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明和病院 臨床研修講義

# Leukocytopenia

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# Leukocytopenia

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- \* Lymphocytopenia
  - \* Neutropenia
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# Lymphocytopenia

<1500/ $\mu$ l

1. Lymphocytes production  $\Downarrow\Downarrow$
2. Lymphocytes destruction  $\Uparrow\Uparrow$
3. Lymph loss  $\Uparrow\Uparrow$
4. Others

# Lymphocytes production ↓↓

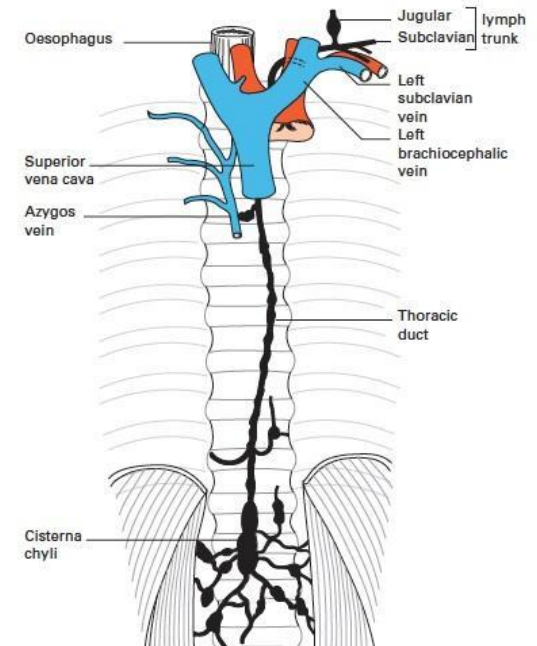
- Ataxia-telangiectasia 毛細血管拡張性小脳失調症
- Thymic dysplasia syndrome  
常染色体劣性，先天性免疫不全によるものの未発達の状態胸腺
- Aplastic anemia

# Lymphocytes destruction↑↑

- Steroid
- ACTH administration
- Irradiation
- Cancer therapy
- ATG ( antithymocyte globulin)

# Lymph loss↑↑

- Thoracic duct drainage
- Congenital lymphatic abnormality  
excessive intestinal lymph loss
- Whipple disease  
腸性脂肪異栄養症  
intestinal lipodystrophy
- Increased venous pressure



# Others

- Sarcoid
- Myasthenia gravis
- SLE
- Military tuberculosis
- acute & chronic renal failure
- Immunosuppressive therapy

