

**MIGRAINE AND NEUROLOGICAL
DISORDERS CORMORBIDITY
CONSEDERATION OF
SINUS HYPOXIC NITRIC OXIDE THEORY**

Dr. S. M. Rathnasiri Bandara
Teaching Hospital Kandy, Sri Lanka



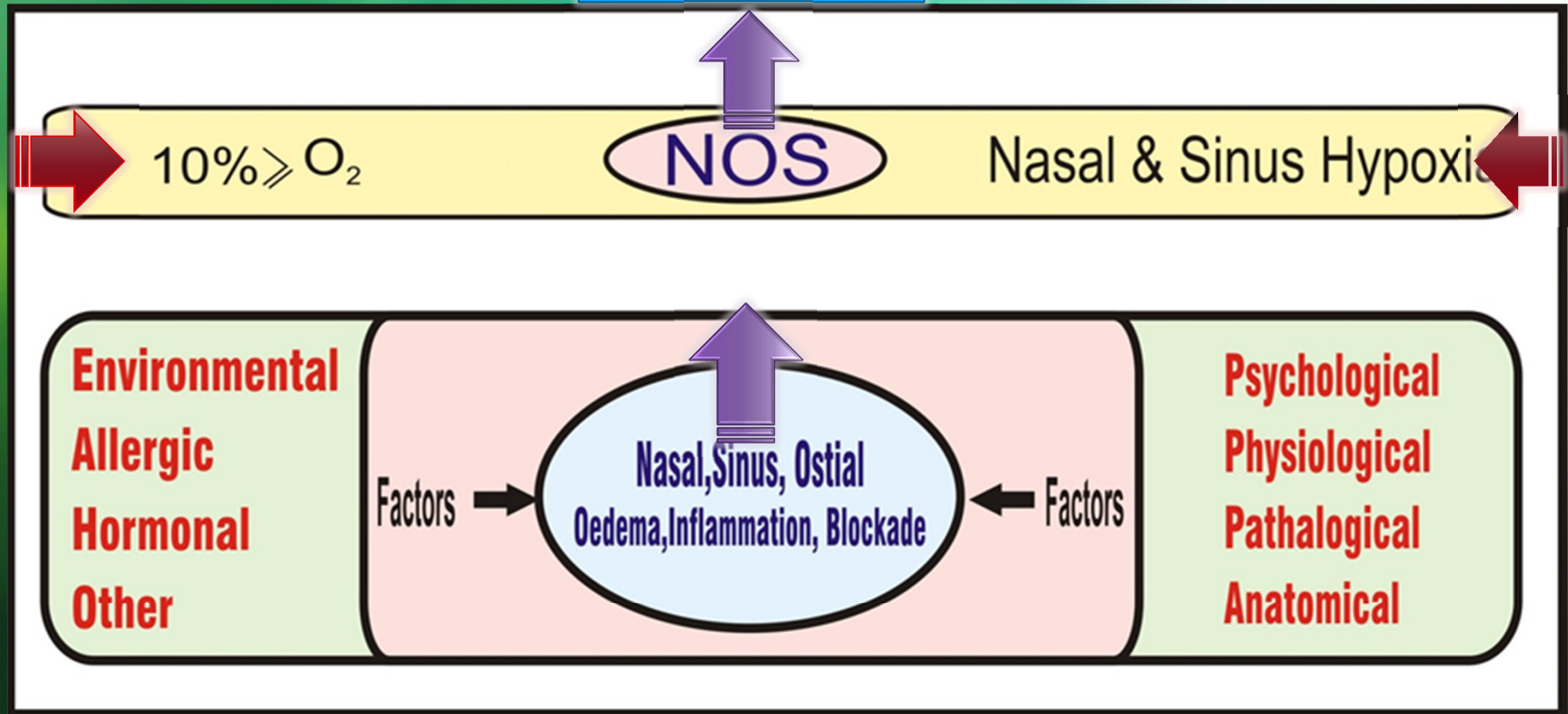
Sinus Hypoxic Nitric Oxide Theory (SHNOT)

- ◎ A large production of NO gas (s NO) takes place in the para nasal sinuses: synthesized by inducible NOS in the ciliated cells
- ◎ Hypoxia is a powerful inducer of paranasal sinus nitric oxide synthetas (NOS)
- ◎ Factors - physiological and pathological conditions, anatomical anomalies, variation of the diameter of sinus ostia, duration of hypoxia and level of oxygen concentration.



