

Prevalence of cervical lymphadenopathy in acute CNS infections – Testing the Glymphatics in humans

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Introduction

- India accounts for one-fifth of all meningitis deaths worldwide. (1)
- Current diagnostic methods are limited by pauci-microbial nature of acute CNS infections in CSF.
- Recently discovered Glymphatics – play vital role in movement of CSF along with substance present in it to cervical LN in animal models. (2)
- We planned to study the prevalence of cervical lymphadenopathy and assess diagnostic yield of cervical LN biopsy.
- This might provide evidence for presence of Glymphatics in humans.

Objectives

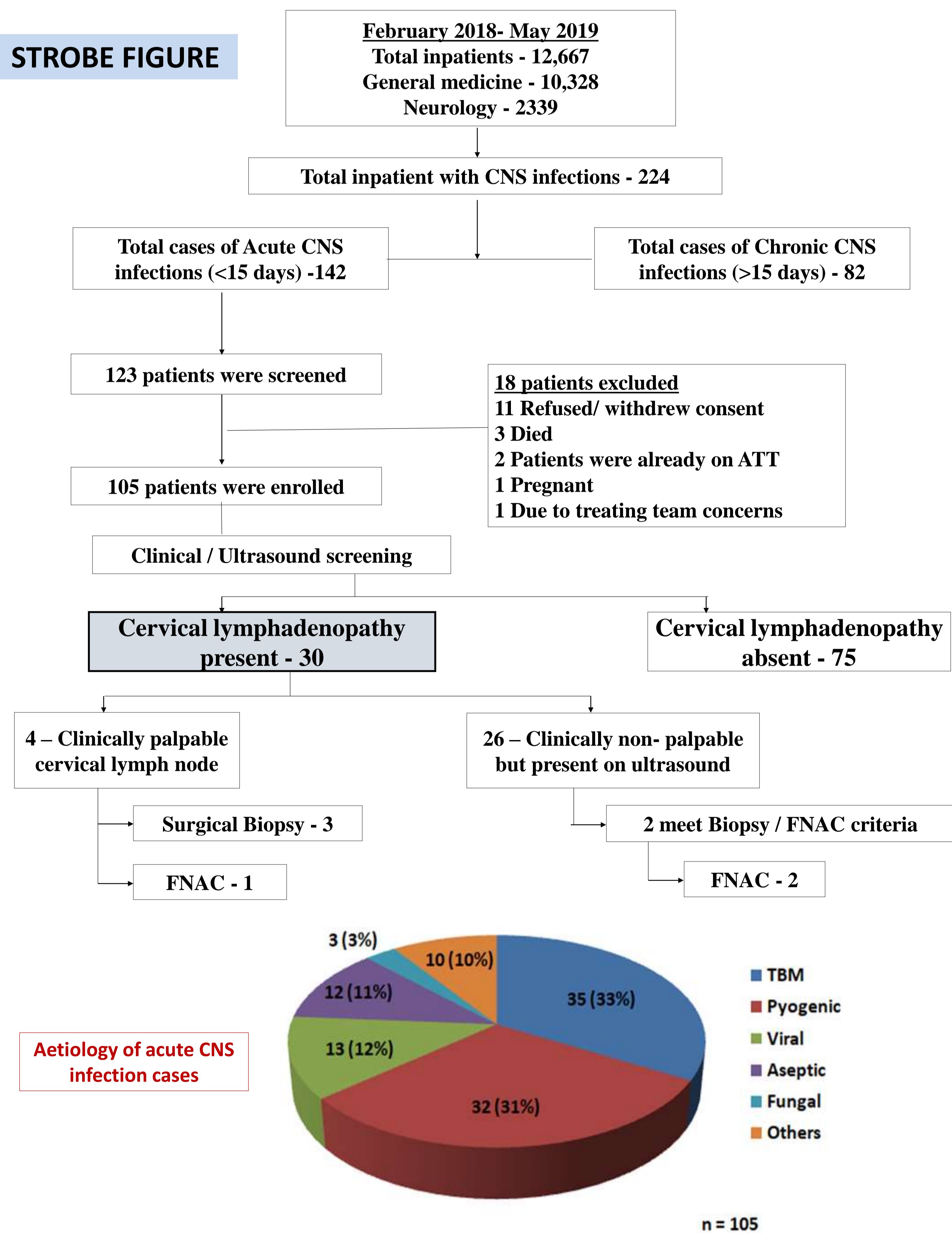
Primary objective – To determine the prevalence of cervical lymphadenopathy in patients with acute CNS infections.