# Neutropenia



# agranulocytes

全てのgranuloctes (Neutrophils,  
eosinophils, basophils) 減少 $<500/\mu\text{l}$

# Acquired Stem Cell Disorders

- Marrow lymphoma
- Myeloma
- Carcinoma
- Fibrosis
- Leukemia

# AML, 84y, FM

BM: NCC=47.9, Mblast =84.7%

CD33=99.1, CD13=21.2, CD56=29.1、

HLA-DR=11.9, WT1=19\*10E4

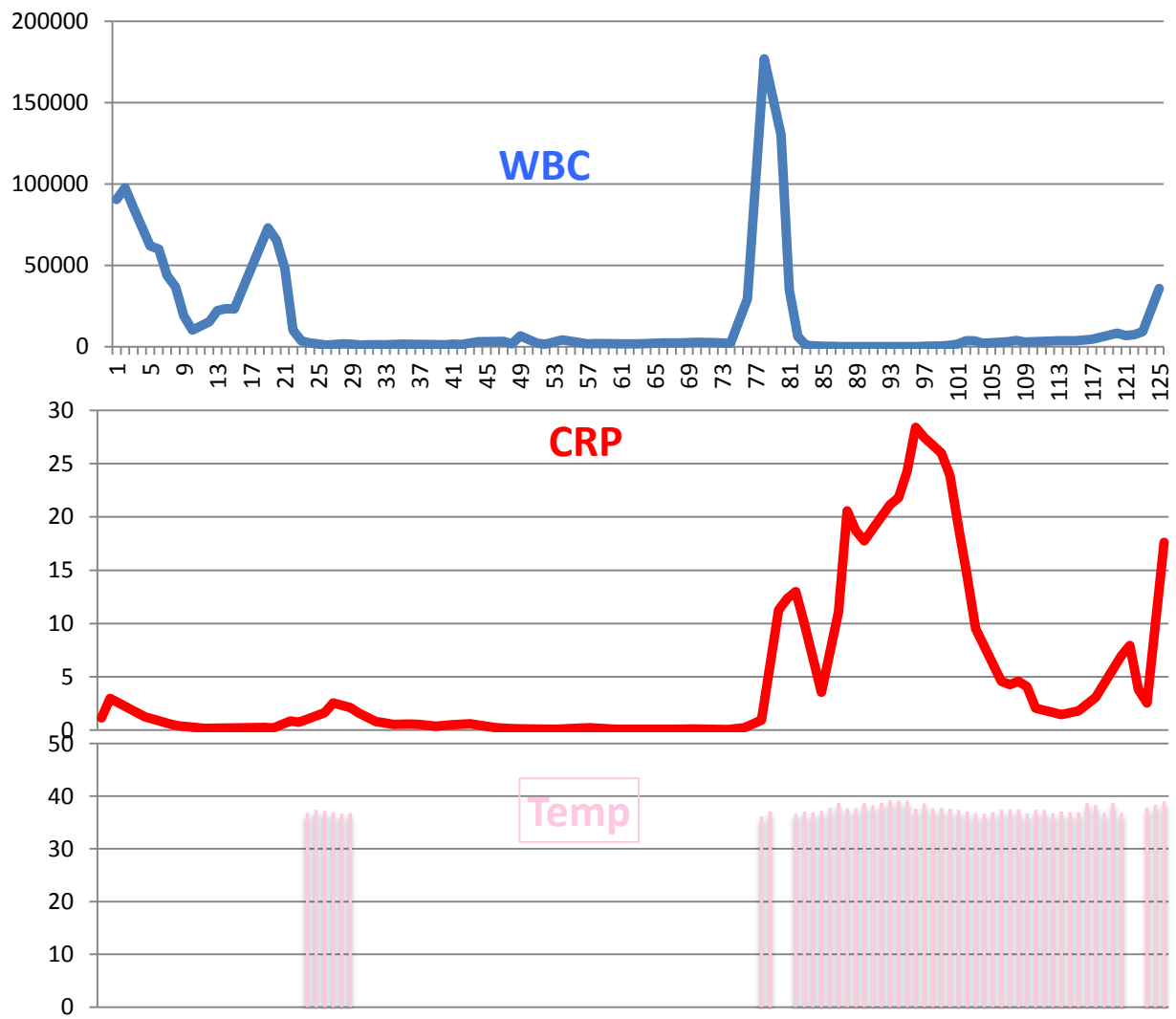
46XY,

PB:WBC=90500, Blast=94%, N=3%, L=3%

Hb=7.6, Plt=6

CRP=1.16, LDH=428,

# AML 症例



# AML, 76y.o. Female

76y.o. Female

PB: WBC : Hb : Plt=1400 : 4.2 : 1.5