SHNOT

s NO



Sinus Hypoxic Nitric Oxide Theory (SHNOT)

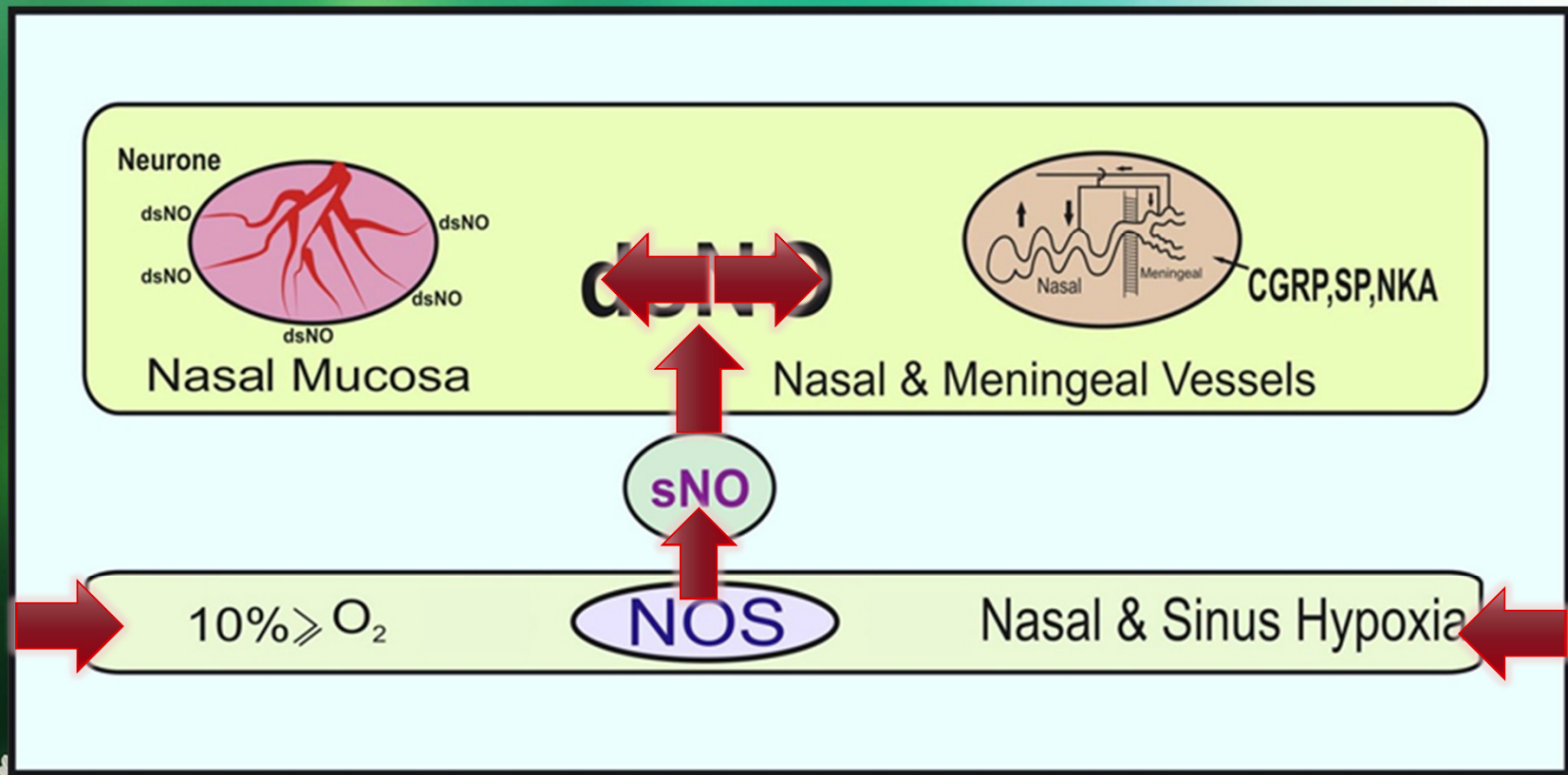
1. S.M.Rathnasiri Bandara .Par anasal Sinus Nitric Oxide and Migraine Medical hypotheses,80(2013),329-340)
2. S.M.Rathnasiri Bandara. Migraine and psychiatric disorder explained by Sinus hypoxic nitric oxide theory . Medical hypotheses,82(2014),257-265
3. S.M.Rathnasiri Bandara et al. Migraine and neurological disorders disorder .Consideration of Sinus hypoxic nitric oxide theory for migraine .J Neurol Disord 2014, 2:5

