ER-INF COMBINE CONFERENCE

報告者：R3許力云
指導者：VS洪世文
102.01.19

Basic data

- ER visit on day1 12:12 PM
- 檢傷主訴：病患來診為發燒畏寒
- Gender : male
- Age : 76 y/o
- Cons : E4V5M6
- Vital signs :

SpO2 : 81%, TPR : 38.6/ 56/ 21, BP : 140/71 mmhg

- Triage I

Present illness

- 患者為印尼華僑由家屬代述患者已經畏寒發燒一個月,每天燒一到兩次
- Decrease appetite and body weight
- He had visit local hospital at Indonesia without definite diagnosis
- Cough mild
- Abdominal fullness
- Myalgia
- No nausea/vomiting/diarrhea
- No dysuria
- No skin rash or obvious wound

Past history

- Allergy : NKA
- L4-L5 HIVD s/p OP at 2008

Physical examination

- Consciousness : E4V5M6
- HEENT : supple neck, no icteric sclera
- Chest : clear breathing sound, RHB
- Abdomen : soft, no tenderness point, back pain and soreness
- Extremities : left thigh tenderness, no obvious wound at skin

Tentative diagnosis

- FUO r/o atypical infection

Orders

12:21 PM
- WBC/DC/HB/PLT
- PT/aPTT
- BUN/Crea, GOT, T-bil, CRP
- Lactate
- Blood/C * II
- ABG G6
- N/S run 60 ml/hr
- CXR
- U/A, U/C

CXR

Lab data

WBC/DC/Hb/PLT		Biochemistry		PT/aPTT	
Hb	8.1	GOT(AST)	96	PT	11.7
WBC	16.7	T-Bilirubin	0.7	Normal control	10.2
Segmented Neutro.	69	BUN	14	INR	1.15
Lymphocyte	20	Creatinine	1	APTT	34.1
Monocyte	5.5	CRP	16.2	Normal control	32.8
Eosinophil	0.5	Lactate	29.3	APTT ratio	1.04
Atypical lymphocyte	0.5				
Band	0.5				
Metamyelocyte	3.5				
Myelocyte	0.5				
Platelet	359				

Lab data

U/A		
RBC	16-30	/HPF
WBC	>100	/HPF
Epithelial cell	0-1	/HPF
Cast	Granular	/LPF
.cast-amount	+	
Crystal	Not Found	/HPF
.Cry-amount	-	
Bacteria	+	

PH=7.549
PCO2=37.7 mmHg
PO2=65 mmHg
BE=11 mmol/L
HCO3=32.9 mmol/L
TCO2=34 mmol/L
SO2=95 %
NA=133 mmol/L
K=3.8 mmol/L
HCT=26 %PCV
HB=8.8 g/dL

ORDERS

1404
- N/S 200ml challenge(BT 37.4, BP 95/58, HR 111)
- PSA (1.8)
- Flumarin 2g IV ST & 1g Q6H
- On BP monitor
- Arrange Infection ward
- IV 改N/S 100ml/hr

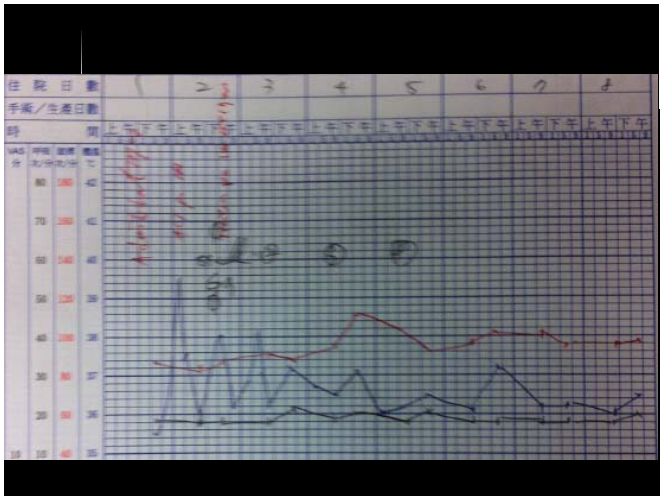
1450
- Morphine 5mg IV st(back pain)

1510
- Admission to 7B

Admission course

- After admission to ward initial antibiotics : cefmetazole 1g Q8H (day1-day3)
- F/U lab data on day3, day4

