

# Clinical, epidemiological & autopsy spectrum of rabies encephalitis

## A study from a Tertiary Care Hospital in North India

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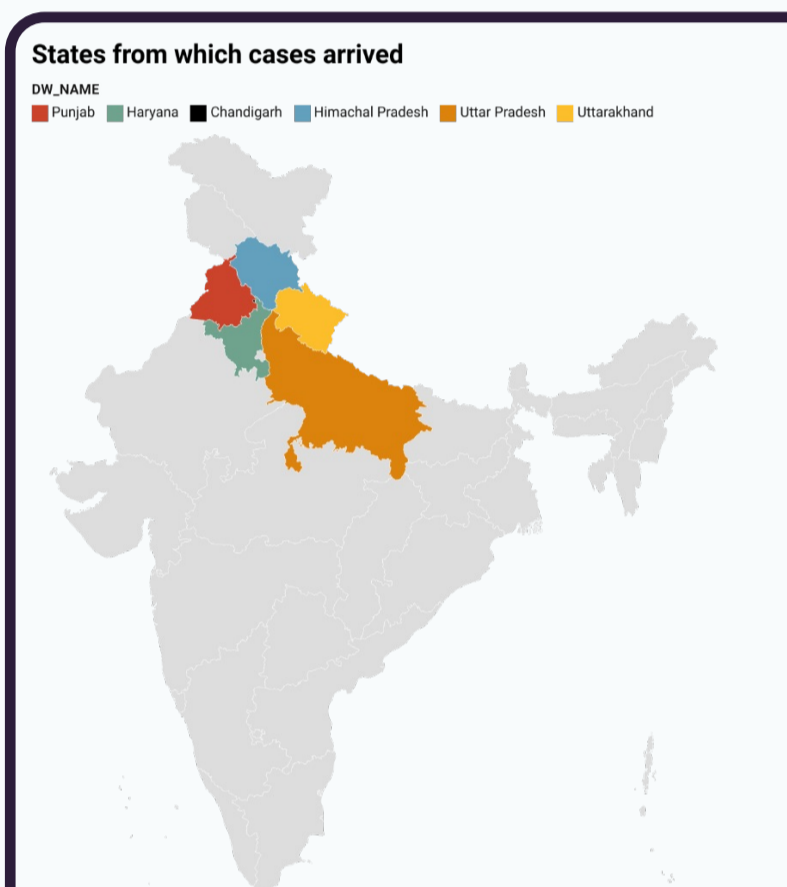
### INTRODUCTION

- Rabies has nearly 100% case fatality rate
- Only limited knowledge mostly via the retrospective studies
- This prospective study aimed to narrow this gap and study the epidemiological, clinical and neuroimaging features of the disease as well as the yield of various ante and postmortem diagnostic tests

