

# What Should Be Considered to Cause the Early Post-craniotomy Seizure: Antibiotics (Cefazolin) Irrigation

Young Seob Chung MD PhD; Ji Hwan Jang; Kyung Sun Song; Jae Seung Bang MD; Chang Wan Oh MD, PhD; O-Ki Kwon

MD



## Introduction

Post-craniotomy seizure (PCS) is reported only rarely. However, our department noted a 433% increase in PCS for a year beginning

September 2010, especially after cerebrovascular surgery. Our goal was to identify the cause of our unusual outbreak of PCS.

## Methods

For almost one year after September 2010, cases of PCS increased significantly in our department. We analyzed 973 patients who had

received a major craniotomy between January 2009 and November 2011. We included seizures that occurred only in the first 24 postoperative

hours, which we defined as early PCS. After verifying the presence of PCS, we analyzed multiple seizure-provoking factors and their relation to the

duration and character of seizure activity.

## Results

Overall PCS incidence was 7.2% (70/973). Cefazolin (2 g/L saline) was the antibiotic drug used for intraoperative irrigation in 88.4% of the operations, and no PCS occurred without intraoperative cefazolin irrigation. When analyzed by operation type, clipping surgery for unruptured aneurysms was the most frequently associated with PCS (80%). Using logistic regression, only 2 g cefazolin intraoperative irrigation ( $p=0.024$ ) and unruptured aneurysm clipping surgery ( $p<0.001$ ) were associated with early PCS. The seizure rate of unruptured aneurysm clipping surgery using 2 g cefazolin intraoperative irrigation was 32.9%.

## Conclusions

Intraoperative cefazolin irrigation must be avoided in patients undergoing craniotomy, especially for clipping of unruptured aneurysms, because of the increased risk of early PCS.

## Learning Objectives

To know the causes associated with post-craniotomy seizure, which occurs within the first 24 hours.

## References

1. Akula KK, Dhir A, Kulkarni SK : Pro-convulsant effect of cefazolin sodium against pentylenetetrazol- or picrotoxin-induced convulsions in mice. *Indian J Exp Biol* 45 : 720-725, 2007
2. Arkaravichien W, Tamungklang J, Arkaravichien T : Cefazolin induced seizures in hemodialysis patients. *J Med Assoc Thai* 89 : 1981-1983, 2006
3. Boswell MV, Wolfe JR : Intrathecal cefazolin-induced seizures following attempted discography. *Pain Physician* 7 : 103-106, 2004
4. Kamei C, Sunami A, Tasaka K : Epileptogenic activity of cephalosporins in rats and their structure-activity relationship. *Epilepsia* 24 : 431-439, 1983
5. Lee Y, Pyun SB, Park EK, Youn SW : Persistent dysarthria after cefazolin-induced status epilepticus. *Brain Inj* 23 : 846-851, 2009
6. Manzella JP, Paul RL, Butler IL : CNS toxicity associated with intraventricular injection of cefazolin. Report of three cases. *J Neurosurg* 68 : 970-971, 1988
7. Martin ES 3rd, Bagwell JT, Bush-Veith S, Renger H Jr : Seizures after intraventricular cefazolin administration. *Clin Pharm* 11 : 104-105, 1992

8. Michenfelder JD, Cucchiara RF, Sundt TM Jr : Influence of intraoperative antibiotic choice on the incidence of early postcraniotomy seizures. *J Neurosurg* 72 : 703-705, 1990
9. Nisticò G, De Sarro GB, Naccari F, Musolino R, Rotiroti D, Gallitto G, et al. : Cefazolin : a valid model of experimental epilepsy? *Monogr Neural Sci* 5 : 14-19, 1980
10. Park KS, Lee YW : The effect of topical application of antibiotics on the cerebral cortex. *J Korean Neurosurg Soc* 10 : 39-52, 1981
11. Yost RL, Lee JD, O'Leary JP : Convulsions associated with sodium cefazolin : a case report. *Am Surg* 43 : 417-420, 1977
12. Yu QH, Kitazumi K, Kamei C, Tasaka K : Epileptogenic activity induced by intravenous injection of certain cephalosporins in rats. *J Pharmacobiodyn* 7 : 586-592, 1984