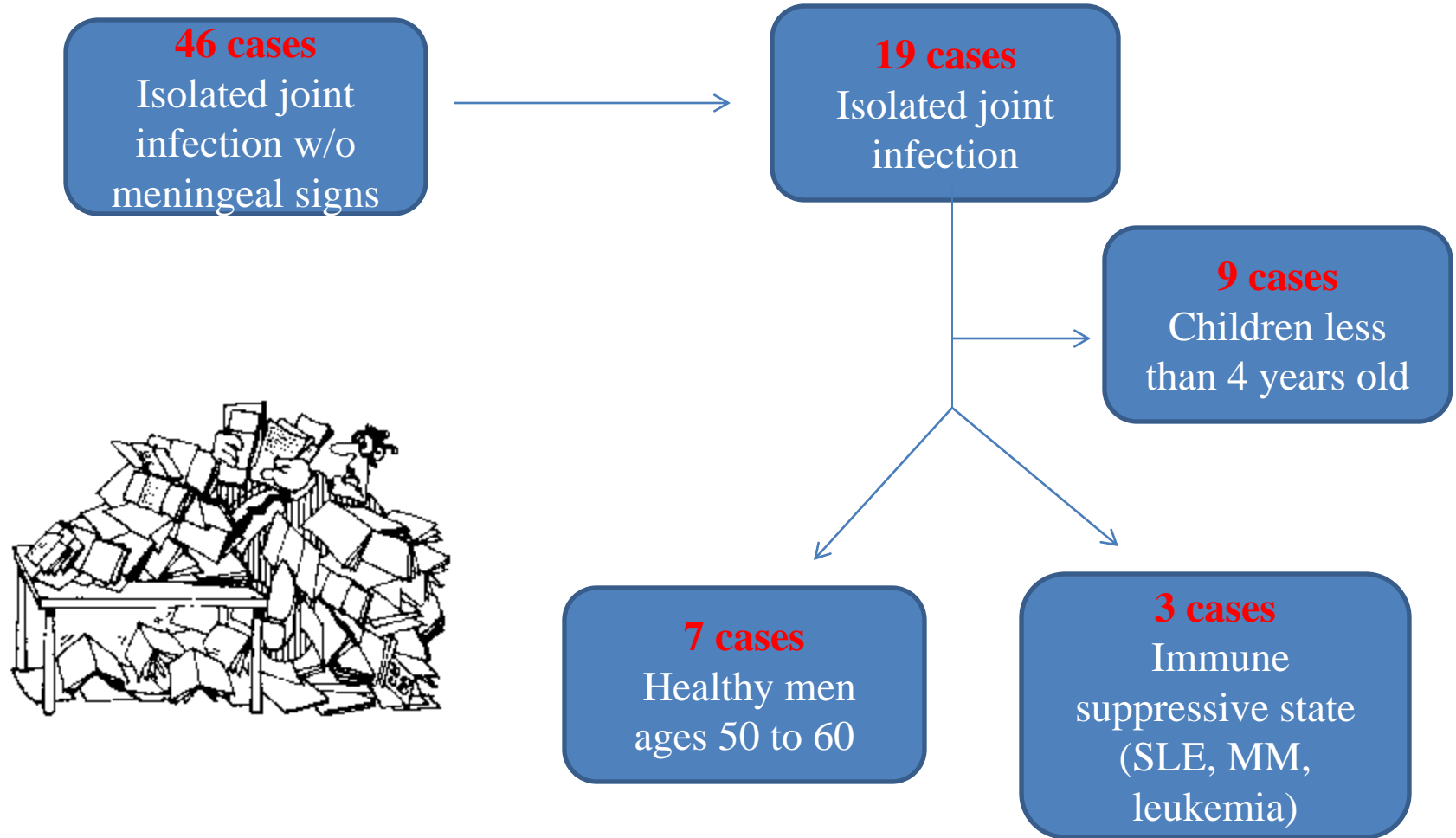
# Primary Meningococcal Arthritis

- More prevalent amongst males
- Joints affected
  - Knee (most common)
  - Ankle (second most common)
- Bacteria isolated
  - Synovial fluid (highest positive in 70 to 90 %)
  - Blood (28 to 40%)
  - Pharynx (13 to 30%)
- Importance of arthrocentesis in diagnosis





# Discussion



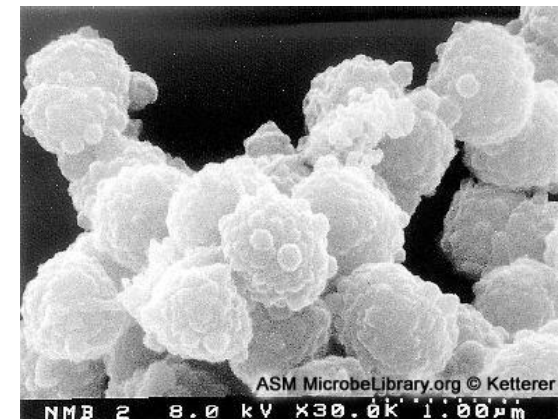
# PubMed Search

Author/Year publication	Age/Sex	Joint	Treatment
Giamarellos-Bourboulis et al.; 2002	16/Female	Knee	IV Penicillin G
Shawn; 2002	18/Female	Knee	IV Ceftriaxone
Cartolano et al; 2001	19/Female	Knee	IV Ceftriaxone, IV Amoxicillin, PO Ofloxacin
Christiansen JC; 1995	19/Female	Hip	IV Penicillin G
Harwood et al.; 2008	29/Female	Knee	IV Ceftriaxone
Garner et al.; 2011	75/Female	Shoulder	IV Ceftriaxone
Joyce et al.2003	19/Female	Knee	IV Benzylpenicillin
<b>Current Case; 2012</b>	<b>46/Female</b>	<b>Elbow</b>	<b>IV Ceftriaxone</b>



# *N. meningitides* vs *N. gonorrhoea*

- *N. gonorrhoea* is the most common cause of septic arthritis in sexually active young adults with a 4 times more preponderance in females
- Morphologically indistinguishable
- Different outcomes
  - *N. gonorrhoea*
    - Minimal damage to joint surfaces
    - Few systemic manifestations
  - *N. meningitidis*
    - Serious complications of CNS, heart, lungs
    - Bone and joint destruction

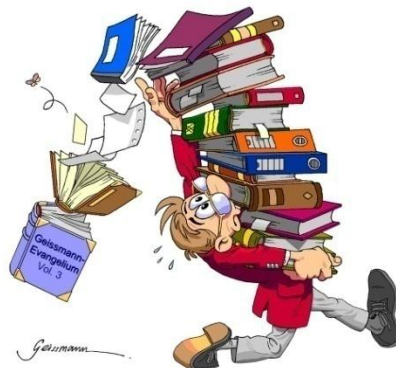


- Challenging as few cases reported
- Antibiotic therapy
  - IV penicillin or cephalosporins
  - Duration varied from 7 to 42 days
- Surgical debridement
  - To avoid high rate of complications



# Take Home Message

- This case highlights the systemic nature of *N. meningitidis* infection causing disease in a native joint of an immunocompetent patient.
- The elbow being the infected joint is rare.
- Obtaining fluid or tissue culture prior to administration of antibiotics is critical for diagnosis.
- Microbiology support is essential to differentiate from *N. gonorrhoea* as approach and duration of treatment is different.
- Surgical debridement adjunct to antibiotic therapy.
- Do not suggest STD based on gram stain.



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Thank You