



I'm an ID specialist, may I help you?

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ID consultation

- For diagnosis
- For management (treatment initiation & modification)
- For counseling

ผู้ป่วยหญิงอายุ **35** ปี มาพบแพทย์เรื่องมีตุ่มแผลที่ขาขวา เป็นๆหายๆมา **2** เดือน
แรกๆสังเกตว่ามีลักษณะเป็นตุ่มแดงเหมือนนูนกแมลงกัด ต่อมาแตกเป็นแผลมีหนอง
รับประทานยาแก้อักเสบอาการเหมือนจะดี แต่ก็กลับเป็นใหม่อีก ไม่มีอาการไข้
ล่าสุดตุ่มแตกออกเป็นหนองอีก



แพทย์ได้ส่งเพาะเชื้อ. ขึ้นเป็น *Pseudomonas aeruginosa*
ไวกับยา amikacin, meropenem, piperacillin- tazobactam
จึงส่งมาปรึกษาเพื่อพิจารณาเรื่องยาปฏิชีวนะ

Approach to chronic skin lesion

Chronic skin lesions : causes

- **Non- IDs :**
 - Chronic venous, lymphatic insufficiency or neuropathy
 - Inflammation: vasculitis; panniculitis, pyoderma gangrenosum, etc.
 - Retained foreign body
 - Primary or secondary skin malignancy
- **IDs:**
 - Complication of acute pyogenic infections: COM, viscerocutaneous fistula
 - By nature of individual chronic infections: Mycobacteria, fungi, higher bacteria, parasites, etc.



Characters: ulcer, pustules, nodules, etc.



Location : common (typical) area or random

Distribution : symmetrical or asymmetrical





Sporotrichoid- like lesions

Distribution : specific pattern



Approach to chronic skin lesions

- Characters: nodules, ulcer, pustules, sinus drainage, etc.
- Location : exposed area or random
- Distribution : symmetrical or asymmetrical, specific pattern
- **Clinical course : persistence v.s. recurrence (locally or progressively)**
- **Association with other organs : adjacent site (lymphatic system, underneath or nearby structures : e.g. bone & joint, muscles, blood vessels, etc.) or remote sites (lungs, brain, liver & spleen, etc.)**

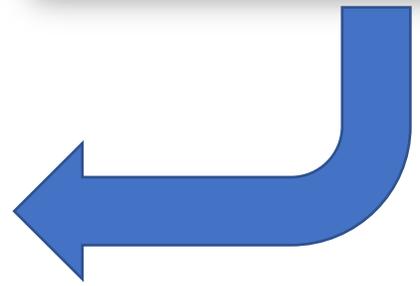
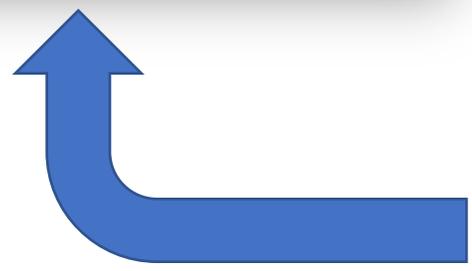
Approach to chronic

