

ER-INF COMBINE CONFERENCE

報告者：R3許力云
指導者：VS蕭蔚全
101.08.18

Basic data

- ER visit on day1 08:55 AM
- 檢傷主訴：病患來診為左下肢疼痛
- Gender : male
- Age : 75 y/o
- Cons : E4V5M6
- Vital signs :
SpO2 : 100%, TPR : 36.5/ 65/ 20, BP : 97/41 mmHg
- Triage III

Present illness

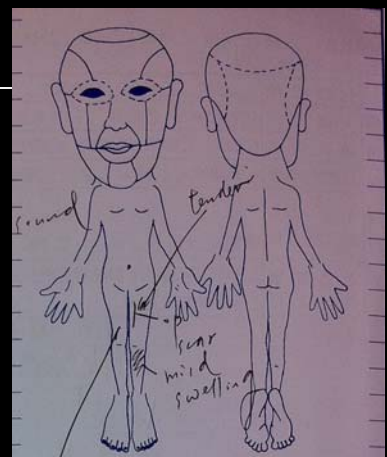
- Left leg pain since morning
- 患者自述昨晚有感冒去LMD打IV
- 今天早上開始左腿會痛
- Fever : 不確定, Chillness(+)

Past history

- Allergy : NKA
- CAD s/p CABG

Physical examination

- Consciousness : E4V5M6
- HEENT : supple neck,
- Chest : clear breathing sound
- Abdomen : soft, no tenderness point
- Extremities : left thigh tenderness



Tentative diagnosis

- R/O DVT
- R/O occult infection

Orders

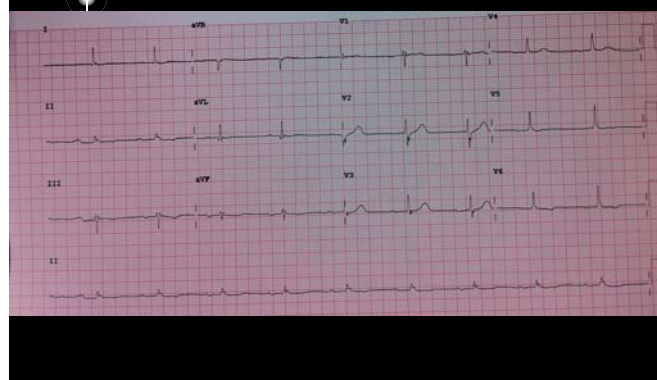
day1 09:05 AM

- WBC/DC/PLT/Hb
- D-dimer
- Panel 1
- Blood/C * I
- N/S run 60 ml/hr
- CXR
- EKG
- Morphine 4 mg IV st

CXR



ECG

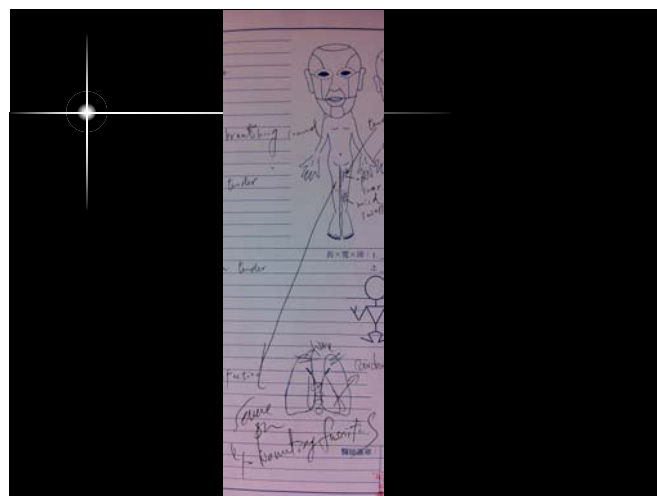


Lab data

Glucose	101	mg/dL
GOT	23	U/L
BUN	41	mg/dL
Creatinine	2.1	mg/dL
Na	137	meq/L
K	3.6	meq/L

WBC	16.5	X1000/ul
Hb	13.2	gm/dl
Platelet	132	x1000/ul
Segmented Neutro.	77	%
Lymphocyte	4	%
Monocyte	2	%
Band	16	%
Metamyelocyte	1	%

D dimer	456.3	ng/mL
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Orders

1035

- Left leg CT
- PCT(negative)
- Oxacillin 2g IV st
- 排INF床位
- 轉EC床位

1320

- BP 73/52 mmhg → N/S 300ml IV st

CT



EC orders

day1 13:40

- PCN-G 1.5 MU IV Q6H + st
- Cefazidime 1g IV Q8H + st
- Clindamycin 600mg IV Q8H + st
- On monitor
- PT/aPTT
- CRP
- ABG G4
- On critical
- N/S 200ml IV st
- Contact 內科總值 for ICU admission