Alkaline p-tase	88	U/L
LDH	156	U/L
HIV Screen	0.74	S/CO
AFP	1.73	ng/mL
CEA	1.78	ng/mL
T4	4.2	ug/dL
ESR	113	mm/hr



Blood culture 01/08

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PRELIMINARY BLOOD CULTURE REPORT:
Aerobic:            SALHSWM8            +
Anerobic:           SNLJ349M            +
One bottle of bottle set was positive cultured and final report  **X**
Microscopic finding:    Gram (+) coccus in cluster.
FINAL BLOOD CULTURE REPORT:
Organism:
1.Staphylococcus aureus(MSSA)
/////
Antibiotic/Culture:S8 Staphylococcus aureus(MSSA)
  CC    CIP   E     GM    LVX   MXF   OX    P     SXT   TET   TGC
  S     S     S     S     S     S     S     R     S     R     S
  <=.25 <=.5  <=.25 <=.5  .25   <=.25 <=.25 >=.5  <=10  >=16  .5
  VA
  S
  2
CC:CC(Clindamycin) CIP:CIP(Ciprofloxacin ) E:E(Erythromycin  )
GM:GM(Gentamicin ) LVX:LVX(Levofloxacin) MXF:MXF(Moxifloxacin)
OX:OX(Oxacillin) P:P(Penicillin) SXT:SXT(Bactrim)
TET:TET(Tetracycline ) TGC:TGC(Tigecycline ) VA:VA(Vancomycin )
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Urine culture 01/08

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MID-STREAM URINE CULTURE:
Colony count :     >100000
Organism:
1.  Staphylococcus aureus(MSSA)
/////
Antibiotic/Culture:S8 Staphylococcus aureus(MSSA)
  CC    CIP   E     GM    LVX   MXF   OX    P     SXT   TET   TGC
  S     S     S     S     S     S     S     R     S     R     S
  <=.25 <=.5  <=.25 <=.5  .25   <=.25 <=.25 >=.5  <=10  >=16  .25
  VA
  S
  2
CC:CC(Clindamycin) CIP:CIP(Ciprofloxacin ) E:E(Erythromycin  )
GM:GM(Gentamicin ) LVX:LVX(Levofloxacin) MXF:MXF(Moxifloxacin)
OX:OX(Oxacillin) P:P(Penicillin) SXT:SXT(Bactrim)
TET:TET(Tetracycline ) TGC:TGC(Tigecycline ) VA:VA(Vancomycin )
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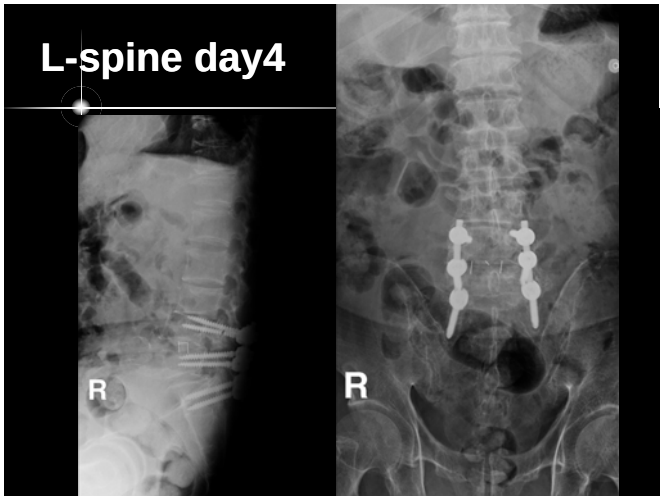
CXR day4

L-spine day4



Admission course

- Antibiotics change to Oxacillin 2g IV Q4H +Gentamycin 60mg Q8H due to culture data

Admission course

- Heart echo was arrange for evaluate of IE on 01/09

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RVD            mm  ( 07 - 23 )
  AO root  34     mm  ( 20 - 39 )
IVS      8      mm  ( 06 - 11 )
  LA       43     mm  ( 19 - 40 )
LVEDD    58     mm  ( 36 - 52 )       EF       72     %
LVPW     8      mm  ( 06 - 11 )       EF by Simpson s        %
LVESD    34     mm  ( 20 - 36 )       Rhythm : Normal sinus rhythm