- Genuine chronic



Less Pitfalls

with an



series of picture

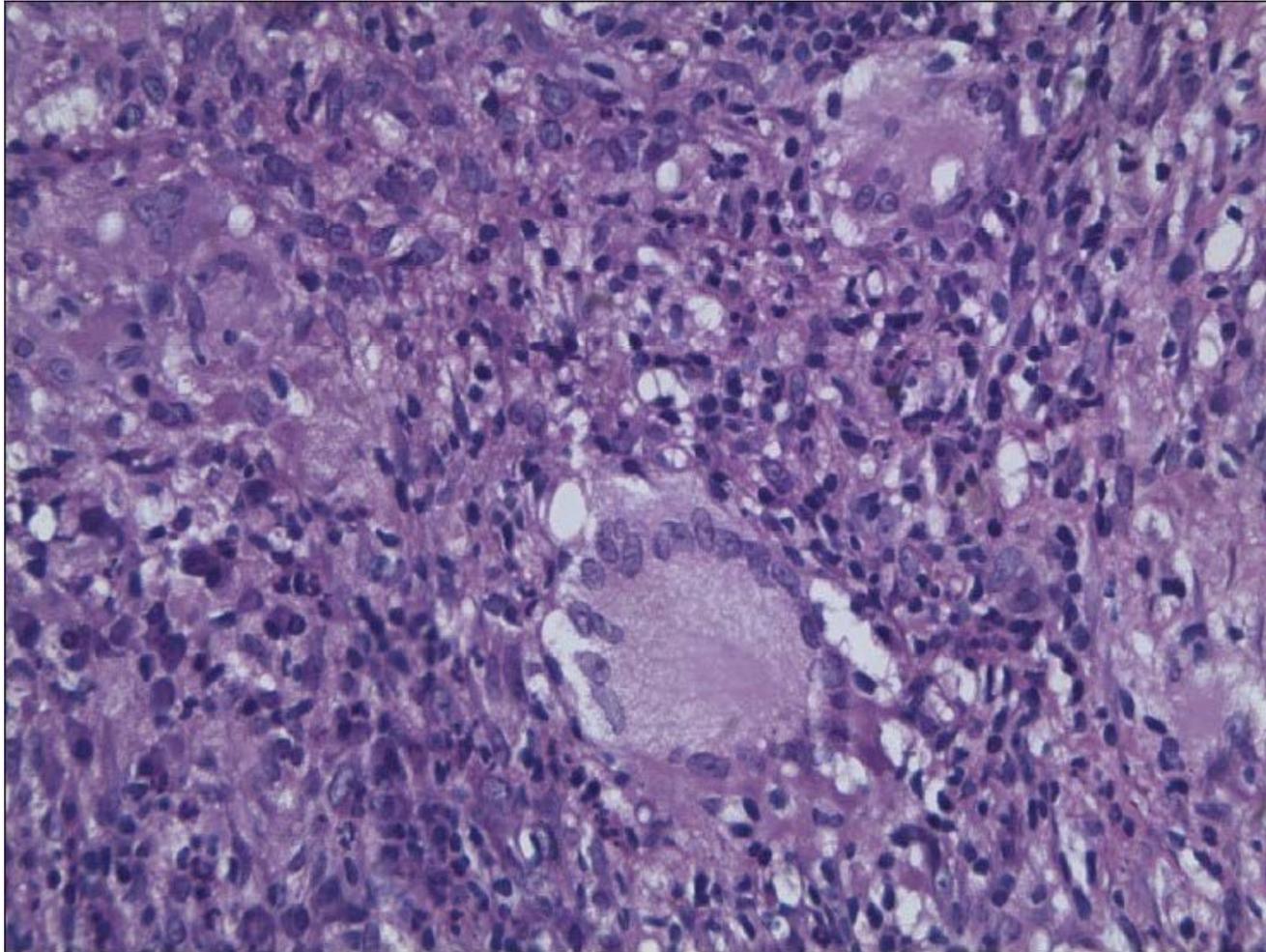
Approach to chronic, recurrent abscess & ulcer : Pitfalls

- Genuine chronic lesion vs simple SSI with inadequate treatment
- Lesion (s) might be modified by prior antimicrobial agent (s)
>>> “ask for series of picture”
- Extension of lesion has to be evaluated >>> possible fistula, deep seated collection, adjacent organ involvement, etc.

Approach to chronic, recurrent abscess & ulcer : Pitfalls

- Host factors evaluation: With or without co- morbidities/ risk factors
- Exposure to specific conditions >>> **water, procedures, Hx of trauma, bites, cosmetic procedure or operation**, etc.
- Organism (s) isolated from the discharge, esp. by wound swab, **might not be a “genuine culprit”**
- Ponder >>> what is/are the appropriate investigation (s)
 - **tissue pathology, special stain (s), culture, molecular diagnostic tests, etc.**

