



The diagnostic role of CSF presepsin in neonates

Nizhniy Novgorod Pediatric
Hospital No 1



Questions

- CSF analysis - is it an absolutely new approach?
- What biomarkers have been used?
- Bacterial or aseptic process?
- Inflammation or barrier damage?
- Presepsin: preliminary data and our tasks?



Biomarkers

- CSF lactate (since 1974) (Critical care 2010; 14(6))
- Cytokines (IL-1 β ; TNF α) (Eur J neurol 2014; Aug 21 (8)).
- CPR
- Procalcitonine

Materials

- 28 neonates
- Lumbar punctions were performed because of signs of central nervous system damage or increased temperature without definite site of infection
- The mean age at the moment of puncture was $10,2 \pm 5,8$ days
- The mean weight was 1980 ± 958 grams



Methods

- For investigation of preseprin level in CSF rapid chemiluminescent enzyme immunoassay on the fully automated PATHFAST® immunoanalyzer (Mitsubishi Chemical Medience Corporation, Tokyo, Japan) was used
- The quantity of cells, glucose and protein levels were determined in CSF

Results

- 22 neonates didn't have laboratory signs of bacterial meningitis (HIE, IVH, viral neuroinfection)
- The quantity of cells was $9,76 \pm 4,30$ per mcl (neutrophils - $4,38 \pm 1,86$ per mcl).
- Level of protein also was normal: $0,73 \pm 0,33$ g/l.

Results

For presepsin mediana was 139,00 pg/ml,
25 percentile – 91,30 pg/ml;
75 percentile – 170,00 pg/ml
Maximum — 465 pg/ml



Results

- 6 neonates with bacterial meningitis
- cytosis – mediana 880 cells/mcl; 25-75 percentile - 329,25 - 1301 cells/mcl
- protein – mediana - 1,35 g/l; 25-75 percentile – 1,02 - 2,15 g/l
- CSF presepsin – mediana - 963,5 pg/ml; 25-75 percentile - 729,5 - 1396,25 pg/ml (z=-3,65; p=0,000267)
- Blood (serum) presepsin – mediana 204,5 25-75 percentile - 177,25 - 869,25 pg/ml



