

# COMPARISON OF CYTOLOGIC AND BIOCHEMISTRY CEREBROSPINAL FLUID (CSF) PARAMETERS BETWEEN VIRAL AND BACTERIAL MENINGITIS



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## INTRODUCTION

Cerebrospinal fluid cytological and biochemical analyses are used to empirically distinguish bacterial and viral meningitis guiding early therapeutic decisions. The aim of this study was to compare CSF cytological and biochemical findings in patients with community acquired viral and bacterial meningitis.

## METHODS

We included CSF samples sent to “Senne Liquor Diagnostico”. We considered bacterial meningitis every CSF in with at least one of the microbiological tests (bacterioscopy, latex antigen, or culture) was positive.

All cases of meningitis with enterovirus or herpes simplex positive PCR were considered of viral etiology.

Univariate CSF cytology and biochemistry data were compared with *t* test. Multivariate analysis was carried out with binary logistic regression.

## RESULTS

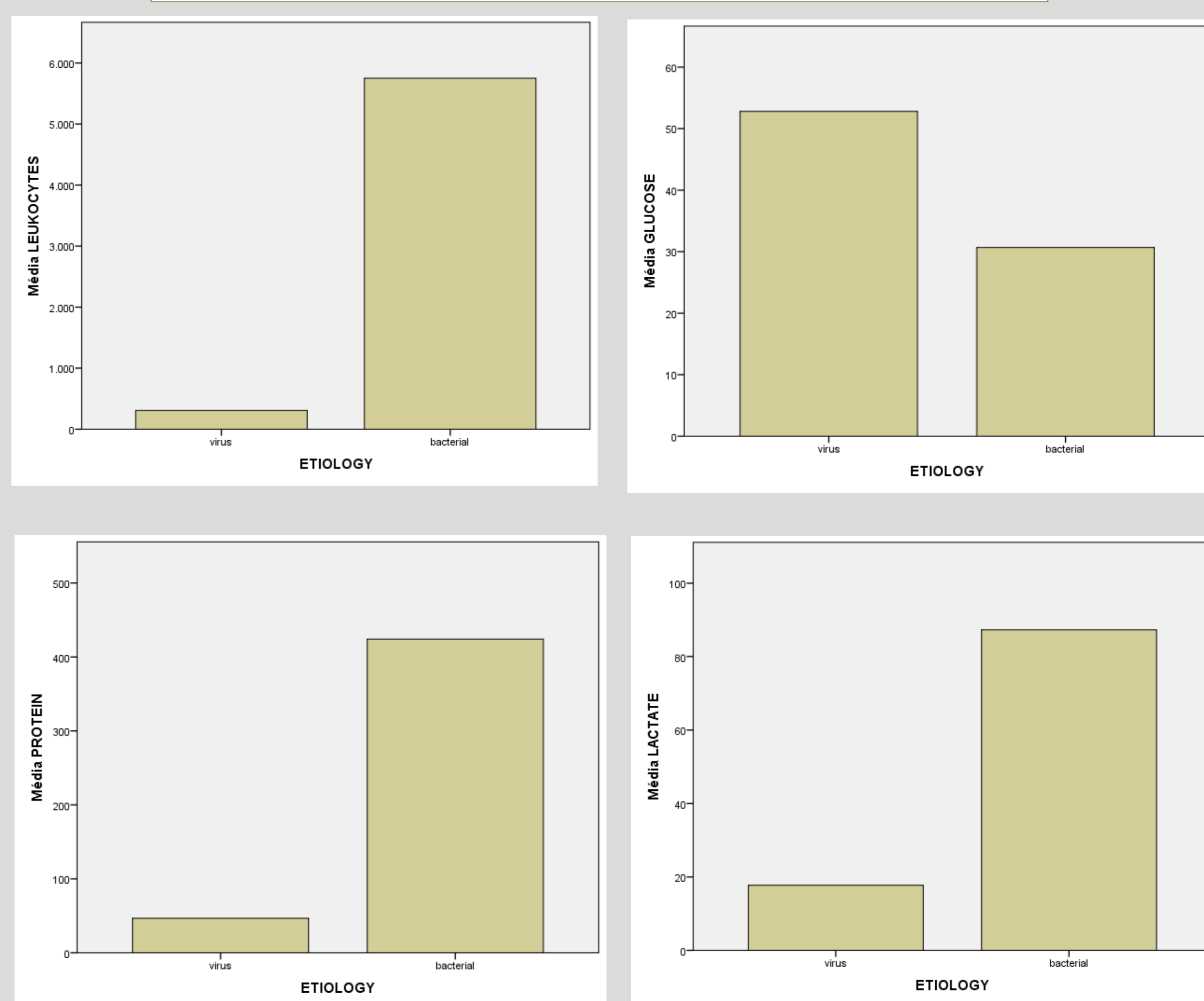
634 CSFs of bacterial meningitis and 524 CSFs of viral meningitis were included. CSF leukocyte count was significantly higher with bacterial meningitis ( $5750 \pm 27512 \times 306.4 \pm 424.4 \text{ mm}^3$ ) ( $P < 0,001$ ). CSF glucose was significantly lower with bacterial meningitis ( $30.68 \pm 31.22 \times 52.80 \pm 13.45 \text{ mg/dl}$ ) ( $P < 0.001$ ). CSF protein and lactate were significantly higher with bacterial meningitis ( $424.1 \pm 645.9 \times 46.76 \pm 29.05 \text{ mg/dl}$ ,  $P < 0.001$  and  $87.28 \pm 58.85 \times 17.76 \pm 4.55 \text{ mg/dl}$ ,  $P < 0.0001$ ; respectively).

After binary logistic regression the leukocytes count, protein, and lactate remained statistical significance ( $P < 0.0001$ ). Glucose was the only variable not significant; different between viral and bacterial meningitis after logistic regression ( $P = 0.771$ )

## CONCLUSION

All parameters but glucose were independently associated with meningitis etiology. Glucose was significantly lower with univariate analysis but not significant after binary logistic regression. It is possible that the lack of determination of CSF/serum glucose ratio may have precluded statistical significance with this variable with multivariate analysis.

**Figure 1:** Univariate comparisons of CSF data between viral and bacterial meningitis ( $P < 0.0001$ )



**Table 1:** Multivariate analysis of CSF data of viral and bacterial meningitis

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
	LEUKOCYTES	,000	,000	28,471	1	,000	1,000
	GLUCOSE	,002	,006	,085	1	,771	1,002
	PROTEIN	,013	,003	22,846	1	,000	1,013
	LACTATE	,182	,017	116,056	1	,000	1,200
	Constant	-5,981	,516	134,408	1	,000	,003

a. Variable(s) entered on step 1: LEUKOCYTES, GLUCOSE, PROTEIN, LACTATE.

## REFERENCES:

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 Brouwer MC, van de Beek D. Management of bacterial central nervous system infections. Handb Clin Neurol. 2017;140:349-364.