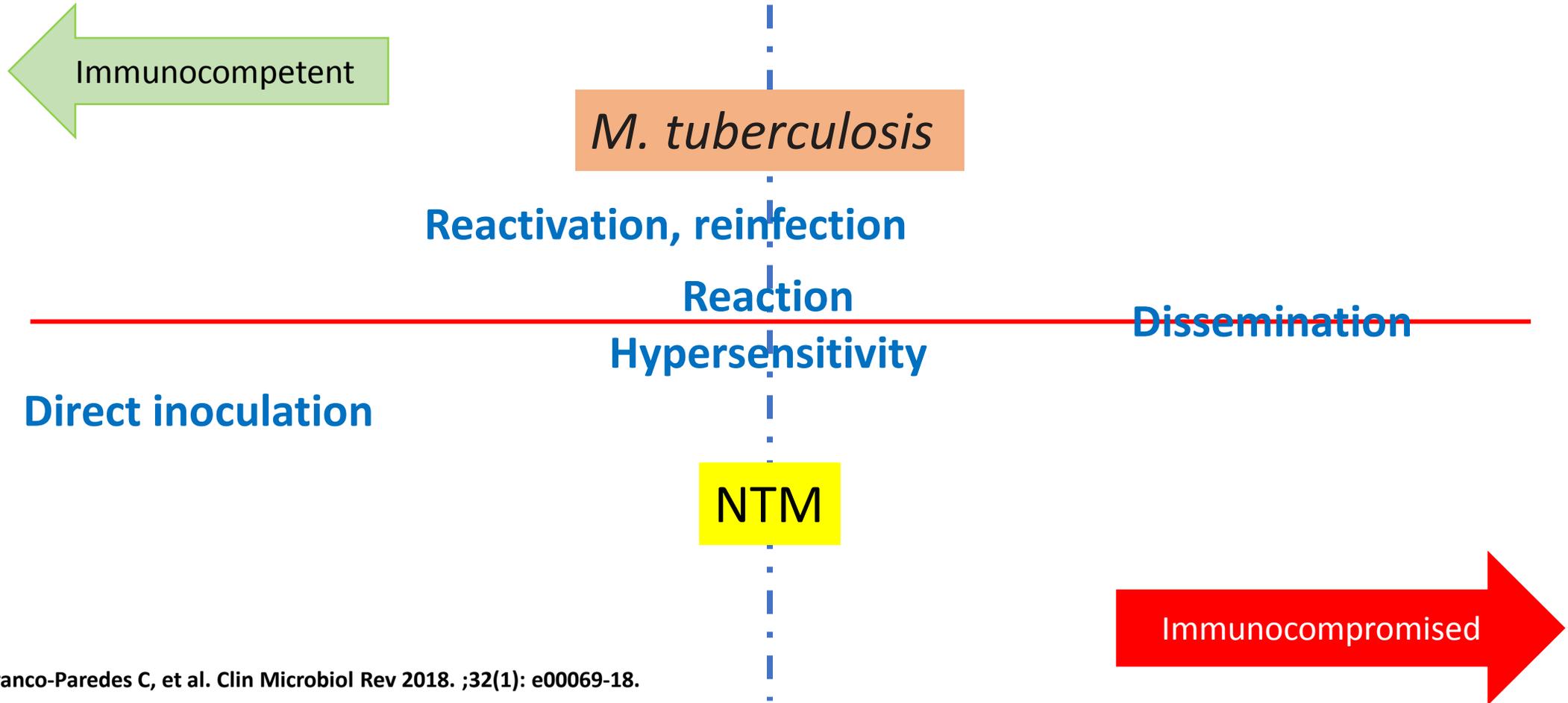
Patient's pathological report



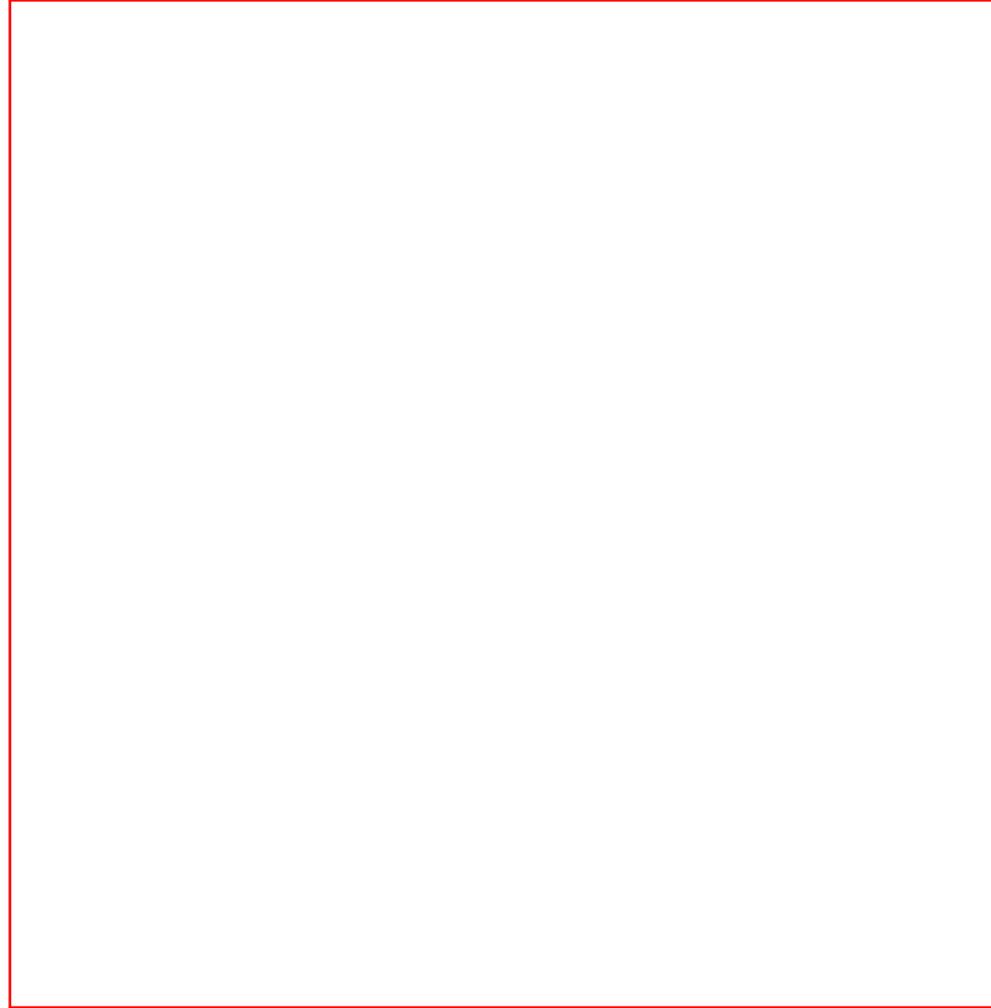
Pitfalls

- : Granulomatous lesion is not specific to mycobacterial infection
- : **Isolation of *Mycobacterium* or demonstration of AFB from the affected specimen** is crucial for the definite diagnosis
- : Negative AFB stain does not exclude cutaneous mycobacterial infection
- : MTB vs NTM ?????