Blast 0, N 33%, L 64%

BM: NCC

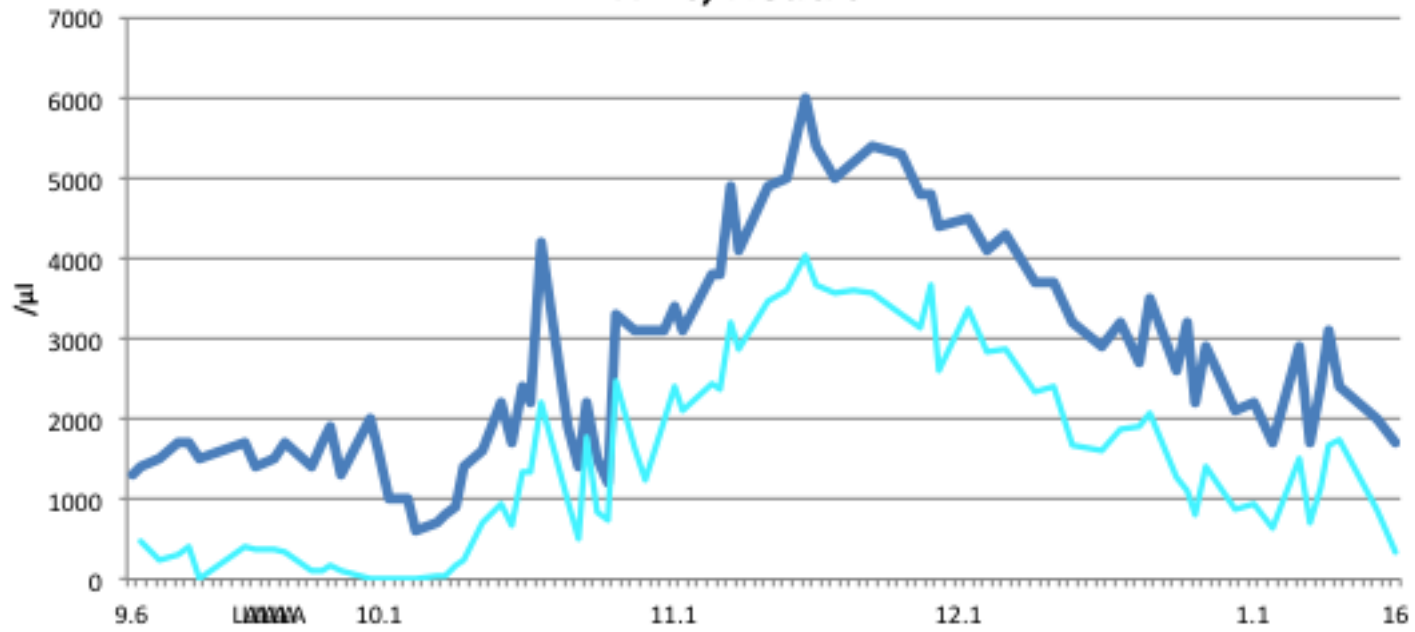
Blast 24.9%,

CD13, CD33, CD34, HLA-DR

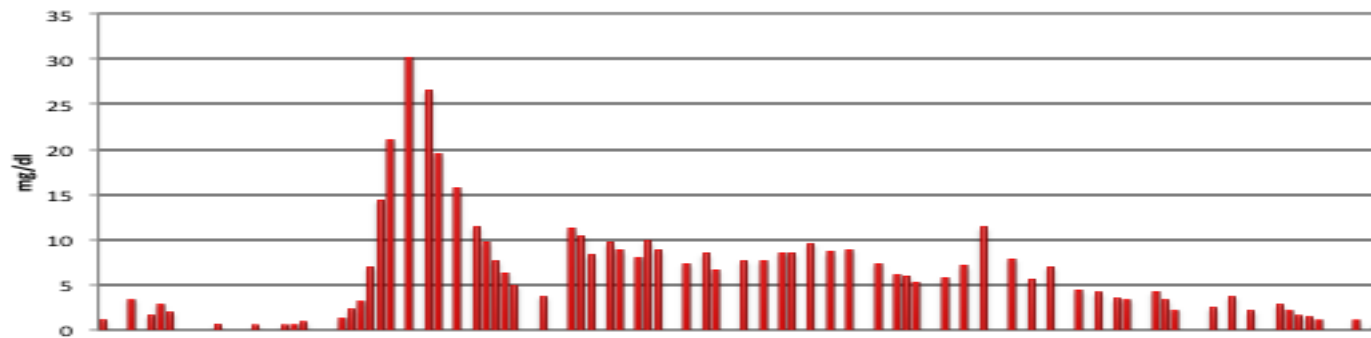
CD4

46XX

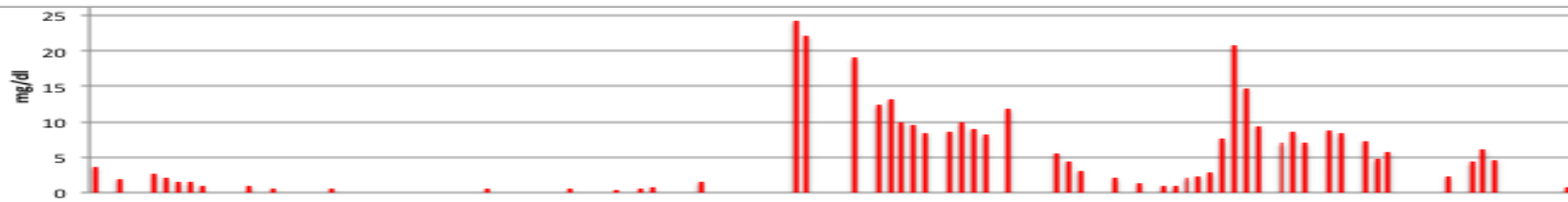
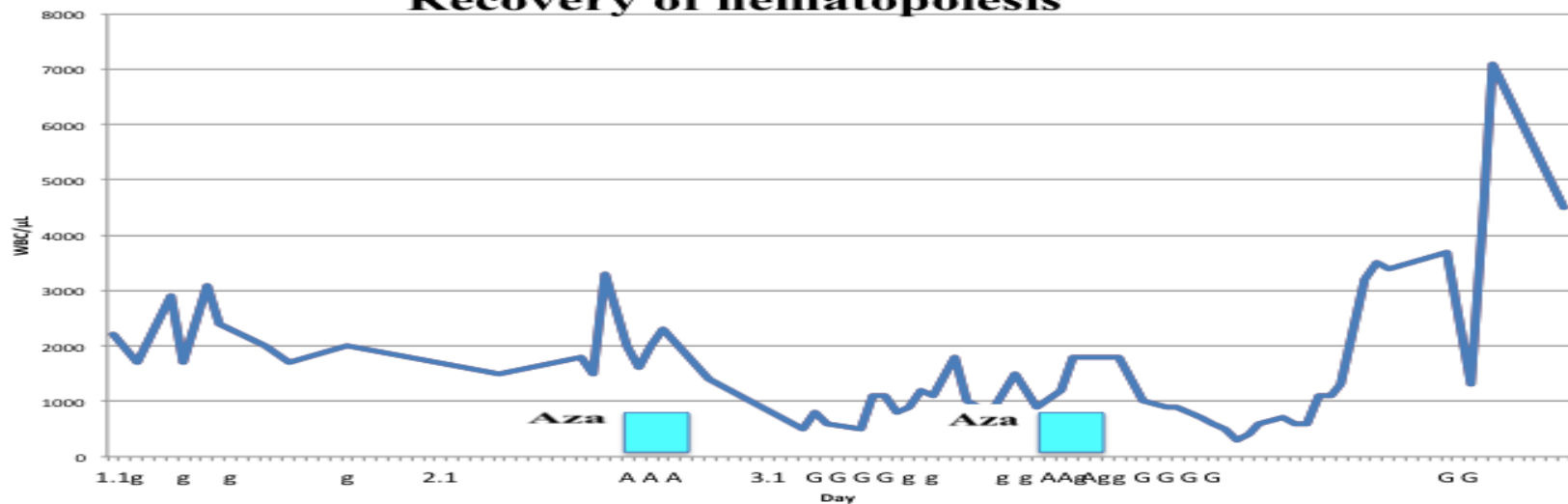
### WBC, Neutro