Suggest By INF doctor

Lab data

PT	15.2	second	ABG G4 (ABG with lactate) PH=7.414 PCO2=29.1 mmHg PO2=75 mmHg BE=-6 mmol/L HCO3=18.6 mmol/L TCO2=20 mmol/L SO2=95 % LAC=18.8 mg/dL
Normal control	10.5	second	
INR	1.46	Ratio	
APTT	32.7	second	
Normal control	32.8	second	
CRP	16.900	mg/dL	

EC order

1435

- U/A,U/C
- PSA
- On CVC
- CXR post CVC
- Troponin-I
- ECG
- Levophed run 20ml/hr
- Admission to RICU

Suggest by 內科總值

1530

1620

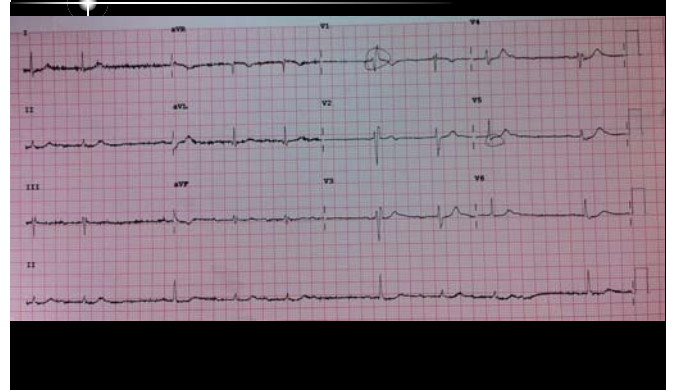
- Check cortisol level

1315		BP 73/52
1320	M/S 300 ml @	
1450	Levophed 20ml/hr	BP 76/55 3%
1450	on CVC	28.16 3%
1540	Levophed 20ml/hr	BP 75/43
1600	CVP 10 mmHg	CVP 10 mmHg
1600	GS 20 100%	GS 20 100%
1600	SpO2 100%	SpO2 100%
1650	20 cortisol level	
1650	Cortisol 31.5	31.5 45.0 3%
1650	20 Troponin-I 2.2	36.6 3.2 3%
1650	Admission	

CXR



ECG



Lab data

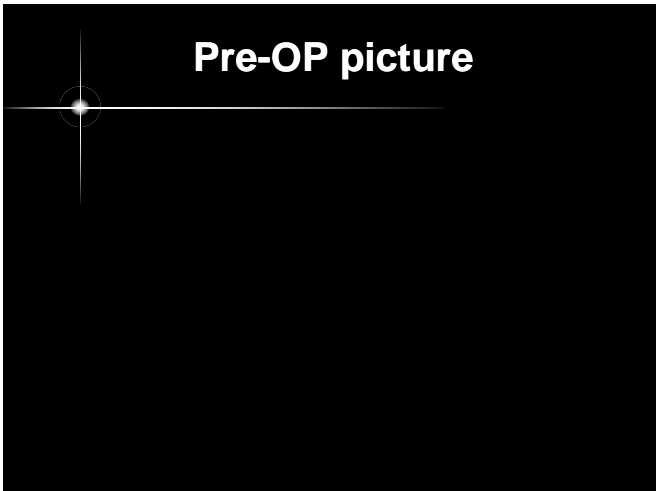
Troponin I	0.032	ug/L
**PM Cortisol	33.7	ug/dL

Sediment	*****	
RBC	31-50	/HPF
WBC	8-15	/HPF
Epithelial cell	3-5	/HPF
Cast	WBC Cast	/LPF
Cast-amount	+	
Crystal	Not Found	/HPF

Admission course

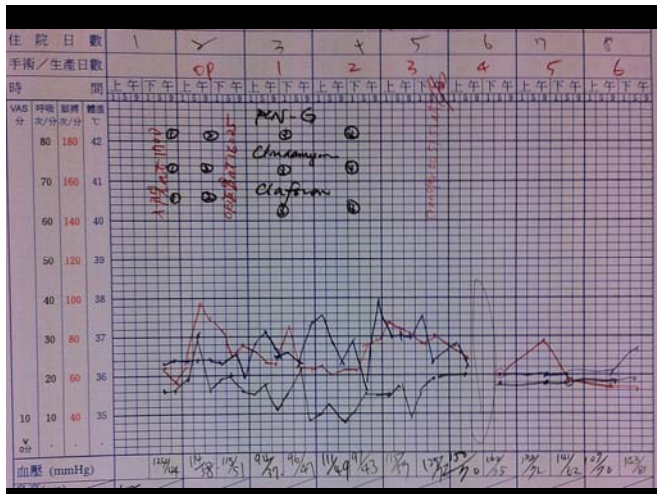
- After admission to RCU INF and PS were consulted for further management
- Fasciotomy was performed at 08/05 evening due to rapid progression of left calf swelling and hemorrhagic bulla formation
- 08/07 blood culture → GAS → change abx to clindamycin + PCN-G
- Patient was transferred to 5A on 08/08 under PS/INF combine care and s/p several times of debridement,