Based on A NEW HYPOTHESIS



The New Hypothesis For Migraine

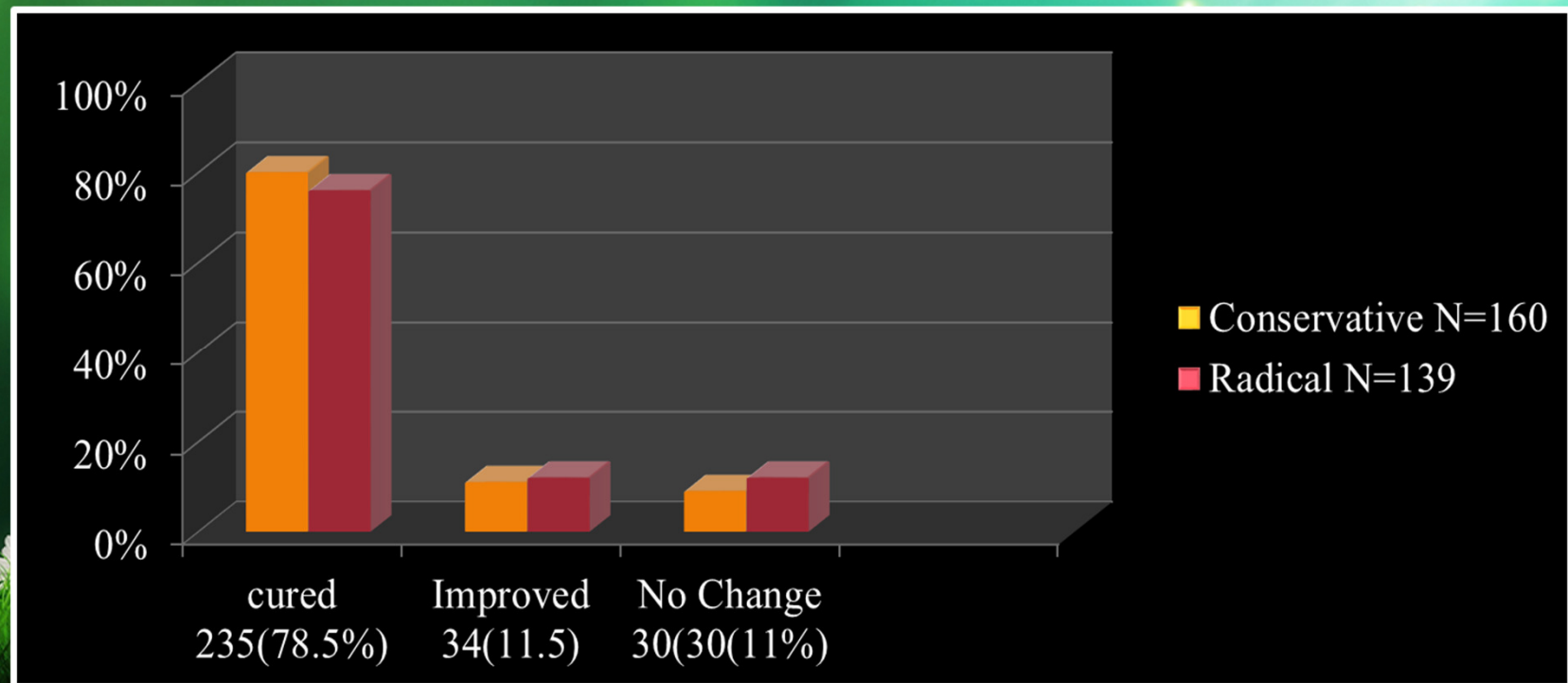
The diffused sinus NO (ds NO) in the para nasal sinus and nasal mucosa is a main causative and an initiative molecule for migraine headache.