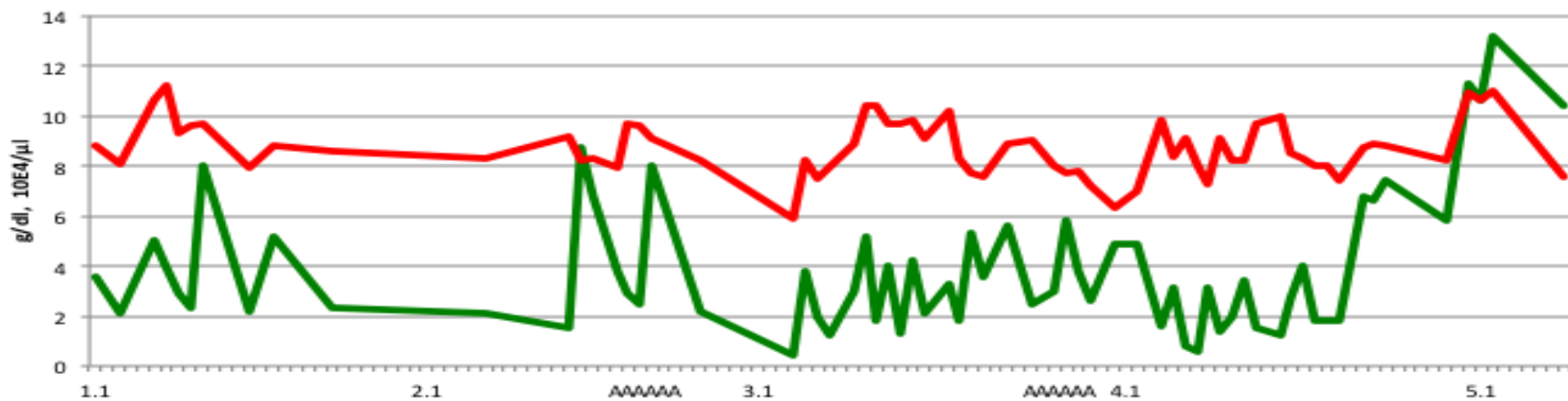
### CRP



## Recovery of hematopoiesis



## Hb & Platelet



# Case: Female, 71y

10/6 WBC : Hb : Plt=6600:13.6:2.4  
CRP=28.39, LDH=1422,, ALP=2009,  
sIL2R=1050

10/19 WBC : Hb : Plt=1800 : 7.8 : 6.5

10/23 マルク ;NCC=0.2, M<sub>gk</sub>=0, M/E=5, Others=14.3  
marker:CD10=81.2, CD19=76.6, CD20=70

骨髓病理：ほとんどが凝固壊死の骨髓、  
少数の小型LNの集束像



# BM necrosis

## Symptoms

骨痛 66%, 発熱 77.7%, 全身倦怠 44.4%  
肝臓腫大 33.3%

## Examinations

Pancytopenia, Anemia, Thrombocytopenia  
Elevation of LDH,ALP,UA

## The cause of BM necrosis

1. 血流障害
2. 腫瘍細胞の浸潤(腫瘍塞栓)および微小血栓
3. 腫瘍自体に壊死傾向
4. TNF $\alpha$ 産生亢進

# BM necrosis原因疾患(133例)

血液疾患		非血液疾患	
悪性血液疾患 (白血病)		癌	29
ALL	38	感染症 Infection	9
AML	14	薬物	
CML	11		
nonH	17		
CLL	2		
sickle cell disease	9		
Myelofibrosis	1		

