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# Inflammatory markers associated with seizures

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# Systemic effects of seizures

- In generalized convulsive status epilepticus: well described
  - Rise in body temperature
  - Hypertension
  - Cardiac arrhythmia
  - Leukocytosis
  - Acidosis
  - Hyperglycaemia
- *In other type of seizures? still unclear*

(Simon, *Epilepsia* 1985; Walton, *Epilepsia* 1993)

# Inflammation-like responses induced by seizures

- Elevated body temperature (BT)
- White Blood Cell (WBC) count
- C-reactive protein (CRP) levels

*frequently occur associated with acute seizure.*

*This may lead clinicians to assume that there is a concurrent infection.*

# Results of this study

- Frequency of concurrent infection among all ER visits with seizure: 19.3%
- Incidence and positive predictive value (PPV) of the inflammation-like response for infection:

Inflammation-like response	Incidence	PPV
Any type of inflammation-like response	56.3%	34.7%
Elevated BT	18.6%	61.5%
Leukocytosis	37.7%	32.7%
Elevated CRP	17.4%	42.9%
Elevated BT & leukocytosis	9.42%	69.2%
Leukocytosis & elevated CRP	8.26%	60.0%
Elevated BT & CRP	6.61%	62.5%
Elevated BT, leukocytosis & elevated CRP	3.31%	75.0%

# Differences in inflammation-like response between patients with or without infection

- Increased BT occurred only in cases of generalized tonic-clonic seizures, whereas leukocytosis and elevated CRP were reported in patients with any type of seizure.
- Increased BT returned to normal within 8 hours in cases without infection.
- Increases in BT and CRP were milder ( $<39^{\circ}\text{C}$  and  $<6\text{ mg/dl}$ , respectively) in patients without infection compared to those with infection, whereas there was no difference in leukocytosis, with regard to the presence or absence of infection.

		With infection		Without infection		
	Overall	Number	Range	Number	Range	
Elevated BT	26	16	38.1~40	10	37.8~38.7	p=0.002
Leukocytosis	52	17	10.8~19.4	35	10.8~32.8	NS
Elevated CRP	21	9	1.16~38.7	12	1.02~5.72	NS

# Conclusion

- *Inflammation-like response is common among acute seizures.*
- *Treatment or work-up for infection can be placed on hold in the absence of any clinical signs of infection.*
- Concurrent infection should be considered in cases of
  - Elevated BT
    - in the absence of generalized tonic-clonic seizures
    - $> 39^{\circ}\text{C}$
    - $> 8$  hours after recovery of consciousness
  - C-reactive protein  $> 6 \text{ mg/dl}$