Pre-OP picture



Blood culture data

PRELIMINARY BLOOD CULTURE REPORT:
 Aerobic: SALCNLK2 +
 Anaerobic: SNLBVCG0 +
 Two bottles of bottle set were positive cultured and final report pending.
 Microscopic finding: Gram (+) coccus in chain
 FINAL BLOOD CULTURE REPORT:
 Organism:
 1. β -Streptococcus group A (pyogenes)
 //
 Antibiotic/Culture: ST39 β -Streptococcus group A (pyogenes)
 AM CC CMZ CTX CZ E FEP LUX P UA
 S S S S S S S S S S
 AM:Am(Ampicillin) CC:CC(Clindamycin) CMZ:CMZ(Cefmetazole)
 CTX:CTX(Cefotaxime) CZ:CZ(Cefazolin) E:E(Erythromycin)
 FEP:FEP(Cefepime) LUX:LUX(Levofloxacin) P:P(Penicillin)
 UA:UA(Vancomycin)



Final diagnosis

- Necrotizing fasciitis of left leg, GAS infection with STSS.

DISCUSSION

Clinical feature of necrotizing fasciitis

- Pain is often out of proportion to PE findings ! (Cellulitis may not have this presentation)
- Crepitus and brawny edema on the painful area
- Skin bronze or brownish discoloration with malodorous sero-sanguineous discharge and bullae
- In *Vibrio vulnificus* infection may have CV collapse and rapid mental change

From Tintinalli's text book

Clinical Clues to Diagnosis of Necrotizing Soft Tissue Infection

- Skin:**
 - Erythema
 - Tense edema
 - Grayish or other discolored wound drainage
 - Vesicles to bullae
 - Necrosis
 - Ulcers
 - Crepitus
- Pain:**
 - Pain that extends past margin of apparent infection
 - Severe pain that appears disproportionate to physical findings
 - Decreased pain or anesthesia at apparent site of infection
- General features:**
 - Fever
 - Tactile temperature
 - Diaphoresis
 - Tachycardia
 - Toxic delirium

Table 4. Differential Diagnosis of Necrotizing Soft-Tissue Infection

Disorder	Characteristic
Cellulitis/adiposities (necrotizing)	Erythematous, edematous, indurated tissue with normal appearing subcutaneous fat and fascia
Myonecrosis	Pain that extends past margin of apparent infection is important hint in necrotizing fasciitis
Lymphedema	
Noninfectious fasciitis (eosinophilic fasciitis)	
Phlegmasia cerulea dolens	
Myxedema	Systemic manifestations of severe hypothyroidism

Symptoms and sing of necrotizing fasciitis

Table 3. Symptoms/Signs Associated with Necrotizing Soft-Tissue Infection at the Time of Admission

Finding	Percent of patients ⁶ (n = 89)	Percent of patients ³¹ (n = 192)	Percent of patients ³² (n = 22)
Erythema	100	66	95
Pain or tenderness beyond margins of erythema	98	73	95
Swelling	92	75	86
Crepitus or skin necrosis	13	31	0
Induration	12	45	
Bullae	45	23	41
Fluctuance	11		
Fever	53	32	
Hypotension	18	11	

Pain is often out of proportion to PE findings !
(Cellulitis may not have this presentation)

J Am Coll Surg. 2009 Feb;208(2):279-88

Image tool

- Imaging studies, such as soft tissue x-rays, CT scan and MRI are most helpful if there is **gas in the tissue**.
- An emergent non-contrast CT examination to assess for the presence of **air along the fascial planes** may be the most expedient radiographic approach given the associated morbidity with a delay in diagnosis.
- MRI may not be adequate to delineate findings of air along the fascial planes.

Table 5. Laboratory Risk Indicator for Necrotizing Fasciitis Score

Variable	Score
C-reactive protein	
<150	0
≥150	4
WBC (cells/mm ³)	
<15	0
15–25	1
>25	2
Hemoglobin (g/dL)	
>13.5	0
11–13.5	1
<11	2
Sodium (mmol/L)	
≥135	0
<135	2
Creatinine (mcg/L)	
≤141	0
>141	2
Glucose (mmol/L)	
≤10	0
>10	1

A sum ≥6 has a high correlation with necrotizing soft-tissue infection.