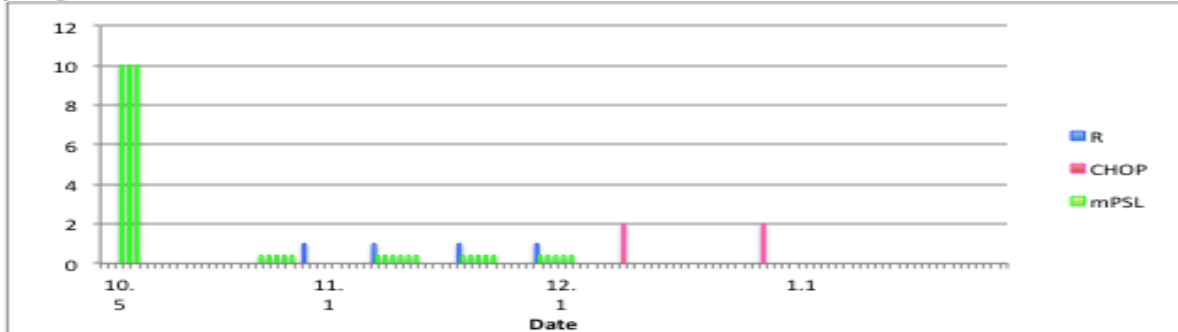
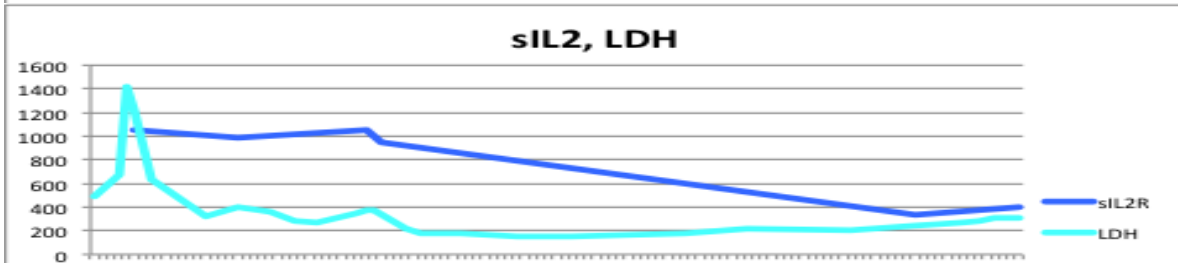
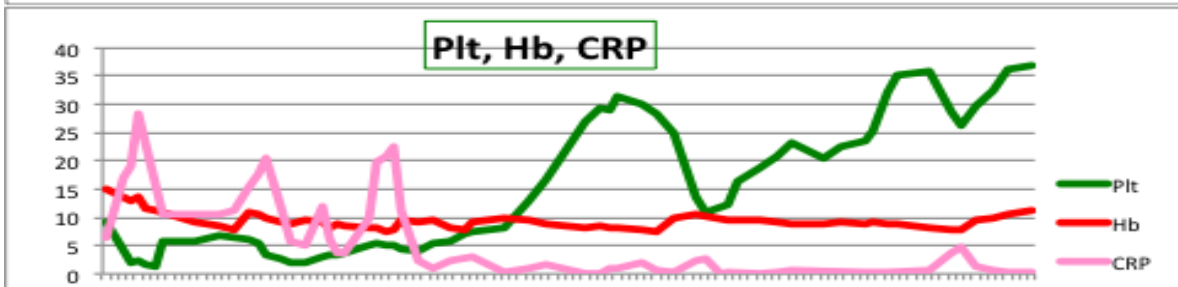
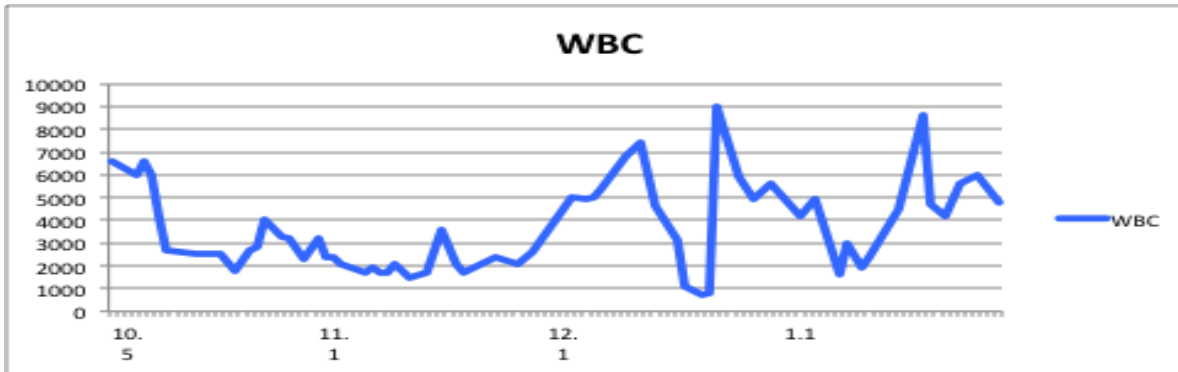
# Pathology