Comment :
 Dilated LA and LV
 Normal regional wall motion and normal LV contractility
 Mild Aortic valve sclerosis with trivial AR
 Mildly thickened mitral valve without MR
 No valvular vegetation visible from Transthoracic approach
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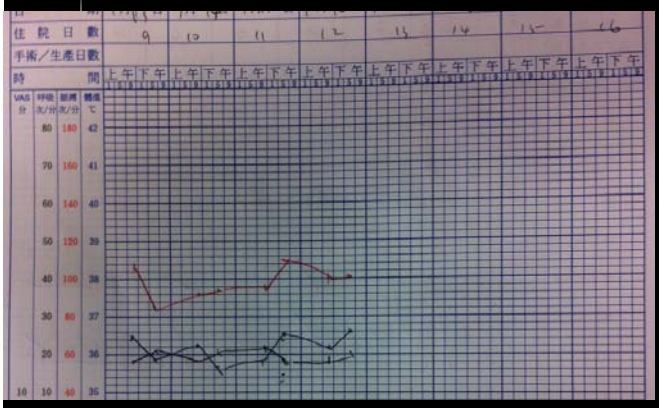
L-spine MRI

- NS doctor : susp. L-spine osteomyelitis → do MRI

Asmission course

- F/U lab data on day8

ESR	**>140**
Hb	**6.3**
WBC	**10.4**
Hb	**6.3**
Segmented Neutro.	73.5
Lymphocyte	**17.5**
Monocyte	5
Eosinophil	1.5
Atypical lymphocyte	0.5
Band	1
Metamyelocyte	**1**
Platelet	318



Final diagnosis

- L-spine osteomyelitis with MSSA bacteremia

DISCUSSION

Osteomyelitis

- Osteomyelitis is infection localized to bone
- dull pain at the involved site
- Local findings (tenderness, warmth, erythema and swelling) and systemic symptoms (fever, rigors)
- Symptoms and sign could be only mild and not easy to diagnosis

When to susp osteomyelitis

- Pus on aspiration
- Positive bacterial culture from bone or blood
- Presence of classic signs and symptoms of acute osteomyelitis
- Radiographic changes typical of osteomyelitis

Some hints for osteomyelitis

Imaging studies (e.g., plain radiography, magnetic resonance imaging, bone scintigraphy) demonstrating contiguous soft tissue infection or bony destruction
Clinical signs
Exposed bone
Persistent sinus tract
Tissue necrosis overlying bone
Chronic wound overlying surgical hardware
Chronic wound overlying fracture
Laboratory evaluation
Positive blood cultures
Elevated C-reactive protein level
Elevated erythrocyte sedimentation rate

Classification of osteomyelitis

- **Waldvogel Classification System for Osteomyelitis**
- **Cierny-Mader Staging System for Osteomyelitis**

TABLE 1

Waldvogel Classification System for Osteomyelitis

Hematogenous osteomyelitis
Osteomyelitis secondary to contiguous focus of infection
No generalized vascular disease
Generalized vascular disease
Chronic osteomyelitis (necrotic bone)

Information from Waldvogel FA, Medoff G, Swartz MN. Osteomyelitis: a review of clinical features, therapeutic considerations and unusual aspects (first of three parts). N Engl J Med 1970;282:198–206.

Cierny-Mader Staging System for Osteomyelitis

Anatomic type
Stage 1: medullary osteomyelitis
Stage 2: superficial osteomyelitis
Stage 3: localized osteomyelitis
Stage 4: diffuse osteomyelitis
Physiologic class
A host: healthy
B host:
Bs: systemic compromise
Bl: local compromise
Bls: local and systemic compromise
C host: treatment worse than the disease
Factors affecting immune surveillance, metabolism and local vascularity
Systemic factors (Bs): malnutrition, renal or hepatic failure, diabetes mellitus, chronic hypoxia, immune disease, extremes of age, immunosuppression or immune deficiency
Local factors (Bl): chronic lymphedema, venous stasis, major vessel compromise, arteritis, extensive scarring, radiation fibrosis, small-vessel disease, neuropathy, tobacco abuse

Adapted with permission from Cierny G, Mader JT, Pennick JJ. A clinical staging system for adult osteomyelitis. Contemp Orthop 1985; 10:17–37.

Common pathogen in osteomyelitis

Organisms Commonly Isolated in Osteomyelitis Based on Patient Age

Infants (< 1 year)

Group B streptococci

Staphylococcus aureus

Escherichia coli

Children (1 to 16 years)

S. aureus

Streptococcus pyogenes

Haemophilus influenzae

Adults (> 16 years)

Staphylococcus epidermidis

S. aureus

Pseudomonas aeruginosa

Serratia marcescens

E. coli

Adapted with permission from Dirschl DR, Almekinders LC. Osteomyelitis. Common causes and treatment recommendations. Drugs 1993;45:29–43.