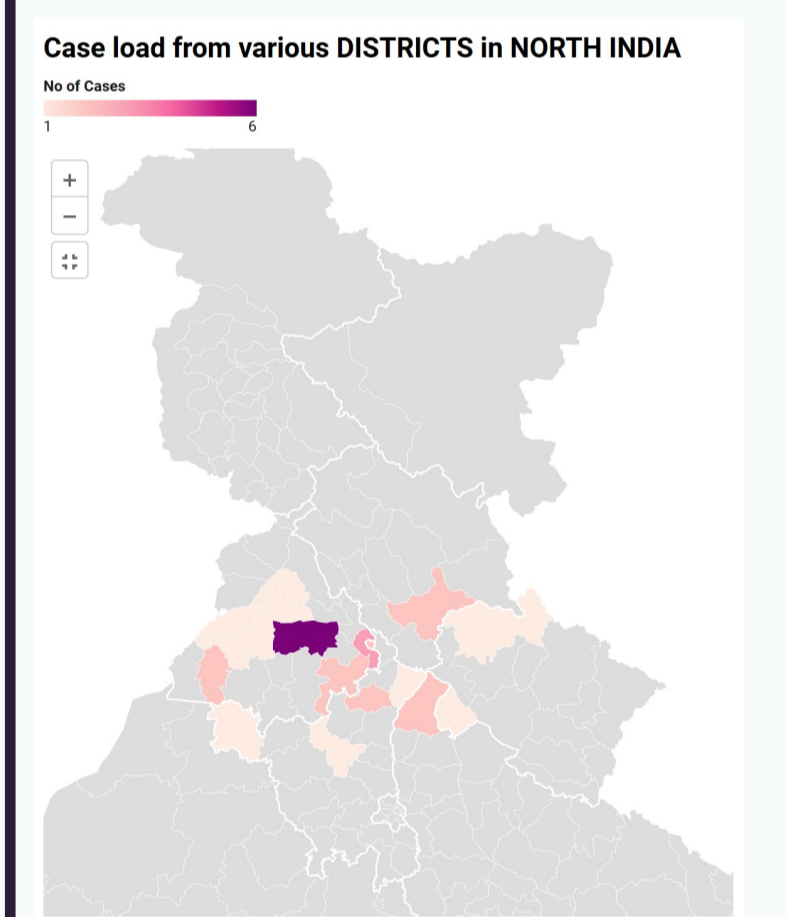
### METHODS

- Prospective observational study 36 patients enrolled over a period of 22-months
- Final 31 patients for analysis
- Detailed clinical history obtained
- Patients were managed as per Milwaukee protocol
- Contrast-Enhanced MRI Brain done for 21 patients. CSF, saliva, nape of neck skin biopsy samples were obtained for diagnosis.
- Autopsy was performed in 8 cases.

### RESULTS



States of patient enrollment



Case load from various DISTRICTS IN NORTH INDIA

Animal Exposure History (N = 31)	
Total exposed	30
Definite history of bite	28
No definite history of bite	3
Animal exposed to	
<b>JACKAL</b>	<b>1</b>
<b>DOG</b>	<b>29</b>
Total stray dogs	25
Adult Stray	21
Puppy stray	4
<b>Total pet dogs</b>	<b>4</b>
Adult pet	3
Puppy pet	1
Total adult dogs	24
Total puppy dogs	5

History & features of RABIDITY in animals (n=30)	
History of rabidity PRESENT	
History not available	13 (46%)
Features of rabidity in the biting animal (n = 15)	
Unprovoked bite	14 (93.3%)
Bitten multiple people	12 (80%)
Animal behaved abnormally or bizarrely	12 (80%)
Animal died itself within some days	10 (66.6%)
Animal had photophobia	2 (13.3%)
Animal had phonophobia	2 (13.3%)
Animal had multiple injuries on body	1 (6.7%)
Animal not taking anything orally	1 (6.7%)

History of post exposure prophylaxis			
ARV history			
	Received	Course completed	Course incomplete
<b>ARV</b>	15	2	13
RIG history			
	Received	Dose adequate	Dose inadequate
<b>RIG</b>	4	0	4
OVERALL (ARV + RIG)			
	Received	Adequate	Inadequate
<b>OVERALL ARV+RIG</b>	4	0	15

Prodromal symptoms (category wise) [n=27/31]	
Flu like symptoms (n = 20/27)	
Fever	18
Myalgia/ Generalised weakness	8
Backache/Headache	3
Psychiatric prodromal symptoms (n = 24/27)	
Anxiety	22
Agitation	11
Behavioural changes	11
Talkativeness	5
Delusion	7
Hallucination	1
Low mood	2
Respiratory prodromal symptoms (4/27)	
Rhinorrhoea	1
Cough	4
GI Prodromal symptoms (7/27)	
Pain abdomen	4
Nausea/ Vomiting	4
Diarrhoea	0
Constipation	2
Lower Urinary tract symptoms, LUTS (n=9/27)	
Burning micturition	8
Increased frequency of micturition	1

Incubation Period (IP)	
Overall IP (n = 31)	
Median (IQR) IP	29 (21 - 90)
Min IP	13 days
Max IP	30 years
Encephalitic rabies (n = 24)	34 (21 - 123) days
Paralytic rabies (n = 4)	24 (19 - 29) days
<b>p-value</b>	0.506

