Neutropenia

Semmelweis University

10th Semester

Severe neutropenia

- ANC: Absolute Neutrophil Count
- **<0.5 G/L** or **<1.0 G/L**, but decreasing

Evaluation

- History
- DiffDg
- Status
- Labs
- Microbiology
- Risk assesment MASCC score
- Antibiotics

History

- Underlying disease
  - AL, induction chemo (severe BM infiltration)
  - vSAA (lack of SCs)
  - NHL with severe BM infiltration
- Age
  - Elderly worsen
- Type of previous chemotherapy
  - AL, induction chemo
  - NHL salvage therapies
- Number of previous chemotherapies/lines
  - Severly pretreated pts are worsen
- Mucositis
- Immunsuppression
  - (T)-ALL, NHL, CLL: humoral +/- cellular immunedeficiency
- Previous infections, colonization, previous AB, allergy, on-prophylaxis?

Differential diagnosis

- Transfusion related complications
- Drug fever
- *Always infection must be suspected first!* – ***Time is (money) LIFE!***

Physical status

- Chest, abdomen, skin, orifices (nasal/oral cavity, perineal, anal)
- BP
- HR
- Breathing rate, mechanics of breathing
- $SatO_2$

- qSOFA score:
  - Breathing >22/min;
  - SystBP<100 Hgmm;
  - mental alteration

  2 of 3 -> HIGH RISK -> ABG -> ICU referal?

Labs

- CBC
- Kidney function
- Liver function
- Lactate
- CRP/PCT

Microbiology

- **Blood sampling for cultivation (aerob/anaerob peripheral and CVC)**
- Stool for CD toxin in case of diarrhea
- (Sputum)
- (Urine)
- (Skin laesion)
- (Anything, if suspected)
- Surveillance cultivation available? (nasal cavity, axilla, sputum, urine, stool, perianal region)

MASCC score (> 21: low risk)

Features	Point
Symptoms – no	5
Symptoms – mild	5
Symptoms – severe	3
No hypotension	5
No COPD	4
Solid tumor or haematological malignancy, but no fungal infection in the history	4
No dehydration	3
Infection acquired outside hospital	3
< 60 y	2

Antibiotics

Empiric choice: effective against *Pseudomonas*

- Piperacillin/Tazobactam
- Carbapenem
- Ceftazidim + Amikacin

- If septic shock presents (BP↓↓): Carbapenem + Amikacin + Vancomycin

- Suspected (historical or ensured by surveillance) multirersistant bacteria:
  - ESBL: carbapenem
  - MRSA/MRSE: +vancomycin
  - MACI: +colomycin
  - VRE: +linezolid
  - *Stenotrophomonas maltophilia*: +amikacin/+sulphomethoxasol-trimethoprim

Antibiotics

Other considerations:

- In case of bilateral pulmonary infiltrates (atypical pneumonia, Legionella pneumonia): macrolid or levofloxacin
- If *Pneumocystis jiroveci* penumonia (PCP) suspected: Trimethoprim+sulfamethoxasol or Pentamidin
- If influenza suspected (seasonal!): oseltamivir (Tamiflu)

Supportive treatment

- Agressive iv.fluid replacement – cristalloid
- Colloid? – Gelofusin (no HAES!)
- O_2 inhalation
- Transfusion (RBC/PLT)
- G-CSF
- Vasopressor: norepinephrine (Arterenol) – invasive arterial BP monitoring is necessary!

What to do if fever persists for days?

- Reevaluate the patient
  - Physical status (haemodinamics, ventillation)
  - Imaging techniques: Xray, US, Echo, **CT (HRCT for pulmonary infiltrates)**
- Microbiologic results?

- Changes in therapy:
  - Change AB
  - Add other AB (multiresistant germs)
  - Add antifungals
  - Remove CVC (*Staphylococcus, Candida*)

Invasive Aspergillosis

- „Long aplasia”
- Use of corticosteroids
- Environment (eg.reconstruction)
- Presentation: lung; paranasal sinuses; metastatic cerebral laesions

- Screening: galactomannan 2x weekly
- Diagnosis: HRCT

- Prophylaxis: POS (posaconazole 300mg q.o.d., po.), VOR (voriconasol 2x200 mg b.i.d., po/iv), MIC (micafungin iv.)
  - AML, induction chemotherapy
- Treatment:
  - POS/VOR if „azol-naïve”; po/iv.
  - AMP (Amphotericin B, liposomal formula prefered) iv., 5 mgTbwkg -> cumulative dose 3-4000 mg
  - MIC (micafungin)

Invasive Candida infection

- „Long aplasia”
- Mucositis
- Central venosus canule
- Presentation: *Candida* sepsis; hepatosplenic candidiasis
- Diagnosis: Cultivation (*non-albicans?!*); US/CT

- Prophylaxis: VOR/FLU (fluconazol)
- Treatment:
  - Fluconazol iv. (*C.albicans*)
  - Micafungin iv.
  - Amphotericin B iv.
  - Caspofungin iv.

