Serial Expressions of Chemokines in Chronic Subdural Hematoma Fluids after Trepanation Surgery

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I have nothing to declare.
Introduction

- Chronic subdural hematoma (CSDH) is considered an angiogenic and inflammatory disease.

- Chemokines attract leukocyte.

- Invading neutrophils and monocyte/macrophage play an important role in the wound healing.

We examined the serial expression of chemokines in CSDH fluids after trepanation surgery.
Methods

- We randomly divided trepanation surgery into two groups.
  - **Irrigation group** \( (n = 10) \)
    - irrigation of CSDH was performed and drainage tube was placed
  - **w/o irrigation group** \( (n = 10) \)
    - drainage tube was inserted without irrigation
- CSDH fluids were collected at 3 times.
  - during the trepanation surgery
  - immediately after surgery
  - on day 1 after surgery
- The concentration of **Interleukin-8, GRO-α, ENA-78, MCP-1, IP-10, vWF** and **tPA** were measured using ELISA kits.
Results

- **IL-8**
  - During surgery (a)
  - Immediately after surgery (b)
  - Day 1 (c)

- **GRO-α**
  - During surgery (a)
  - Immediately after surgery (b)
  - Day 1 (c)

- **ENA-78**
  - During surgery (a)
  - Immediately after surgery (b)
  - Day 1 (c)

- **MCP-1**
  - During surgery (a)
  - Immediately after surgery (b)
  - Day 1 (c)

Comparison with and without irrigation:
- Irrigation (*)
- Without irrigation (*)

Concentrations are measured in pg/ml.
Results

- **IRrigation**
  - IP-10
  - tPA
  - vWF

- **w/o irrigation**
  - IP-10
  - tPA
  - vWF

*a*; during surgery

*b*; immediately after surgery

*c*; day-1
Results

Relationship between neutrophil chemoattractant chemokines

There existed the relationship between IL-8, GRO-a and ENA-78 in the CSDH fluids obtained during the surgery.
Summary of Results

- There existed the relationship between IL-8, GRO-a and ENA-78 in the CSDH fluids obtained during the surgery.
- After irrigation, the concentration of all chemokines decreased.
- However, the concentrations of Interleukin-8, GRO-a and ENA-78 are significantly increased on day 1 compared with during surgery with or w/o irrigation. In some cases the concentration of MCP-1 increased on day 1 compared with during surgery.
- On the contrary, there are no changes in concentrations of IP-10, tPA and vWF after trepanation surgery.
secretory organelles in the endothelial cells

1. Weibel-Palade bodies (WPBs) vWF, IL-8, eotaxin-3
2. tPA organelle tPA
3. Type-2 chemokine-containing organelle GRO-α, MCP-1 etc

Endothelial cells secrete vWF, tPA and chemokines.
Chemokines IL-8, GROα, MCP-1, IP-10, and Mig Are Sequentially and Differentially Expressed During Phase-Specific Infiltration of Leukocyte Subsets in Human Wound Healing

Day 1  migration of neutrophils by IL-8, GRO-α etc.
Day 2  migration of macrophages by MCP-1
Day 4~ migration of lymphocyte by IP-10, Mig
Conclusion

- Secretory organelles in the endothelial cell contain these chemokines, tPA and vWF.
- In the process of general wound healing, chemokines attracting neutrophils (interleukin-8, GRO-a and ENA-78) appears at first. On day 2 MCP-1 attracting macrophage appears next. After day 4 MIG and IP-10 attracting lymphocyte appear finally.
- Our data agree with this previous data, suggesting that chemokines attracting neutrophils (interleukin-8, GRO-a and ENA-78) play an important role in the healing of CSDH at the first stage.
- Same mechanism may be involved with the production of these neutrophil chemoattractants.