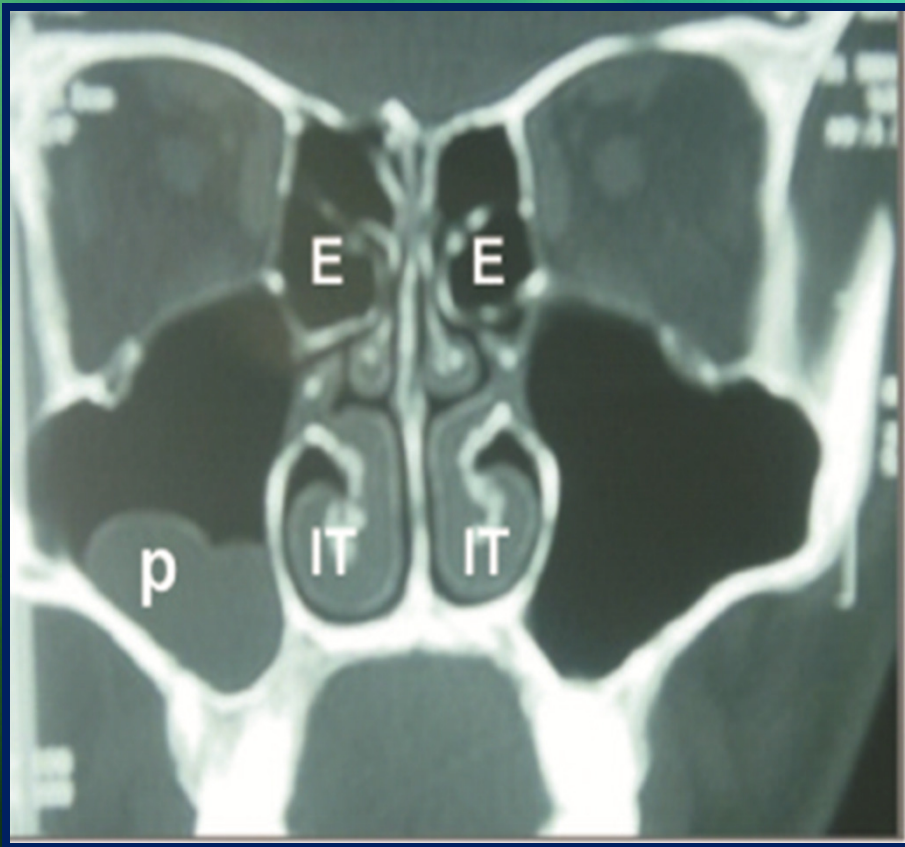
Studies Supporting - SHNOT & Hypothesis for Migraine

Migraine treated by standardized surgical intervention that relieves the sinuses hypoxia.

78% of patients with migraine were free of symptoms post operatively
Bonaccorsi P Amsterdam, vol. 63; 1988. p. 19-22- Radical treatment
Norvak VJ. Rejeka Med 1994;1(3):19-22. - Conservative treatment



Anomalies and other causes for PNS Hypoxia



1. concha bullae
2. paradoxical turbinate
3. large inferior & middle turbinate
4. nasal septal deviation
5. stenosis of nasal cavity
6. deviation of the uncinated process tip
7. nasal spur
8. uncinate bulla
9. Haller cells
10. ethmoidial bullae

Studies Supporting Cont..

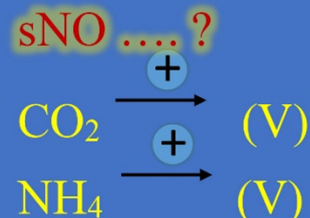
Physiological and biological roles of NO

- A main neurotransmitter
- A potent vasodilator
- High ability to diffuse
- Release other Neurotransmitters -CGRP, Glutamate, n NO,

Migraine - about 88% of the sinus headache patients.

