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Report of "Research Award of Oral Sciences"

Major: Oral Sciences

Grade: 2nd

Department: Stomatognathic Function
and Occlusal Reconstruction

Name: Arief Waskitho

Title: Bilateral effects of unilateral administration of botulinum toxin A in chemotherapy induced neuropathy

1. Aim of research and results obtained (Approximately 400 words):

Cancer caused morbidity and mortality worldwide, GLOBOCAN 2018 estimates the possibility of 18.1 million new cases of cancer, also 9.6 million deaths from cancer in 2018. Although the cancer survivors may survive from cancer, many of them have poor outcomes due to several syndromes that reduce the quality of life because of cancer treatment.

Recently, cancer chemotherapy drugs have a great outcome in arresting the progression of cancer. Unfortunately, these chemotherapy agents also affect normal cells and structures of the body, causing various damages and sometimes even devastating side effects (e.g., pain and peripheral neuropathy).

Cisplatin is clinically proven to combat different types of cancers. Although received better prognosis and become less life-threatening, adverse side effect, such as neuropathy remains. Peripheral neurotoxicity is the dose-limiting problem associated with cisplatin. A number of pathophysiological mechanisms have been proposed to explain this phenomenon, with some data suggesting that cisplatin kills malignant cells and peripheral neurons using a similar mechanism of apoptosis.

Botulinum toxin is a protein group produced by anaerobic bacteria called Clostridium Botulinum, which has approximately 40 subtypes. Botulinum toxin injection has proven anti-nociceptive effects for neuropathic pain in some disorders. Botulinum toxin (BoNT) inhibits the release of pain mediators in the

peripheral nerve terminal, DRG, and spinal cord neuron, and reducing the inflammatory response and preventing the development of peripheral and central sensitization. Botulinum toxin can control neuropathic pain by blocking the Na channel. Some of the botulinum toxins appear to retrograde transport along the axons. Cleavage of SNAP-25 in the dorsal horn of spinal cord, and central nuclei after a small amount of botulinum toxin administration to the peripheral side, thereby proof the retrograde axonal transport of botulinum toxin.

The aim of our study is to examine the effect of cisplatin administration to induce neuropathy in the rat model. Furthermore, the examination of the effect of peripherally injected botulinum toxin (BoNT A) to CIPN in rat model and effect of one side injection of BoNT A will affect one side only or both sides. Also finds the mechanisms of CIPN and BoNT A effect in infraorbital nerve trigeminal ganglia, spinal cord or brain (SNAP-25 etc.). Our result shows that unilateral BoNT A administration in the whisker pad area attenuated chemotherapy-induced mechanical allodynia bilaterally. These results suggest that BoNT A has the potential central effect, proven by the bilateral effect on one-side peripheral injection.

2. Self-evaluation of research achievement:

As 2nd year Ph.D student, I will continue my research and study about basic research. I will try my best to finish my thesis and showing good result.

3. Meeting presentation:

* Title, conference, venue, date, co-author, presentation (oral/ poster).

Bilateral effects of unilateral administration of botulinum toxin A in chemotherapy induced neuropathy, Dentisphere, Shangri-La Hotel Surabaya, Indonesia, November 29-30, 2019, co-author: Yumiko Yamamoto, Tsuyoshi Morita, Huijiao Yan, Resmi Raju, Masamitsu Oshima, Junhel Dalanon, Otto Baba, Yoshizo Matsuka, oral presentation

4. Journal publication:

* Title, journal, volume, number, paragraph, date, co-author.

(Underline the speaker.)