IP based on the site of bite (considering first bite if bites at multiple intervals) (considering most proximal bite if bites at multiple sites)	
Head, neck & face (HNF) (n = 4)	15 (14 - 16) days
Upper limb (n = 12)	22 (21 - 44) days
Lower Limb (n = 12)	84 (43 - 246.5) days
p-value of comparison b/w site of bite (p-value-Dunn test with post-hoc Sidac correction)	
Head-neck-face and UL	0.0831
Head-neck-face ace and LL	<b>0.0003</b>
UL and LL	<b>0.0325</b>
IP based on whether red-chili was applied on not	
Red-chili application (n = 8)	21.5 (16.5 - 31.5)
No red-chili application (n = 20)	52 (22 - 130)
<b>p-value</b>	<b>0.0478</b>

Laboratory Features				
CSF (n = 29)	Encephalitic rabies Median (IQR)	Paralytic rabies Median (IQR)	p-value	Overall Median (IQR)
WBC/mm <sup>3</sup>	20.00 (11.00 - 63.00)	136.00 (45.00 - 260.00)	0.072	28.00 (12.00-100.00)
DCN (number, %)	8.70 (5.20 - 37.00)	17.75 (13.40 - 24.00)	0.510	13.90 (5.40 - 30.00)
DCM (number, %)	82.00 (50.00 - 92.30)	82.25 (76.00 - 86.60)	0.917	82.00 (53.20 - 91.80)
Protein (mg/dL)	67.00 (58.00 79.30)	168.00 (125.00 228.50)	<b>0.006</b>	74.00 (58.20-120.00)
Glucose (mg/dL)	84.00 (69.00 97.00)	71.50 (55.50 - 129.00)	0.703	78.00 (68.00 - 97.00)