Secondary objective – To assess the diagnostic yield of culture from cervical lymph node biopsy in the definitive diagnosis of acute CNS bacterial infection.

Methods

- Prospective cross-sectional study
- Screened clinically and radiologically for cervical lymphadenopathy.
- Biopsy (surgical/FNAC) was carried in cases wherever it was feasible.
- Biopsy sample was sent for histopath, aerobic and MGIT culture.
- Results were compared with CSF reports and the clinician's diagnosis.

STROBE FIGURE



Results

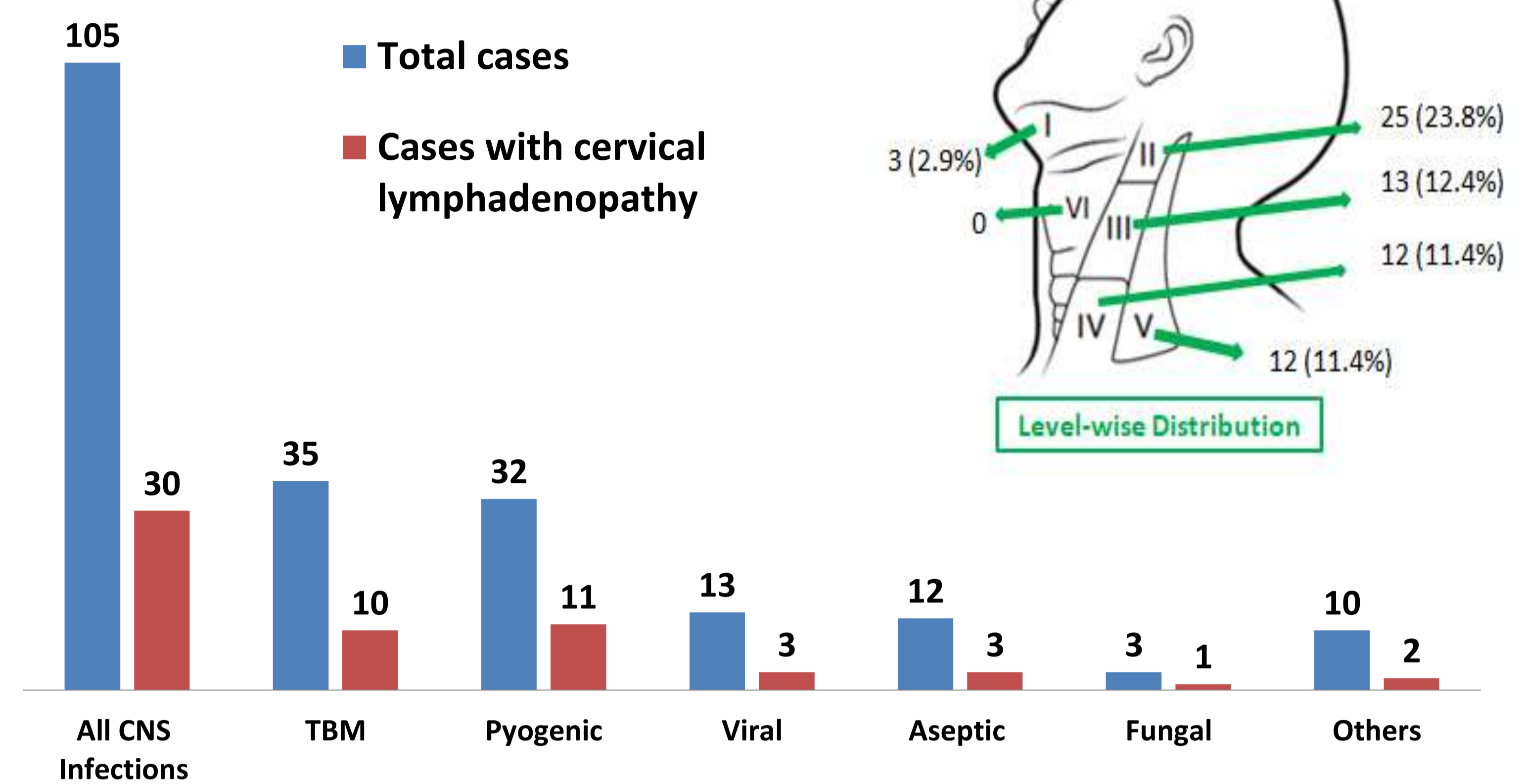


Table below showing univariate analysis of characteristics in acute CNS infections cases with presence versus absence of cervical lymphadenopathy