Common pathogen in osteomyelitis

Organisms Isolated in Bacterial Osteomyelitis

Organism	*Comments*
Staphylococcus aureus	Organism most often isolated in all types of osteomyelitis
Coagulase-negative staphylococci or Propionibacterium species	Foreign-body–associated infection
Enterobacteriaceae species or *Pseudomonas aeruginosa*	Common in nosocomial infections
Streptococci or anaerobic bacteria	Associated with bites, fist injuries caused by contact with another person's mouth, diabetic foot lesions, decubitus ulcers
Salmonella species or *Streptococcus pneumoniae*	Sickle cell disease
Bartonella henselae	Human immunodeficiency virus infection
Pasteurella multocida or *Eikenella corrodens*	Human or animal bites
Aspergillus species, *Mycobacterium avium-intracellulare* or *Candida albicans*	Immunocompromised patients
Mycobacterium tuberculosis	Populations in which tuberculosis is prevalent
Brucella species, *Coxiella burnetii* (cause of chronic Q fever) or other fungi found in specific geographic areas	Population in which these pathogens are endemic

Adapted with permission from Lew DP, Waldvogel FA. Osteomyelitis. N Engl J Med 1997;336:999–1007.

Types of Osteomyelitis	Typical Age (yr)	Site(s) involved	Risk Factors
Hematogenous	Less than 1	Long bones and joints	Prematurity, umbilical catheter or venous cutdown, respiratory distress syndrome, perinatal asphyxia
	1-20	Long bones (femur,tibia, humerus)	Infection (pharyngitis, cellulitis, respiratory infectious), sickle cell disease, puncture wounds to feet
	Older than 50	Vertebrae	Diabetes mellitus, blunt trauma to spine, urinary tract infection
Contiguous	Older than 50	Femur,tibia, mandible	Hip fractures, open fractures
Vascular insufficiency	Older than 50	Feet,toes	Diabetes mellitus, peripheral vascular disease, pressure sores

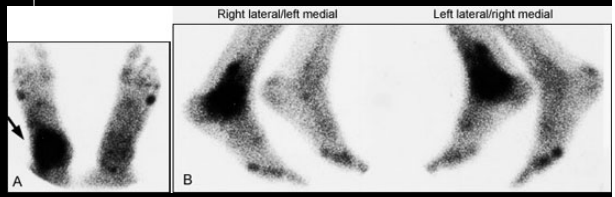
Image for osteomyelitis

Table 2. Diagnostic Imaging Studies for Osteomyelitis

Imaging modality	*Sensitivity (%)*	*Specificity (%)*	*Comments*
Computed tomography	67	50	Generally should not be used in osteomyelitis evaluation
Leukocyte scintigraphy	61 to 84	60 to 68	Combining with technetium-99 bone scintigraphy can increase specificity
Magnetic resonance imaging	78 to 90	60 to 90	Useful to distinguish between soft tissue and bone infection, and to determine extent of infection; less useful in locations of surgical hardware because of image distortion
Plain radiography (anteroposterior, lateral, and oblique views)	14 to 54	68 to 70	Preferred imaging modality; useful to rule out other pathology
Positron emission tomography	96	91	Expensive; limited availability
Technetium-99 bone scintigraphy	82	25	Low specificity, especially if patient has had recent trauma or surgery; useful to differentiate osteomyelitis from cellulitis, and in patients in whom magnetic resonance imaging is contraindicated