EVIDENCES

INTRANASAL



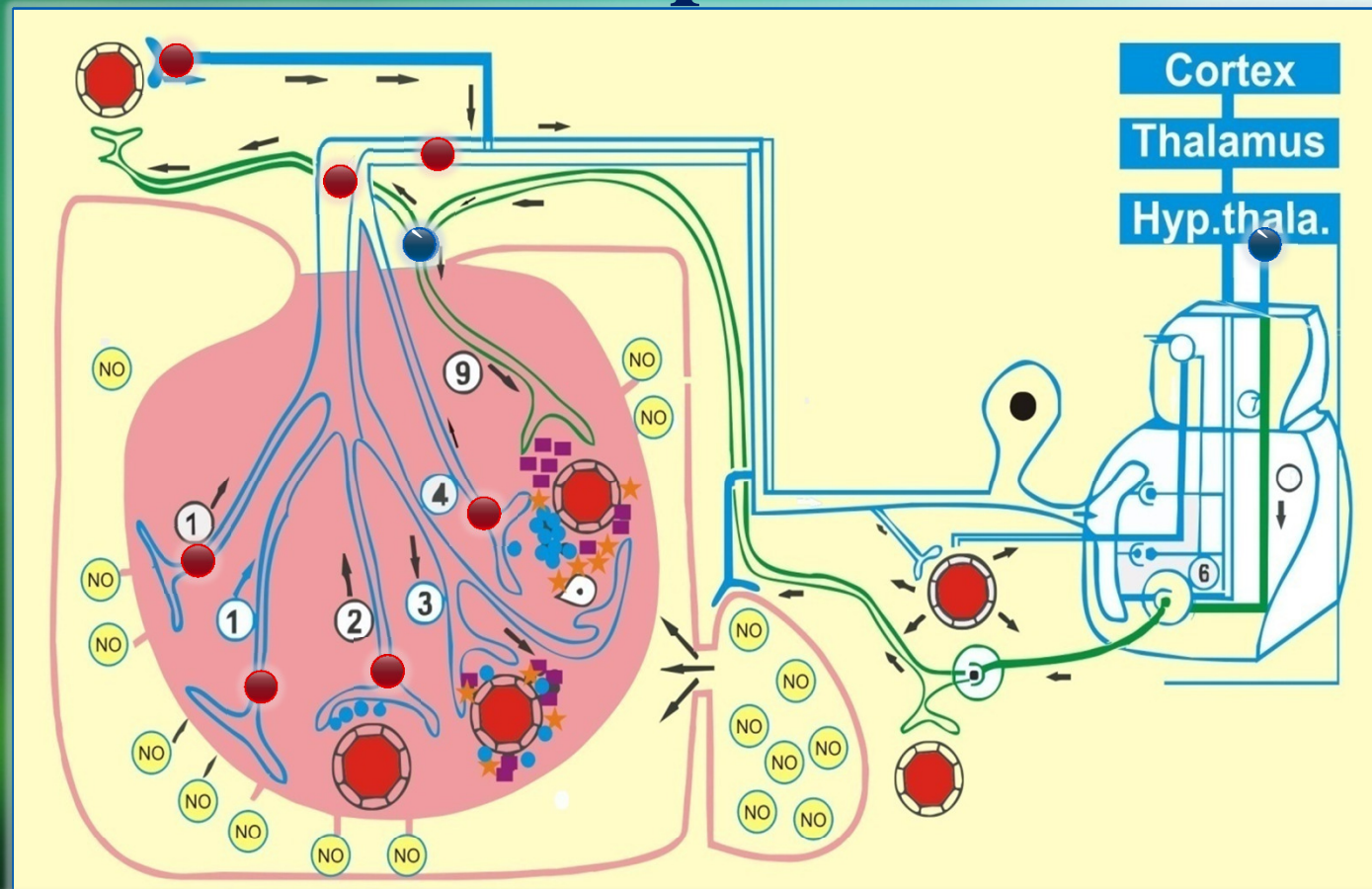
INTRANASAL

B₁₂ – NO Scavenger
Lignocaine / cocaine



Pulmonary oxygen uptake enhanced by sNO

Conversion of ds NO into neuronal impulse



1. Activates free nerve endings and peri vascular nerves.
2. The nerves activated by vaso active substances.
3. Extra cranial vaso dilation and activation of the nociceptors .
4. The neurogenic inflammation

