SUMMARY & CONCLUSION

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The present work was carried out on 31 patients of meningitis admitted to Shebin El-Kom Fever Hospital during 1998 and 10 children presenting with convulsions served as controls.

The study included 3 groups:

1) Sixteen patients diagnosed as bacterial meningitis.
2) Fifteen patients diagnosed as viral meningitis.
3) Ten children presenting with convulsions which were diagnosed after that as febrile, epileptic and drug induced convulsions served as controls.

Blood samples from patients and controls were subjected to the following laboratory investigations:

1- Estimation of total leucocytic count.
2- Estimation of differential leucocytic count.
3- Estimation of the levels of IL-10 and TNFα.

CSF samples from patients and controls were examined for color, aspect and subjected to the following laboratory investigations:

1- Total and differential leucocytic count.
2- Protein level.
3- Glucose level.
4- Gram stained films.
5- Cultures on chocolate agar, blood agar and MacKonkey's media.
6- Estimation of IL-10 and TNFα.

In the first group of bacterial meningitis, TLC showed a mean of 17,875 ± 2276 cells/mm^3 which can significantly elevated compared to controls. The differential count showed 77.8% ± 2.8 neutrophils and 22.2% ± 2.8 lymphocytes. CSF examination showed significant, increase in cells 1225 ± 738 cells/mm^3 mainly PMNLs, increase in protein concentration 137.8 ± 24.6 mg/dl and decrease in glucose concentration 10.3 ± 5.3 mg/dl compared to controls, bacterial cultures were positive in all cases.

CSF IL-10 showed a highly significant increase, median 275.2 pg/ml with a range of 12.9 - 899.1 pg/ml compared to controls, median 4.2 pg/ml with a range of 1.1 - 7.3 pg/ml.

Serum IL-10 showed significant increase, median 26.4 pg/ml, range 14.9 - 118.5 pg/ml compared to controls, median 3.1 pg/ml, range 0 - 7.2 pg/ml. Regarding TNFα, CSF level showed highly significant increase, median was 148.1 pg/ml with a range of 23 - 1832 pg/ml compared to controls, median 1.8 pg/ml, range 0 - 3.7. Serum TNFα showed significant increase, median was 37 pg/ml with a range of 11.6 - 789 pg/ml compared to controls, median 3.2 pg/ml, range 1.9 - 4.2 pg/ml.

In the second group of viral meningitis, TLC showed a mild increase 9933±1032 cells/mm^3 and the differential count showed 77.3% ± 2.4 lymphocytes and 22.7% ± 2.4% neutrophils. CSF examination showed significant increase in cells 273.2 ± 143 cells/mm^3 mainly lymphocytes, moderate increase in protein 62 ± 6.7 mg/dl, normal glucose concentration 58.8 ± 5.2 mg/dl. Gram stain and bacterial cultures were negative for all samples.

IL-10 was detected in 8 out of 15 CSF samples, the median was 18.8 pg/ml with a range of 11.6 - 45.1 pg/ml, which was significantly elevated compared to controls. Serum IL-10 was detected in 5 out of 15 samples, the median was 14.7 pg/ml with a range of 11.2 - 19.8 pg/ml. Regarding TNFα, it was detected in 4 out of 15 CSF samples, the median was 45 pg/ml ranged between 11.2 - 3 8.4 and 2 out of 15 serum samples.

In bacterial meningitis group CSF, IL-10 and TNFα correlated, negatively with CSF glucose level, positively with CSF PMNLs and protein concentration. CSF IL-10 correlated positively with TNFα, while in viral group of meningitis CSF IL-10 correlated positively only with CSF lymphocytes.

CSF IL-10 showed significant increase in bacterial meningitis group compared to viral group of meningitis, regarding CSF TNFα, it showed also a significant increase in bacterial meningitis group compared to viral meningitis group.

Among bacterial and viral groups of meningitis IL-10 showed a significant increase in CSF levels than serum levels suggesting that it was released in CSF compartment. Also TNFα showed a significant increase in CSF levels than serum levels in bacterial meningitis group.

From the results reported in this study, we can conclude that:

TNFα could be of value in diagnosis of bacterial meningitis as it showed a significant elevation in CSF and serum samples from children with bacterial meningitis compared to children with viral meningitis.

CSF TNFα showed a significant increase compared to serum level, this suggest that it was produced in the subarachnoid space as a sequelae of the disease.

IL-10 showed a significant increase in CSF and serum of children with bacterial meningitis and in CSF of children with viral meningitis, but its level was markedly elevated in bacterial than in viral meningitis.

CSF IL-10 showed a significant increase compared to serum level, this suggest that it was released in the CSF compartment. So endogenous IL-10 production in CSF may play an important role as a natural regulatory and anti-inflammatory cytokine in human meningitis.