Cutaneous Mycobacterial infections



NTM causing SSTIs in Thailand



Pitfalls in the diagnosis of NTM SSTIs

- The definite diagnosis of NTM SSTIs requires a positive microbiological culture; **RPG grows by 7-10 d in sold media!!!**
- **Less severe decontamination procedures and lower incubation temperatures (i.e. *M. marinum*, *M. haemophilim*, *M. ulcerans*) have to be ordered, i.g. for skin & soft tissue diseases**
- Since commonly found in the environment, diagnostic approaches (culture or molecular methods, such as PCR) have to be carefully interpreted.

Griffith DE, et al. Am J Respir Crit Care Med. 2007;175:367-416.

van Ingen J. DiSemin Respir Crit Care Med. 2013;34:103-9.

Hogan JI, et al. Infect Dis Clin North Am. 2017;31:369-82.

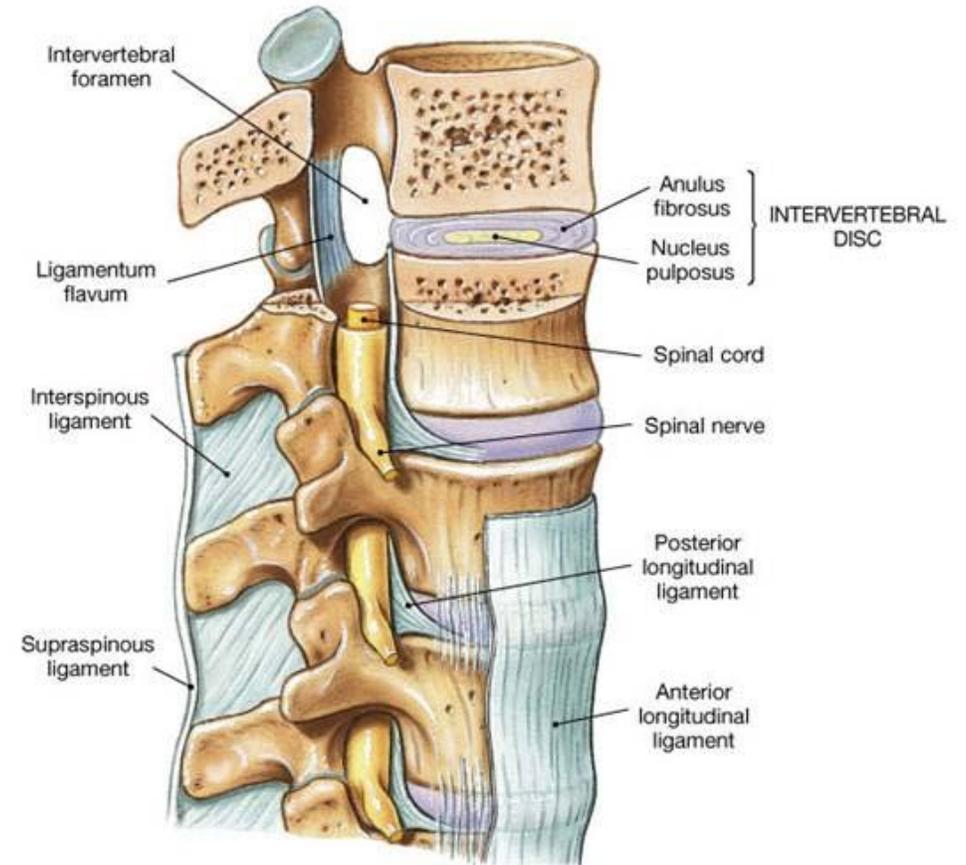
ผู้ป่วยชายอายุ **65** ปี, **DM**, พิษณุโลก, มาพบแพทย์ด้วยเรื่องมีอาการปวดหลัง มาประมาณ **2** สัปดาห์ ปวดมากเวลาเดินหรือเอี้ยวตัว ไอค้อมจะปวดมาก กลั้นอุจจาระปัสสาวะได้ บางวันรู้สึกมีอาการไข้ น้ำหนักลดไป **5** ก.ก. ใน เวลา **1** เดือน

ผลการตรวจ **MRI** พบความผิดปกติบริเวณ **L1-L2**

ศัลยแพทย์สงสัย การติดเชื้อวัณโรค

Spinal infections

- Etiologically : pyogenic, granulomatous (tuberculous, fungal) and parasitic (Echinococcosis)



Epidemiology of pyogenic spondylodiscitis

- *Staphylococcus aureus* - the most common hematogenous: IVDU, SSTIs
Staphylococcus GBS is a rising star !!!!
Others: *Enterobacteriaceae* >>> associated with UTI & GI tract