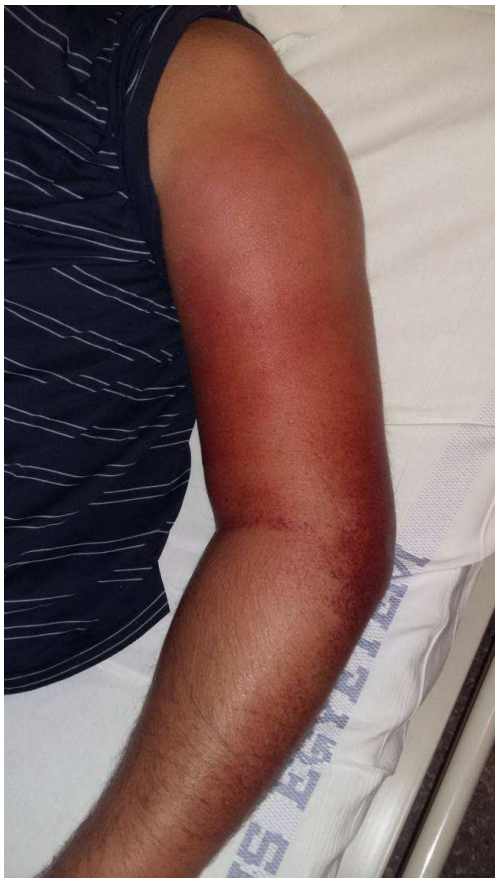
Granulocyte transfusion

- Indication: long BM aplasia / agranulocytosis (<0.5 G/L) + life-threatening bacterial or fungal infection, combined with AB:
  - Skin, soft tissue
  - abdominal
  - Aspergillis of the lung or paranasal sinuses
- NO!: (bilateral) pulmonal bacterial / interstitial infection
- Generally interventional, but may be prophylactic

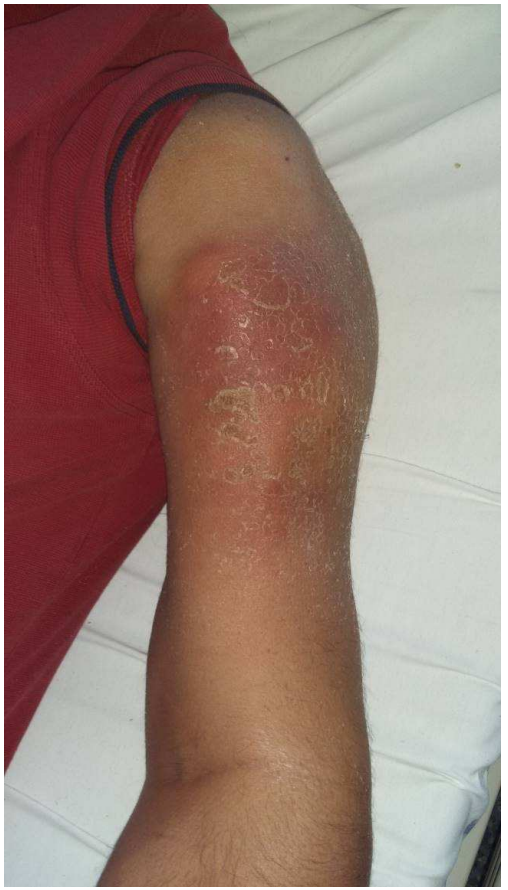
Granulocyte transfusion

- 20 U, from leukapheresis
- Irradiated
- Logistic
- Expiry on that day
- Increment is irrelevant – *focus on the clinical improvement*
- Risks:
  - HLA-sensitisation
  - CMV transmisson
  - Cytokin release
  - ARDS

Very Severe Aplastic Anaemia (vSAA); Pyomyositis + Sepsis (*Stenothrophomonas maltophilia)*



4x20 U granulocyte
+
Tazocin + Amikin + Bactrim
+
1 week



Preventive measures

- G-CSF use
- Diet
- Isolation
- Infection control
- Hygienic measures: hand desinfection (!), face mask, invasive devices
- Preventive AB: not routinley
- Aciclovir; POS/VOR; Sulfamethoxasol+Trimethoprim in special patient populations