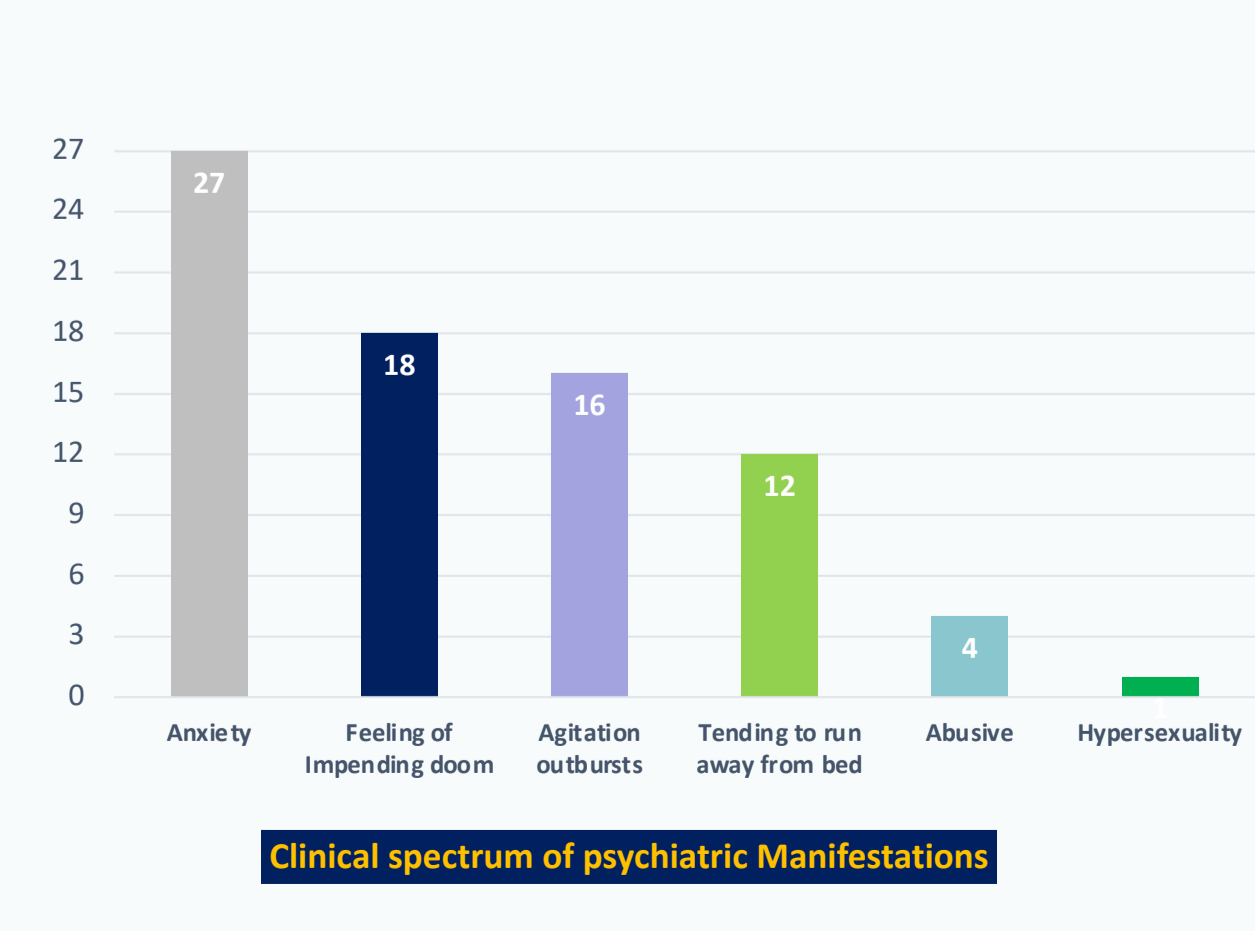
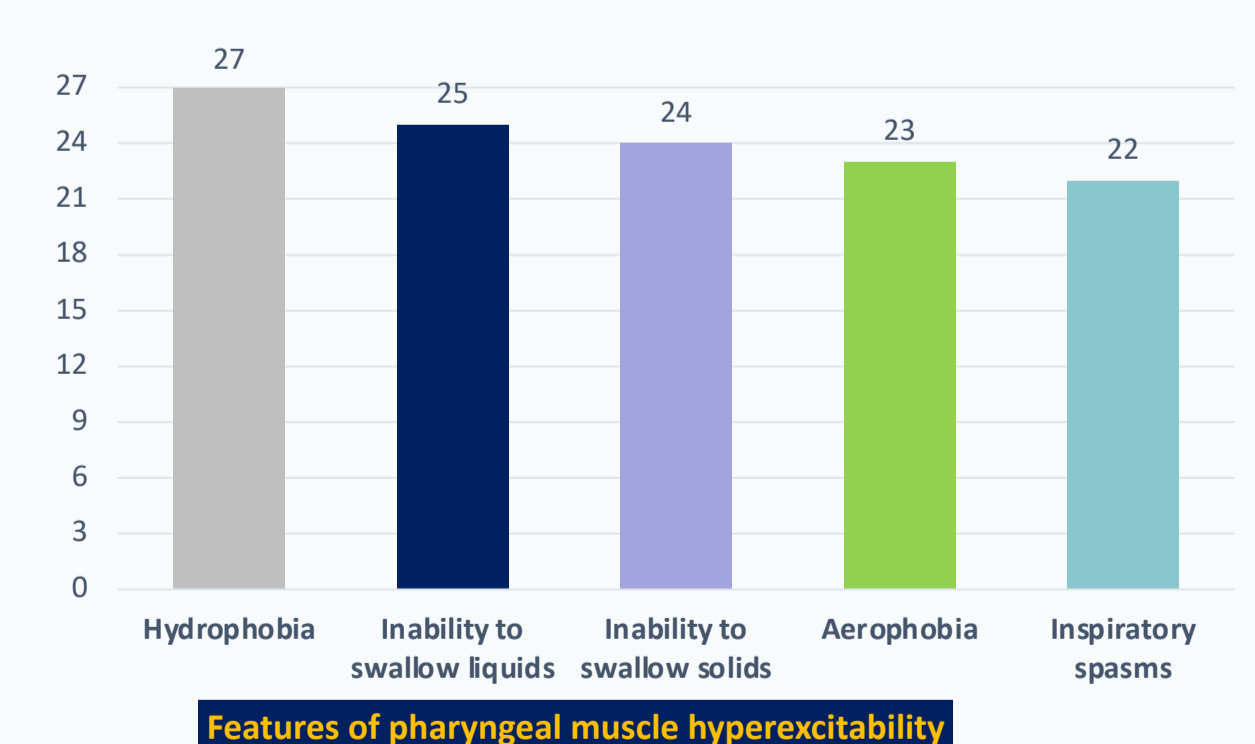
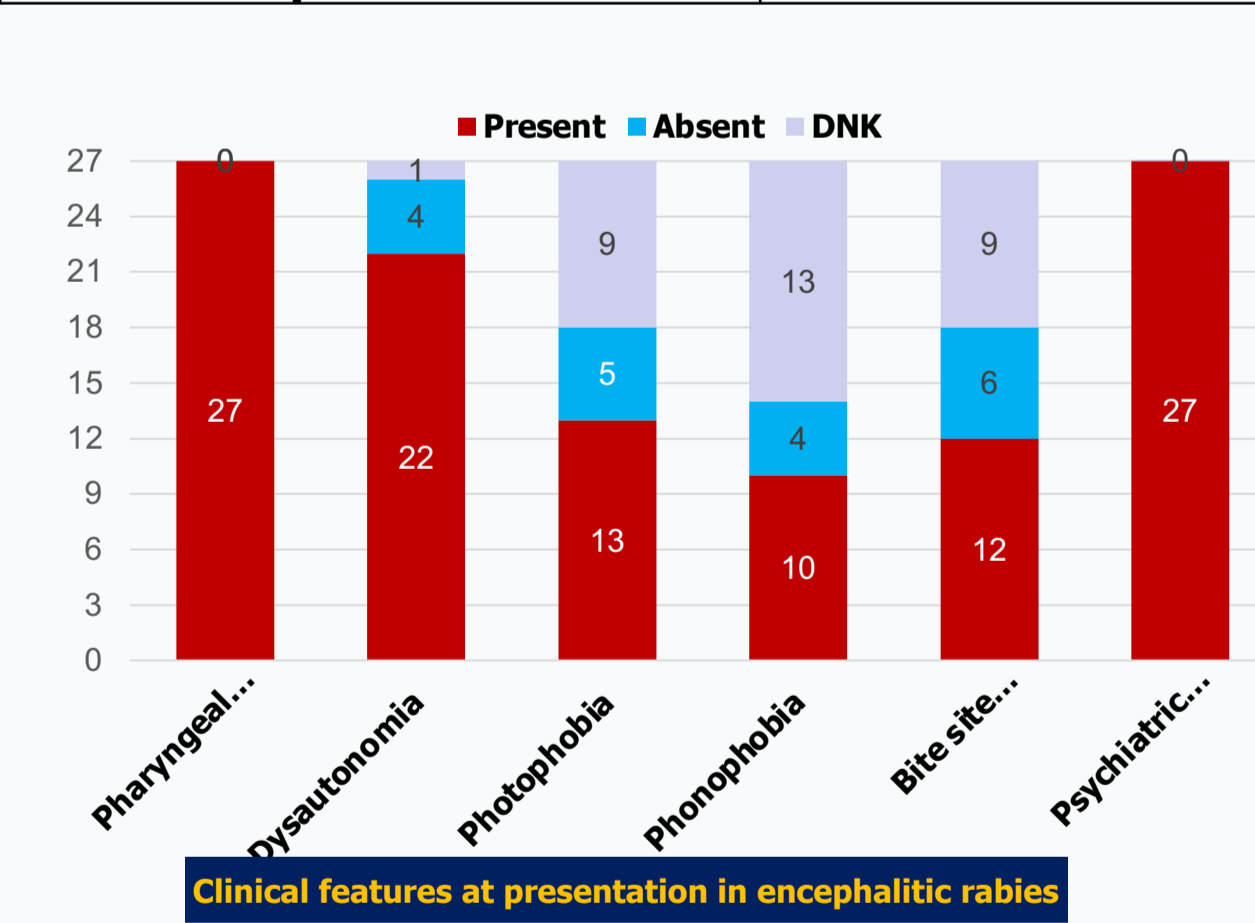
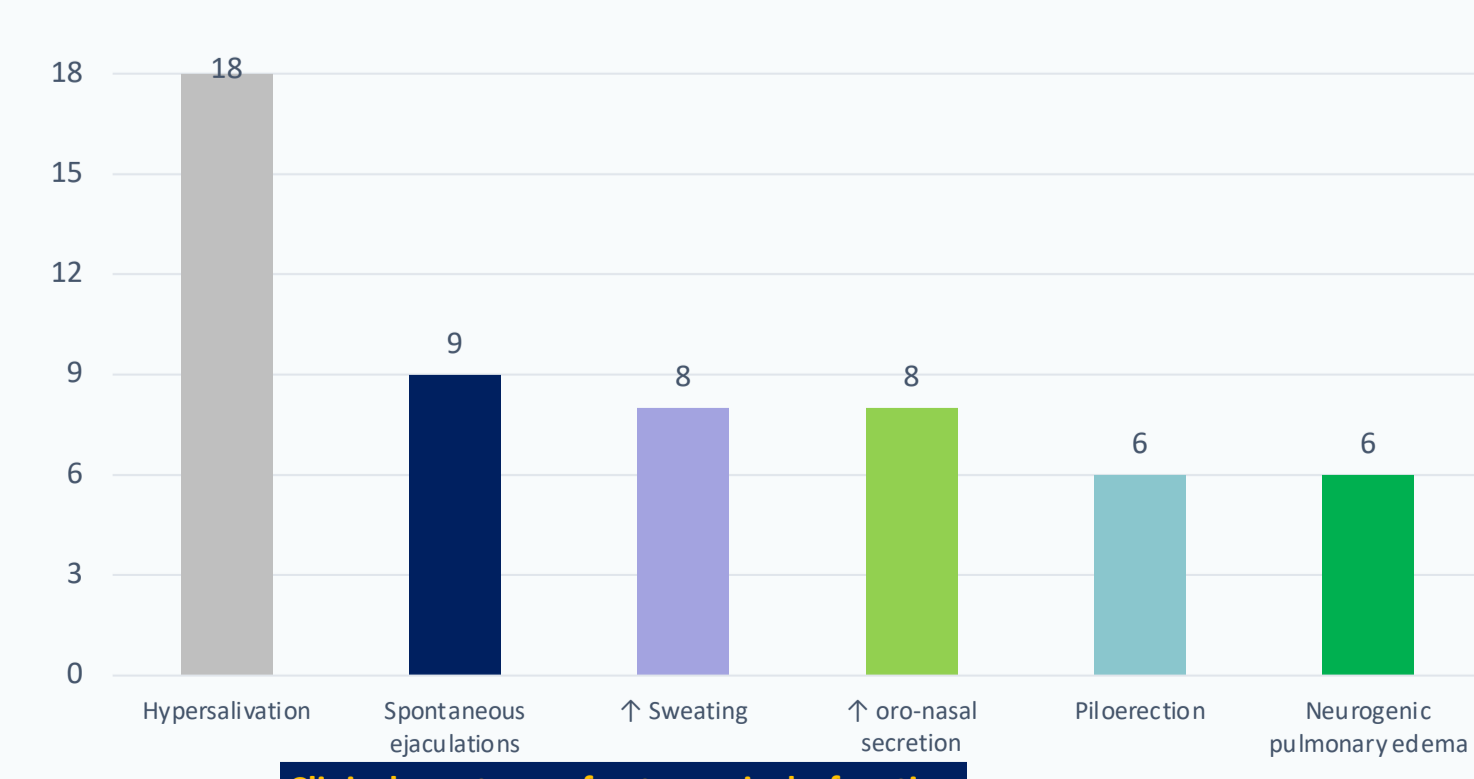
Test performed	Number of samples tested (n)	Number of Positives	Positivity (95% CI)
CSF RT-qPCR	23	1	4.3% (0.1 - 22%)
Saliva RT-qPCR	21	5	23.8% (8.2 - 47%)
Nape of neck skin Bx RT-qPCR	10	2	20% (25 - 55%)
Brain Bx RT-qPCR	7	7	100% (59 - 100%)
RT-qPCR OVERALL	61	15	24.5% (14.5-37.3%)
Nape of Neck skin Biopsy - HPE (Negri bodies)	15	0	0%
Nape of neck skin biopsy - IHC (anti-rabies)	15	6	40% (16-67%)