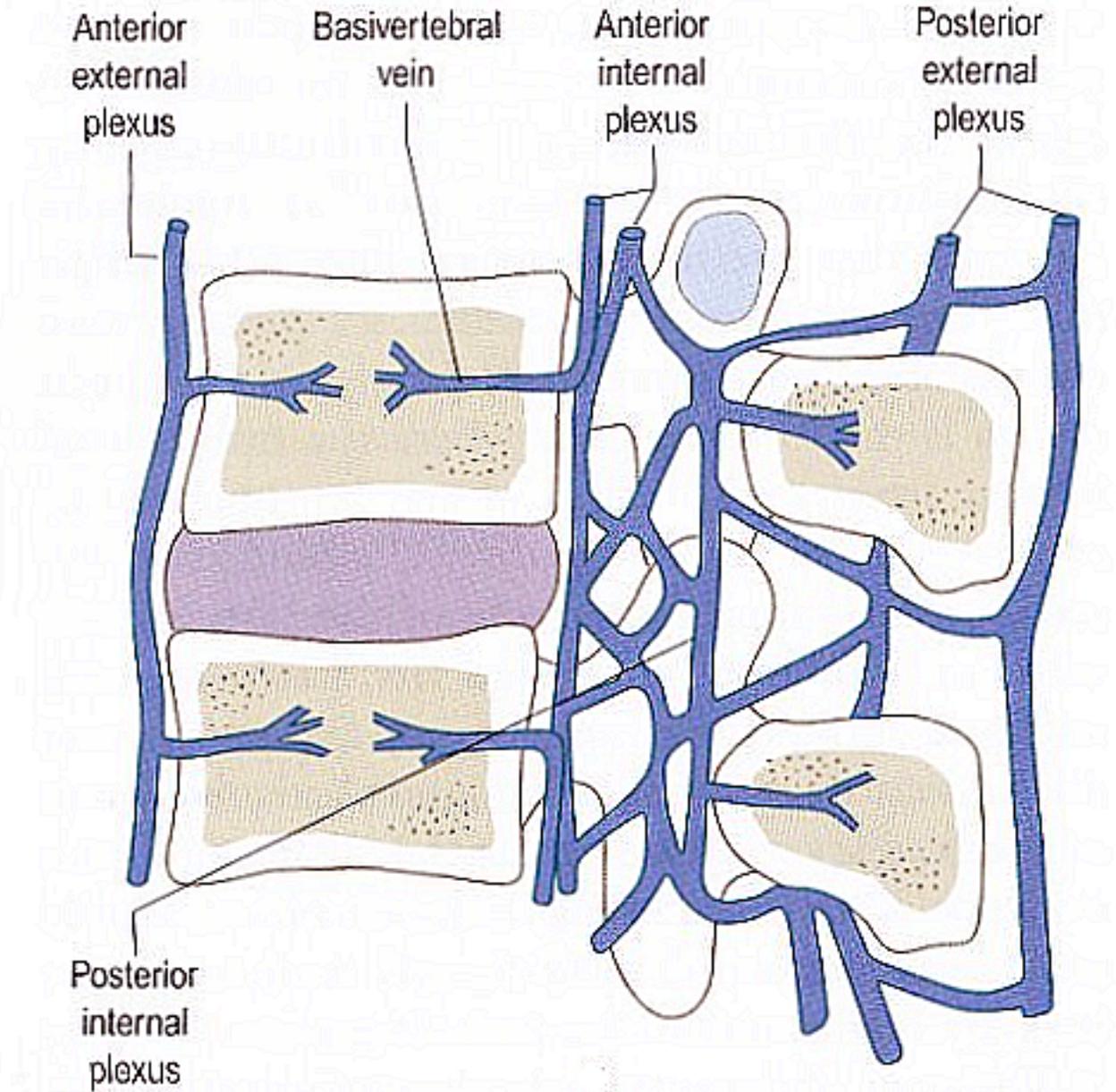
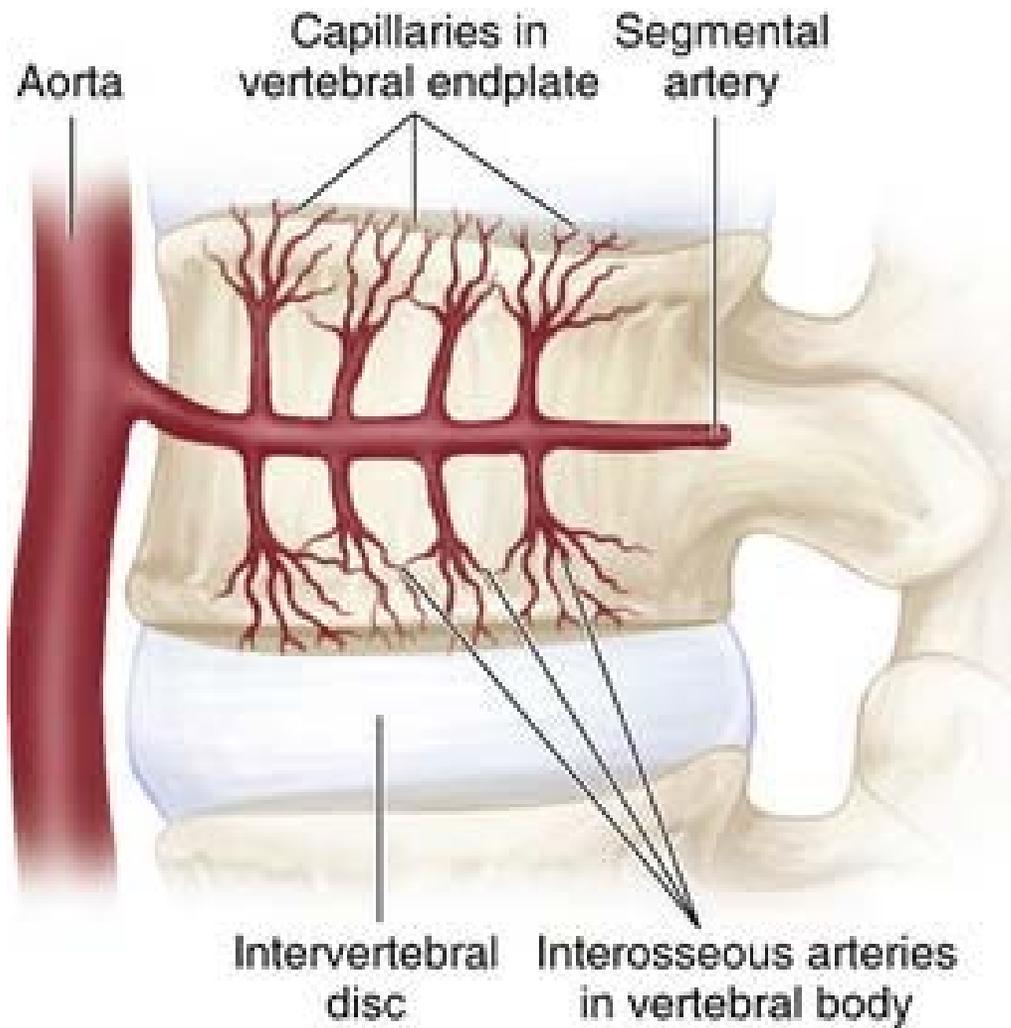
“The primary source of infection can be found in approximately 50% of infections”