Migraine co-morbid with Neurological Disorders and Evidences

- Stroke
 - Epilepsy
 - Motion sickness
 - Vertigo
 - Balance disorder
 - BIH
 - Narcolepsy
- Epidemiological evidence
 - Pharmacological evidence
 - Genetic
 - Acquired mal-function of brain tissues
 - Objective investigative evidence
 - Neuro pathophysiological



Migraine Neuro pathophysiology

Cortical spreading depression (CSD)

1. Neuronal mediated vasodilatation
2. ↑ Inflammatory process
3. ↑ Vasoactive substances
4. Altered vascular permeability

1. ↓ BF in major ICV & ↓ in Small ICV
2. Cytotoxic cell damage & gliosis
3. Activation of matrix metallo proteinases
4. Thrombosis in the blood vessel

- Dysfunction neurotransmitter projections
1. (DA, 5HT, GLU, DA)
 2. Ab. sleep pattern, CS, stress to CNS

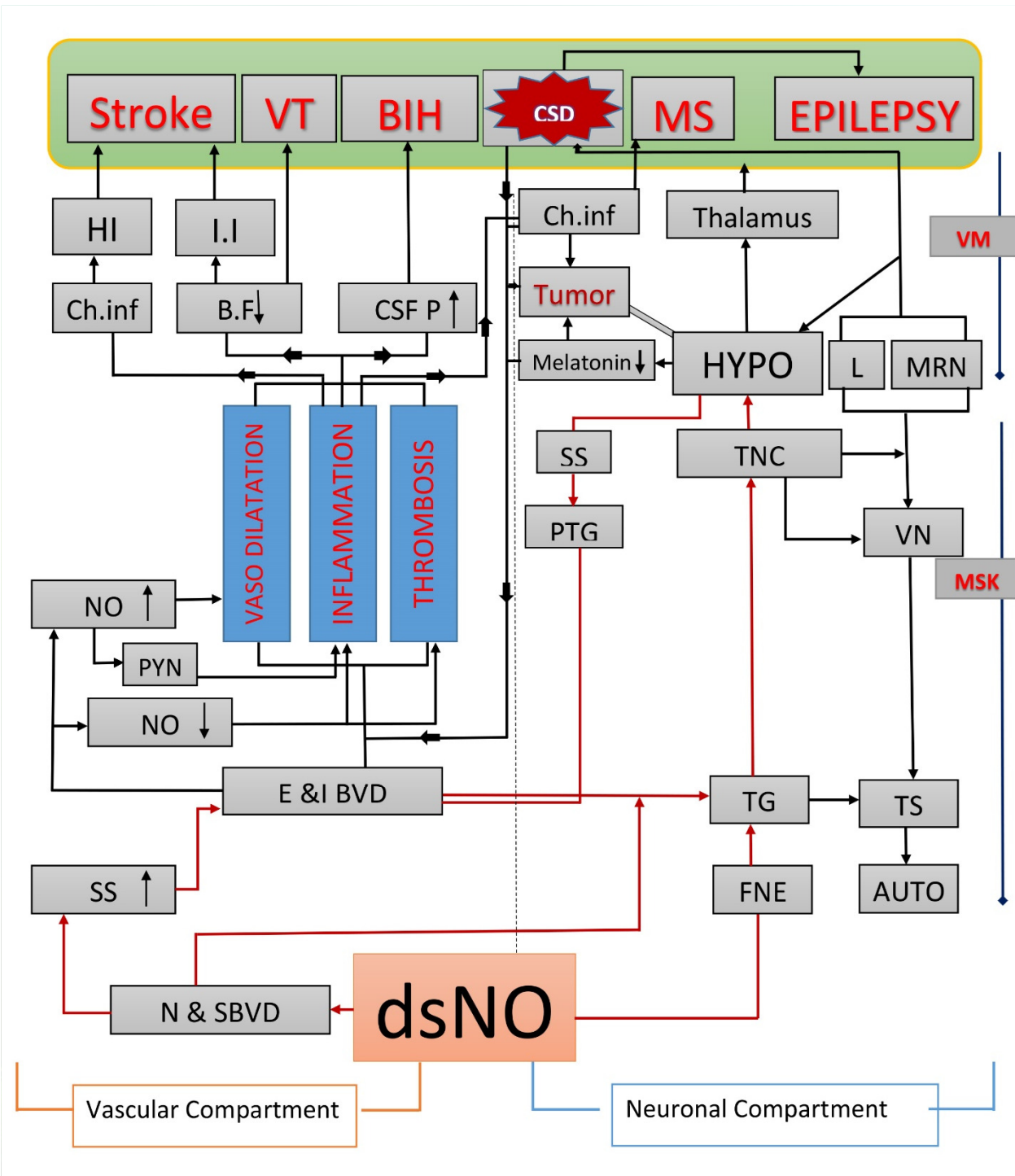