## Pathology

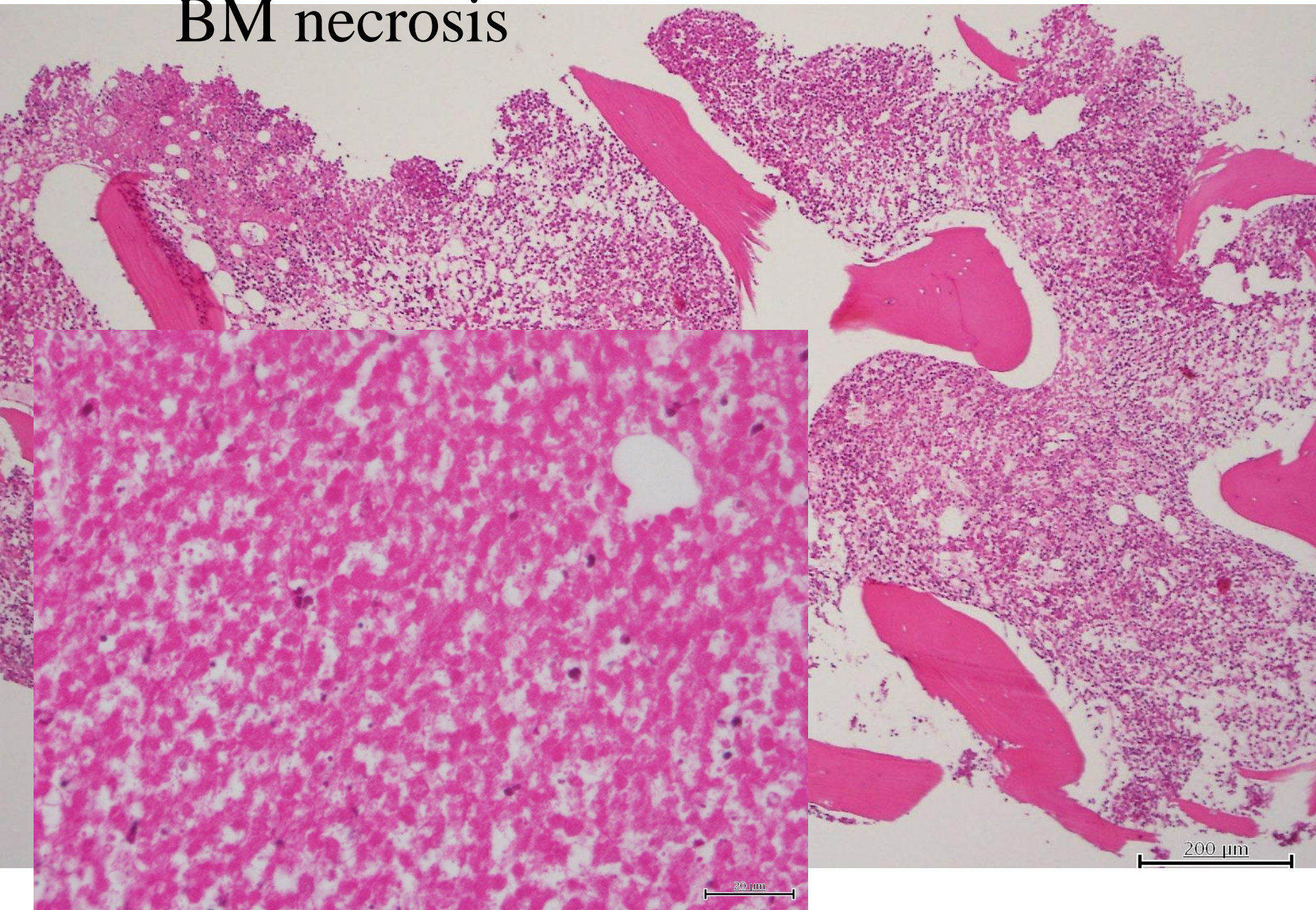
- 1 . Necrosis of Myeloid tissue, Medullary stroma
- 2 . Loss of fat spaces
- 3 . Spicular architecture (+)
- 4 . Reticular structure (×)