Pyogenic spondylodiscitis: Pathogenesis

Hematogenous*	Direct external inoculation	Extension from nearby structure
Lumbar > thoracic > cervical spine Cervical spine : DM, IVDU	Most commonly iatrogenic following spinal surgery, lumbar puncture or epidural procedures	Relatively rare; Commonly from aortic graft infections, a ruptured esophagus or a retropharyngeal abscess, UTI
Anterior compartment > posterior compartment (pedicles, transverse processes, laminae and posterior spinous processes)	The posterior parts are usually affected	
> 2 vertebrae or skip lesion: rare for pyogenic but more common in TB		
Monomicrobial	Usually monomicrobial; if Mycobacteria: NTM>TB	Polymicrobial or monomicrobial; depends on the primary site

* Most common

metaphyseal vascular arcades



Batson's venous plexus

Spondylodiscitis: X-ray findings

- In pyogenic spondylodiscitis, the earliest finding is narrowing of the disc space >>> followed by blurring and irregularity of the end-plate >>> early disc destruction due to bacterial proteolytic enzymes
- In early TB, the disc space is generally preserved, however, after 8 to 12 wks, significant bone and disc destruction are obvious

Pyogenic spondylodiscitis

In acute spinal infections

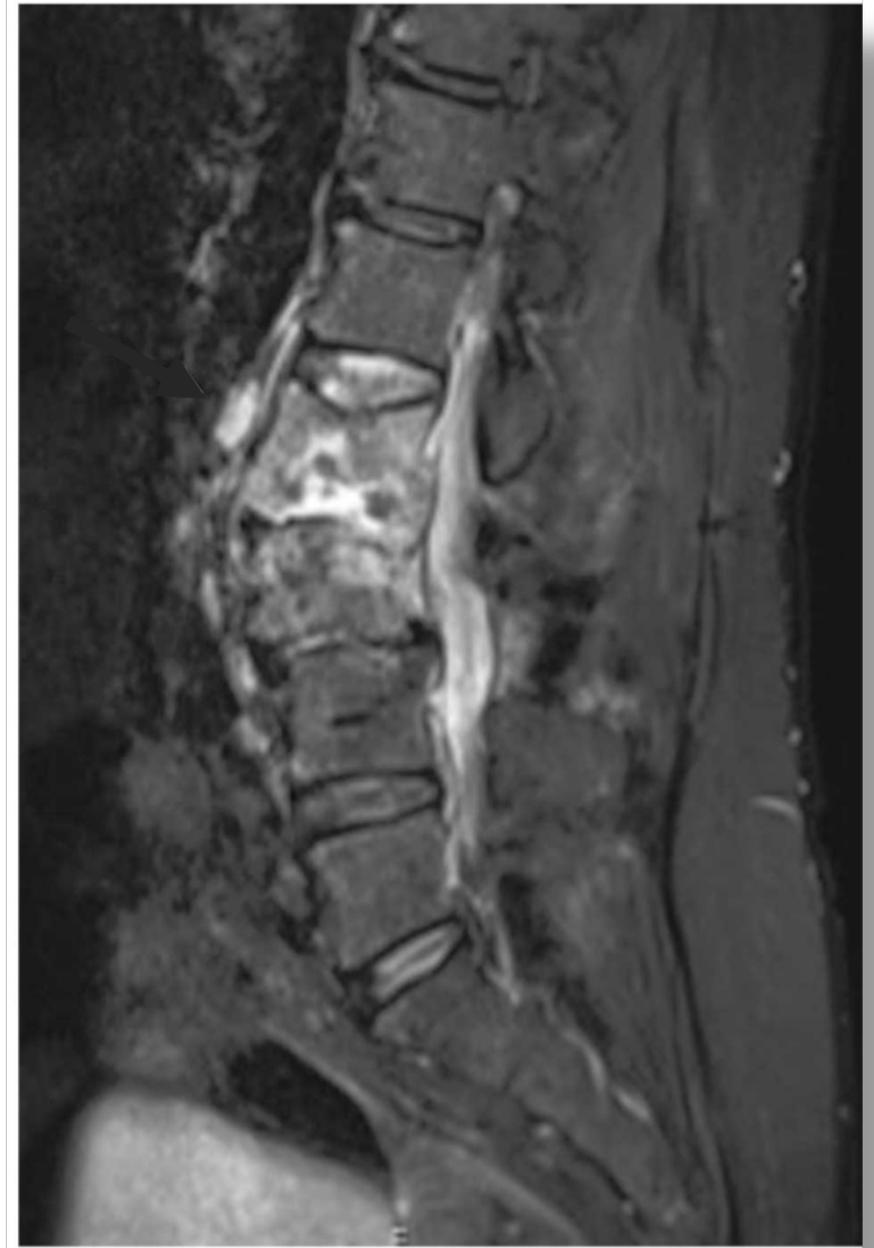
: infection mostly begins in the anterolateral vertebral body near the end-plates