**Neuro
Pathophysiology**

- Shear Stress in the BV -
↑ e NO and ↓ e NO
- Melatonin ↓

Hyper excitability

1. CSD
2. ↑ responsiveness CC

- Excesses ↑ (n NO)
- Migraine aura ↓ Mg⁺, Glu ↑, 5HT ↓

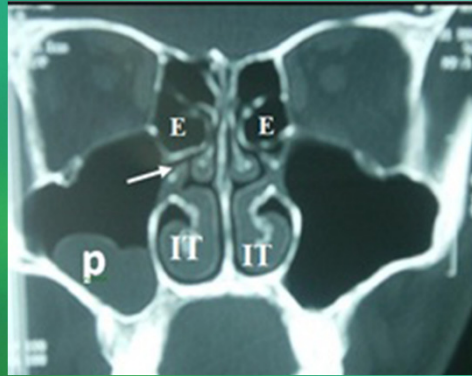


Migraine and Neurological disorders explained by hypothesis and SHNOT

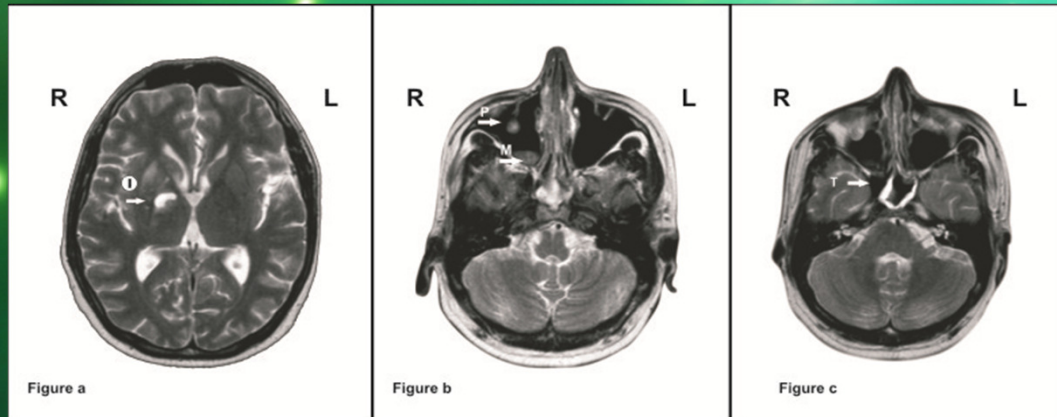


Objective investigative evidences

1. Migraine and BAD



2. Migraine and CVA



Conclusion

- ◎ The excess or unnecessary impulse generation and neurovascular activation primarily due to SHNOT in sinorhinological areas contribute for migraine and other neurological disorders
- ◎ Rhino logical medical or surgical approach may be benefit of stop or prevent neuropathology affecting to cause or aggravate common neurological disorders

Thank you