## Biopsyの必要性

- 1 . Bone marrow involvement  
---PET-CTのthreshold以下
- 2 . targeted biopsyが必要な時もある。



# BM necrosis



# Bacterial Infections

- Sever bacterial sepsis
  - Direct endotoxin
  - Bacterial damage to BM precursors

# Viral infections

- Infectious hepatitis
- Infectious mononucleosis
- Kawasaki Disease

# Metabolic hemopoiesis

- Megaloblastic anemia  
FA, VitB12 欠乏  
無効造血 ineffective myelopoiesis

elder

alcohol

malnourish



# Immune neutropenia

1. neutrophil antibody-associated neutropenic disorder
2. Isoimmune neonatal neutropenia
3. Autoimmune neutropenia
4. Systemic lupus erythematosus

# Acquired neutropenia disorder due to complex mechanism

- Felty syndrome
- Hypersplenism
- Infectious agents
- Acquired pseudoneutropenia
- Drug-induced neutropenia

Analgesics/anti-inflammatory agents

indomethacin  
ibuprofen  
aspirin  
mesalazine  
aminopyrine  
phenylbutazone  
barbiturates

Antipsychotics and antidepressants

phenothiazines  
clozapine  
risperidone  
imipramine  
desipramine  
haloperidol

Anticonvulsants

valproic acid  
carbamazepine  
phenytoin  
ethosuximide  
mesantoin

Antithyroid drugs

thiouracil  
propylthiouracil  
carbimazole  
methimazole  
thiocyanate

Antihistaminics

cimetidine  
ranitidine  
brompheniramine  
methapheniline

Miscellaneous drugs

iv  
immunoglobulin  
allopurinol  
colchicine  
tamoxifen  
retinoic acid  
ethanol  
thiazide diuretics  
levodopa

Antimicrobials

penicillins  
cephalosporins  
chloramphenicol  
gentamicin  
metronidazole  
rifampin  
isoniazid  
pyrimethamine  
levamisole  
sulfonamides  
dapson  
chloroquine  
acyclovir  
zidovudine  
ciprofloxacin

## Cardiovascular drugs

procainamide  
captopril  
propranolol  
hydralazine  
methyldopa  
nifedipine  
ticlopidine  
quinidine

## Chemotherapy

melphalan  
busulfan  
methotrexate  
carboplatin  
cisplatin  
cis-diammine-dichloroplatinum  
paclitaxel  
doxorubicin  
cyclophosphamide  
etoposide  
venorelbine

## Heavy metals

gold compounds  
arsenic compounds  
mercury compounds