: end-plate and disc destruction due to bacterial proteolytic enzymes



Granulomatous spondylodiscitis

- : Intraosseous abscesses,
- : large paravertebral abscesses,
- : Skip lesions,
- : Contiguous subligamentous spread, involvement of the posterior elements
- : Encroachment on the spinal canal and nerve roots
- : Relative preservation of the disc



Pyogenic spondylodiscitis: Antibiogram and Culture

Culture and/ or
Molecular technique, i.e.
16S rRNA PCR

- Antibiotic administration should be initiated preferably after isolation of the pathogenic organism
- The initiation of treatment may be **withheld** until a conclusive result, **as long as the patient's condition is stable.**

“But”

Tsiodras S, Falagas ME. Clin Orthop Relat Res 2006; 444:38-50.

Berbari EF et al. Clin Infect Dis 2015; 61: 26–46.

Jung N, et al. Der Internist 2013; 54: 945–53.

Appropriate diagnosis for TB spondylodiscitis

- MRI is the best radiological method for the diagnosis
- CT-guided percutaneous aspiration biopsy (PAB) has a diagnostic yield of 68% >>> the method of choice in patients with no indication to surgery

Appropriate diagnosis for TB spondylodiscitis: pitfall

- Tuberculin skin test (TST) and interferon-gamma release assays (IGRAs) **are not routinely used in the diagnosis** of extrapulmonary TB since they cannot differentiate latent from active TB infection.

Diagnostic tools for TB

Methods	Yield (sensitivity)	Comments
AFB smear microscopy	As high as 58%	Appropriate specimen
Culture (identification & DST)		
Solid media (Lowenstein-Jensen)	As high as 83%	Slow growing time of up to 3–8 wk
Liquid media (such as Middlebrook media)	Higher than culture in solid media	Reduce the mean time of culture (2-3 wk)
NAAT	A sensitivity of 72% in extrapulmonary specimen	-Reduce the diagnosis time to hours, and helpful for differentiating between MTB and NTM infection. -NAAT is preferred to be used for respiratory specimen (according to standard recommendations).

Colmenero JD, et al. *Eur Spine J* 2013; 22 (4): 579– 86
Weng C-Y, et al. *J Microbiol Immunol Infect* 2010; 43(6): 464-9
Pertuiset E, et al. *Medicine* 1999; 78 (5): 309-20.

Cheng VCC, et al. *J Clin Pathol* 2004; 57 (3): 281-5.
Tortoli E, et al. *Eur Respir J* 2012; 40 (2): 442-7.
Gu Y, et al. *Int J Infect Dis* 2015; 36: 27-30
WHO. Policy Update, WHO, Geneva, Switzerland, 2005.

Diagnostic tools for TB

Methods	Yield (sensitivity)	Comments
The Xpert MTB/RIF assay	A sensitivity and specificity of 82% and 100 %, respectively, in bone & joint TB diagnosis	Simultaneously access the resistance to rifampicin within 2 h Endorsed for extrapulmonary TB diagnosis by the WHO in 2013
GenoType MTBDR plus (MTBDR) assay	A sensitivity of 72% in bone & joint TB	Detects both rifampicin and isoniazid resistances

Colmenero JD, et al. Eur Spine J 2013; 22 (4): 579– 86

Weng C-Y, et al. J Microbiol Immunol Infect 2010; 43(6): 464-9

Pertuiset E, et al. Medicine 1999; 78 (5): 309-20.

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WHO. Policy Update, WHO, Geneva, Switzerland, 2005.