### Clinical Features

Clinical features at presentation	ENCEPHALITIC (n = 27)	PARALYTIC (n = 4)	TOTAL (n = 31)
<b>Pharyngeal muscle hyperactivity</b>	27 (100%)	1 (25%)	28 (90%)
<b>Hydrophobia</b>	27 (100%)	1 (25%)	28 (90%)
Inability to swallow liquids	25 (93%)	1 (25%)	26 (84%)
Inability to swallow solids	24 (89%)	1 (25%)	25 (80%)
<b>Aerophobia</b>	23 (85%)	0	23 (80%)
Inspiratory spasms	22 (81%)	0	22 (80%)
<b>Autonomic dysfunction</b>	18 (67%)	2 (50%)	19 (61%)
Hypersalivation	18 (67%)	1 (25%)	19 (61%)
<b>Spontaneous ejaculation</b>	9 (33%)	0	9 (29%)
Increased Sweating	8 (30%)	0	8 (26%)
Increased oro-nasal secretions	8 (30%)	1 (25%)	9 (29%)
<b>Piloerection</b>	6 (22%)	2 (50%)	8 (26%)
Neurogenic pulmonary edema	6 (22%)	0	6 (19%)
<b>Photophobia</b>	13 (48%)	0	13 (42%)
<b>Phonophobia</b>	10 (37%)	0	10 (32%)
<b>Bite site sensory-motor symptoms</b>	12 (44%)	1 (25%)	13 (41%)
Sensory symptoms			
Positive sensory symptoms (Paraesthesia)	11 (92%)	0	11 (35.5%)
Negative sensory symptoms (Numbness)	1 (3.2%)	0	1 (3.2%)
10 (32.2%)	0	10 (32.2%)	
Motor symptoms	6 (50%)	1 (25%)	7 (22.5%)
<b>Neuro-psychiatric manifestations</b>	27 (100%)	2 (50%)	29 (93.5%)
Anxiety	27 (100%)	1 (25%)	28 (90%)
Delusions	0	1 (25%)	1 (3.2%)
Hallucinations	1 (3.7%)	0	1 (3.2%)
Delirium/ AMS	6 (22.2%)	4 (100%)	10 (32.2%)
Increased/ irrelevant talkativeness	5 (18.5%)	0	5 (16%)
Personality or behavioural changes	11 (40.7%)	1 (25%)	12 (30%)
Low mood	2 (7.4%)	1 (25%)	3 (10%)
Feeling of impending doom	18 (67%)	0	18 (58%)
Agitation outbursts	16 (59%)	0	16 (52%)
Abusive	12 (44%)	0	12 (39%)
Tending to run away from bed	4 (15%)	0	4 (13%)
Hypersexuality	1 (4%)	0	1 (3.2%)

DEFINING FEATURE OF	CARDINAL SYMPTOM(S)	Furious Rabies (n=27)	Paralytic Rabies (n=4)
<b>ENCEPHALITIC (FURIOUS) RABIES</b>	Hydrophobia	27	1
	Aerophobia	23	0
	Spontaneous ejaculation (males) or its equivalent in females	9	0
<b>COMMON in both</b>	New onset bite site related sensory or motor symptoms	12	1
<b>PARALYTIC (DUMB) RABIES</b>	Acute flaccid paralysis	0	4

Sign of autonomic dysfunction	Frequency (%) [n = 21]
Heart Rate fluctuation	19 (90%)
Blood Pressure fluctuation	19 (90%)
Temperature fluctuation	17 (81%)
Neurogenic pulmonary edema	6 (29%)



### Autopsy Findings (n=8)