Bacterial cultures

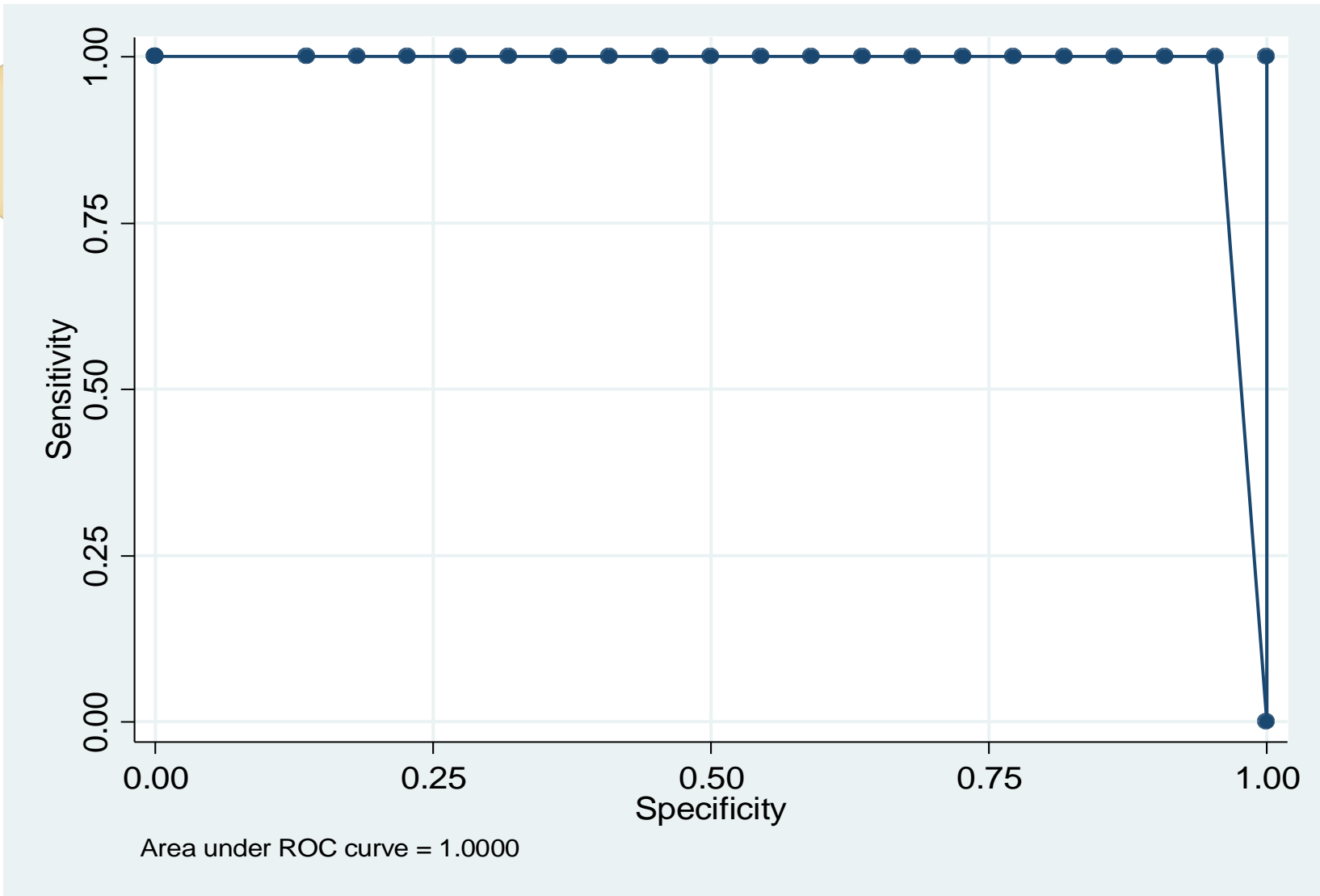
- E. coli
- St. epidermidis
- Ent. faecalis

Blood presepsin

- mediana – 291,00 pg/ml; 25 - 75 percentile - 211 – 512 pg/ml.
- criteria for including: birth weigh more than 2500 g, normal adaptation, admission to the hospital with suspicion on viral or bacterial infection in the late neonatal period. Birth weigh in the group was 3438 ± 561 g, age at the admission was $12,2 \pm 7,1$ days. Nobody have received antibiotics before.



	cytosis (cells/mcl)	protein (g/l)	blood presepsin (pg/ml)	CSF presepsin (pg/ml)
Patient P	651	1,4	152	717
Patient K	1365	2,95	170	767
Patient N	222	0,88	210	649
Patient S	1109	0,93	1095	1475
Patient I	11093	1,3	199	24355
Patient Sh	21	2,4	1089	1160



Area under ROC curve = 1.0000



Bacterial meningitis

- Male
- Gestational age— 33 weeks
- Birth weigh – 2220 g
- Apgar score – 7/8
- Diagnosis – RDSN, intrauterine infection (meningitis?)

Date	Blood presepsin	CSF presepsin	CRP	Blood Le	Cytosis
17.02	199	24 355	9,67	13,3	11 093
19.02	233	1 875		16,1	1 253
24.02	456	1 361	neg		202
27.02	350	992		8,3	353
04.03	557	1 041	neg		262
14.03	172	215	neg	9,0	64

Summary



- As CSF presepsin level in neonates with bacterial meningitis is significantly higher than those in patients with aseptic process it may be used for differential diagnosis
- CSF presepsin level doesn't depend on blood presepsin so it's more useful in patients with local processes (without generalization)
- We need more data to give stronger recommendation for using CSF presepsin in routine practice

Thank you