Plain film

Bone scan



CT scan

MRI

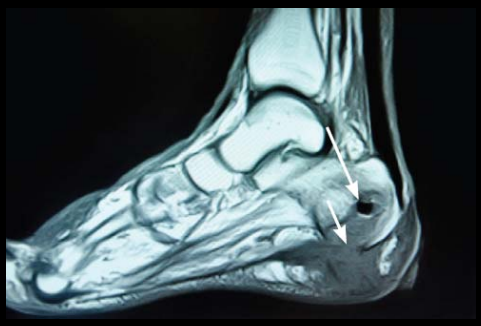


Table 3. Initial Antibiotic Therapy for Treatment of Osteomyelitis in Adults

Organism	*Preferred regimens*	*Alternative regimens*
Anaerobes	Clindamycin, 600 mg IV every 6 hours Ticarcillin/clavulanate (Timentin), 3.1 g IV every 4 hours	Cefotetan (Cefotan), 2 g IV every 12 hours Metronidazole, 500 mg IV every 6 hours
Enterobacteriaceae (e.g., *Escherichia coli*), quinolone-resistant	Ticarcillin/clavulanate, 3.1 g IV every 4 hours Piperacillin/tazobactam (Zosyn), 3.375 g IV every 6 hours	Ceftriaxone, 2 g IV every 24 hours
Enterobacteriaceae, quinolone-sensitive	Fluoroquinolone (e.g., ciprofloxacin [Cipro], 400 mg IV every 8 to 12 hours)	Ceftriaxone, 2 g IV every 24 hours
Pseudomonas aeruginosa	Cefepime, 2 g IV every 8 to 12 hours, plus ciprofloxacin, 400 mg IV every 8 to 12 hours Piperacillin/tazobactam, 3.375 g IV every 6 hours, plus ciprofloxacin, 400 mg IV every 12 hours	Imipenem/cilastatin (Primaxin), 1 g IV every 8 hours, plus aminoglycoside
Staphylococcus aureus, methicillin-resistant	Vancomycin, 1 g IV every 12 hours *For patients allergic to vancomycin:* Linezolid (Zyvox), 600 mg IV every 12 hours	Trimethoprim/sulfamethoxazole (Bactrim, Septra), 1 double-strength tablet every 12 hours Minocycline (Minocin), 200 mg orally initially, then 100 mg daily Fluoroquinolone (e.g., levofloxacin [Levaquin], 750 mg) IV daily plus rifampin, 600 mg IV every 12 hours
S. aureus, methicillin-sensitive	Nafcillin or oxacillin, 1 to 2 g IV every 4 hours Cefazolin, 1 to 1.5 g IV every 6 hours	Ceftriaxone, 2 g IV every 24 hours Vancomycin, 1 g IV every 12 hours
Streptococcus species	Penicillin G, 2 to 4 million units IV every 4 hours	Ceftriaxone, 2 g IV every 24 hours Clindamycin, 600 mg IV every 6 hours

Organism	*Antibiotic(s) of first choice*	*Alternative antibiotics*
Staphylococcus aureus or coagulasenegative (methicillin-sensitive) Staphylococci	Nafcillin (Unipen), 2 g IV every 6 hours, or clindamycin phosphate (Cleocin Phosphate), 900 mg IV every 8 hours	First-generation cephalosporin or vancomycin (Vancocin)
S. aureus or coagulase-negative (methicillin-resistant) staphylococci	Vancomycin, 1 g IV every 12 hours	Teicoplanin (Targocid),* trimethoprim- sulfamethoxazole (Bactrim, Septra) or minocycline (Minocin) plus rifampin (Rifadin)
Various streptococci (groups A and B β-hemolytic organisms or penicillin-sensitive *Streptococcus pneumoniae*)	Penicillin G, 4 million units IV every 6 hours	Clindamycin, erythromycin, vancomycin or ceftriaxone (Rocephin)
Intermediate penicillin-resistant *S. pneumoniae*	Cefotaxime (Claforan), 1 g IV every 6 hours, or ceftriaxone, 2 g IV once daily	Erythromycin or clindamycin
Penicillin-resistant *S. pneumoniae*	Vancomycin, 1 g IV every 12 hours	Levofloxacin (Levaquin)
Enterococcus species	Ampicillin, 1 g IV every 6 hours, or vancomycin, 1 g IV every 12 hours	Ampicillin-sulbactam (Unasyn)
Enteric gram-negative rods	Fluoroquinolone (e.g., ciprofloxacin [Cipro], 750 mg orally every 12 hours)	Third-generation cephalosporin
Serratia species or *Pseudomonas aeruginosa*	Ceftazidime (Fortaz), 2 g IV every 8 hours (with an aminoglycoside given IV once daily or in multiple doses for at least the first 2 weeks)	Imipenem (Primaxin I.V.), piperacillin-tazobactam (Zosyn) or cefepime (Maxipime; given with an aminoglycoside)
Anaerobes	Clindamycin, 600 mg IV or orally every 6 hours	For gram-negative anaerobes: amoxicillin-clavulanate (Augmentin) or metronidazole (Flagyl)
Mixed aerobic and anaerobic Organisms	Amoxicillin-clavulanate, 875 mg and 125 mg, respectively, orally every 12 hours	Imipenem

THANKS FOR YOUR ATTENTION