Variables	Cervical Lymphadenopathy		Univariate Analysis				
	Presence (n = 30)	Absence (n = 75)	Odd ratio	95% CI	p value		
Age (years) : Mean ± SD	38.0 ± 16.9	44.4 ± 17.2	0.98	0.95, 1.00	0.098		
Gender - Male	16	53.3	45	60.0	0.76	0.33, 1.77	0.528
Lower SES Class	17	56.7	38	50.7	1.27	0.54, 2.99	0.579
Severity of illness (GCS <15)	26	86.7	60	80	1.51	0.48, 4.74	0.481
Duration of illness							
1-5 days	13	43.3	37	49.3			
6-15 days	17	56.7	38	50.7	1.26	0.54, 2.93	0.587
Prior antibiotics (≥ 48 hours)	3	10	12	16	0.65	0.18, 2.30	0.500
Co-morbidities							
Presence of any of the immunosuppressive states (DM/CKD/HIV/Immunosuppressive drugs)	5	16.7	29	38.7	0.34	0.12, 0.95	0.040
HTN	3	10.0	15	20.0	0.50	0.14, 1.72	0.271
Obstructive Airway Disease	3	10.0	2	2.7	3.74	0.70, 20.10	0.124
Past History of Tuberculosis	2	6.7	8	10.7	0.7	0.16, 3.05	0.631
CSF Characteristics							
Neutrophilic Predominant	17	56.7	55	73.3	0.48	0.20, 1.15	0.098
Counts (cell/mm ³) : Mean ± SD	313.0 ± 520.1	481.1 ± 1776.9			1.00	1.00, 1.00	0.874
Glucose (mg/dl) : Mean ± SD	67.3 ± 29.7	67.2 ± 39.9			1.00	0.99, 1.01	0.941
Protein (mg/dl) : Mean ± SD	133.6 ± 97.6	232.3 ± 615.5			1.00	1.00, 1.00	0.732
Risk factors associated alteration in Glymphatics							
Insomnia	18	60	41	54.7	1.24	0.53, 2.94	0.619

Discussion and Conclusion

- Prevalence of cervical lymphadenopathy in patients with acute CNS infections was 28.57% which was significantly higher than its prevalence in normal adults (<1%) (3)
- No significant difference in prevalence among different types of CNS infections.
- The finding of granulomatous inflammation on histopathology of biopsied nodes from patients with acute TB meningitis correlated subsequently with the MGIT culture.
- With the help of the FNAC or biopsy of cervical nodes, the number of patients with definite microbiological evidence increased by 25% from 8 to 10 patients at the time of discharge from hospital.
- This finding was helpful in real-time to the treating team of physicians in rapid diagnosis of the disease and initiation of appropriate therapy.
- Cervical lymphadenopathy could provide for additional diagnostic aid in diagnosis of acute CNS infections and also its higher prevalence in acute CNS infections has provided evidence for possible role of glymphatics acting as a channel for spread of the CNS infections to cervical lymph nodes.

Acknowledgement

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Table below showing the smear, culture and histopathology reports of CSF and lymph node biopsy of two patients where biopsy of cervical LN had helped treating physicians in definite diagnosis and prompt appropriate therapy

CASE	CSF				Lymph node					Diagnosis			
	Gram stain	Aerobic c/s	AFB smear	MGIT	Detection Method	Node Level	Biopsy methods	Gram stain	Aerobic c/s		AFB smear	MGIT	Histopath
Case A	negative	negative	negative	positive	USG	IV	FNAC	negative	negative	negative	negative	Granulomatous inflammation	TB meningitis
Case B	negative	negative	negative	negative	Clinical	II	Surgical	negative	negative	negative	positive	Granulomatous inflammation with AFB seen	TB meningitis