ผู้ป่วยหญิงอายุ 65 ปี, รับไว้เนื่องจากมี **rupture diverticulitis** หลังผ่าตัด ต้องอยู่ใน ICU ใช้ **ventilator, central venous catheter, urinary catheter**, ขณะนี้เป็นวันที่ 4 หลังการผ่าตัด. ผู้ป่วยยังมีอาการไข้ ปัจจุบันได้ **Ertapenem**. รับ **feed** ไม่ได้ ได้รับ **TPN** ยังไม่สามารถหย่า **ventilator** ได้

PE BT 38.5 ° C BP 120/80 mmHg, PR 110/min, RR 24/min

Lungs: decreased breath sound RLL, secretion sound

Abdomen: moderate distension, hypoactive bowel sound, no definite point of tenderness, surgical wound: mild erythema and swelling, no discharge,

Drain : serosanguinous fluid (15 ml/d)

Central line: exit site: no inflammation, no discharge

Post operative fever

Cause	Time of fever after operation (d)	Clinical clues	Suggestive investigation
Physiologic	Day 1-3	Clinically stable or improve	No
Complication (s) of primary disease, e.g. collection, abscess formation	Persistent of fever beyond day 3	Not improve or worsening of the primary disease, persistent leukocytosis	Appropriate imaging
Leak of anastomosis	Usually after day 5	Worsening after improvement of primary symptoms	Appropriate imaging
Surgical wound infection	Usually after day 2	Evidence of SSI	Wound exploration
VAP	Usually after day 3	S/S of pneumonia	New abnormal CXR consistent with pneumonia, CT scan
Cath- related UTI	Usually after day 3	New pyuria and bacteriuria in the absence of another cause of fever	Identification of causative pathogen

Post operative fever

Cause	Onset of fever after operation (d)	Clinical clues	Suggestive investigation
Intravenous catheter related infections; exit site, BSI	Usually after day 3	Presence of exit site or surrounding soft tissue inflammation; absence of the above clues if intraluminal infection	Blood cultures from catheter and peripheral site, simultaneously
Non- primary disease related infections, e.g. acute cholecystitis, acute pancreatitis	Usually after day 3	According to individual disease	According to individual disease
Non- ID causes (drug fever, DVT, adrenal insufficiency, pseudogout, etc.)	Persistent of fever or after day 3	According to individual disease	According to individual disease

Investigations

CBC: leukocytosis

Serum amylase, lipase : in normal ranges

CXR: no definite new infiltration

UA: WBC 5-10/ hpf, Gram stain : no bacteria seen

U/S whole abdomen : no collection

Drain fluid Gram stain: rare WBC, no bacteria seen

Possible causes of fever

CXR	Urine	Drain fluid	IV Cather site	Diagnosis
No new infiltration	WBC 5-10./GNR	WBC 0-1/ no bacteria seen	No/ mild inflammation	Possible catheter related UTI
New infiltration	WBC 5-10./GNR	WBC 0-1/ no bacteria seen	No/ mild inflammation	VAP
No new infiltration	WBC 0-1/ no bacteria seen	WBC 10-20/ GNR or no bacteria seen	No/ mild inflammation	Possible infected drain or intraabdominal collection
No new infiltration	WBC 0-1/ no bacteria seen	WBC 0-1/ no bacteria seen	No/ mild inflammation	Possible intravascular related BSI or non- ID cause

Management

- Appropriate culture, Gram stain prior to empirical antibiotic (s)
- Intravascular catheter has to be removed **IF** CA- BSI is most likely diagnosis **in accompanying with** hemodynamic instability or MODS/MOF.
- Empirical antimicrobial therapy when high probability of infection or high risk of life- threatening consequence if infection is missed.

Management

- Empirical antibiotic : depends on bed side microbiologic data (Gram stain) and epidemiologic data (prevalence and local susceptibility)
- Empirical antifungal therapy in the presence of risk

Invasive candidiasis : Predisposing factors

Prolonged broad spectrum antibiotic therapy

Intravascular catheter

TPN

Indwelling urinary catheter

Parenteral glucocorticoid

Neutropenia (early)

Immunosuppressive therapy for organ transplantation

Implantable prosthetic devices

ICU admission

Abdominal & thoracic surgery

Cytotoxic chemotherapy

Severe burn (late)

Low birth weight

IVDU

Dialysis (HD or CAPD)

Invasive yeast (non- candida) infections

Fungi	Underlying immune status	
	competent	compromised
<i>Trichosporon asahii</i> , <i>T. inkin</i> , <i>T. mucoides</i>	Burns, heart valve surgery, in situ CVC	RE malignancy, AIDS, corticosteroid receipt
<i>Geotrichum candidum</i>	Burns, prosthetic devices, peritoneal dialysis	Malignancies, HSCT, HIV/AIDS

Invasive mold infections

Fungi	Underlying immune status	
	competent	compromised
<i>Aspergillus</i> spp.	ICU admission (COPD, cirrhosis ; stay in ICU > 7 d, TPN)	Neutropenia ie. RE malignancy, organ transplantation, CGD, corticosteroid, AIDS
Mucormycosis	Trauma, burn	Acidosis, iron chelating agents, others as in IA

Thank You for Your Attention