LAB data to predic NF

J Am Coll Surg. 2009 Feb;208(2):279-88

Commom bacteria in necrotizing fasciiting

Table 1. Causative Bacteria of Type 1 and Type 2 Necrotizing Fasciitis

type 1

polymicrobial infections including anaerobes.

type 2

Streptococcus pyogenes (Group A Streptococcus)
Staphylococcus aureus, including methicillin-sensitive and resistant

Other microbiological etiologies

Vibrio vulnificus
Aeromonas hydrophila
Enterobacteriaceae (*Escherichia coli*, *Pseudomonas* spp., and *Klebsiella* spp)

Common microbial in type I necrotizing soft tissue infection

Table 2. Common Microbial Causes of Type I Necrotizing Soft-Tissue Infection

Organism	Gram stain	Percent of isolates ⁹ (n = 162)	Percent of isolates ² (n = 272)
<i>Staphylococcus aureus</i>	Gram-positive cocci	16	22
<i>Streptococcus</i> species	Gram-positive cocci	19	17
<i>Klebsiella</i> species	Gram-negative rod	10	
<i>Escherichia coli</i>	Gram-negative rod	7	
Gram-negative bacteria			18
Anaerobic bacteria		7	18

**Clostridia* species (gram-positive rods) are a rare cause of necrotizing soft-tissue infection.

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Staging of necrotizing fascii

Table 1. Clinical features of necrotizing fasciitis as the disease progress through clinical stages

Stage 1 (Early)	Stage 2 (Intermediate)	Stage 3 (Late)
Tenderness to palpation (extending beyond the apparent area of skin involvement)	Blister or bullae formation (serous fluid)	Hemorrhagic bullae
Erythema	Skin fluctuance	Skin anesthesia
Swelling	Skin induration	Crepitus
Warm to palpation		Skin necrosis with dusky discoloration progressing to frank gangrene

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Management of NF

- Treatment of necrotizing fasciitis consists of **early and aggressive surgical exploration and debridement of necrotic tissue**, **antibiotic therapy**, and **hemodynamic support** as needed.
- The best indication for surgical intervention is **severe pain**, **toxicity**, **fever** and **elevated CPK** with or without radiographic findings.

Treatment of Necrotizing Fasciitis, First-line Antimicrobial Agent, by Infection Type

Mixed infection	Streptococcus infection
Ampicillin-sulbactam	Penicillin
or	plus
pipellacillin-tazobactam	clindamycin
plus	<i>S. aureus</i> infection
clindamycin	Cefazolin
plus	Vancomycin(for resistant strains)
ciprofloxacin	Clindamycin
Imipenem/cilastatin	<i>Clostridium</i> infection
Meropenem	Clindamycin
Cefotaxime	Penicillin
plus	<i>Vibro vulnificus</i>
metronidazole	3 rd -generation cephalosporin
or	Plus
Clindamycin	tetracycline

Inter Med 49: 1051-1057, 2010

Toxic Shock Syndrome (TSS)

- Acute, toxin-mediated illness; characterized by fever, rash, hypotension, multiple-organ involvement and desquamation
- **Staphylococcal** toxic shock syndrome: female during menstruation, with recent surgery or any localized staphylococcal abscess
- **Streptococcal** toxic shock syndrome: associated with severe pain and tenderness signifying infection at a site of local trauma

Infect Dis Clin North Am 1996; 10:727

STSS

- Isolation of group A Streptococcus from a normally sterile site (blood, CSF, joint, pleural or pericardial fluid)
- Hypotension
- 2 or more of the following
 - (1) Renal impairment ($Cr > 2$, 2X than baseline)
 - (2) Coagulopathy (Platelets $\leq 100,000$, DIC)
 - (3) Liver impairment (AST/ALT > 2 倍正常值, 2X than baseline)
 - (4) ARDS
 - (5) A generalized erythematous macular rash that may desquamate
 - (6) Soft tissue necrosis

Streptococcal Toxic Shock Syndrome

- Incidence in US: 3.5 cases per 100,000 population
- **Clinical features:**
 - Early symptoms: myalgia, malaise, chills, fever, nausea, vomiting and diarrhea; pain at the site of minor trauma (necrotizing fasciitis)
 - Phase 2: tachycardia, fever, tachypnea; increasing pain at site of infection
 - Phase 3: persistent fever, excruciating pain at the infection site; shock and organ failure
 - Evidence of renal impairment precedes hypotension (50%) at the time of admission

N Engl J Med : 1996, 334: p.240

Streptococcal Toxic Shock Syndrome: Treatment

- Antibiotic therapy:
 - **Clindamycin**, combined with **penicillin**
- **Surgical** exploration and debridement
- **Fluid resuscitation**
- **IVIG**

N Engl J Med : 1996, 334: p.240



**THANKS FOR YOUR
ATTENTION**