THE EFFECT OF CURCUMIN AND QUERCETIN ON ALLODYNA RESPONSE IN OXALIPLATIN-INDUCED PERIPHERAL NEUROPATHY

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ABSTRACT

Background: Chemotherapy-induced Peripheral Neuropathy (CIPN) caused by the toxicity of chemotherapy agents mainly affects the peripheral nervous system. Platinum-class chemotherapy drugs, such as Oxaliplatin and Cisplatin, have higher prevalence in occurring this pain. Symptoms that arise as a result of these side effects are often called allodynia, such as dysesthesia and paraesthesia, of the hands, feet, and perioral area. Since ancient time, compounds like curcumin and quercetin may prevent this negative effect, we focused on the potential effect of curcumin and quercetin in reduce or cure the peripheral neuropathy. Through mechanical allodynia parameters with von Frey test, we can measure the withdrawal threshold of the mice.

Methods: Mice were injected intraperitoneally with oxaliplatin 3 mg/kg four times a week, then followed by giving curcumin at a dose of 30, 60, 120 mg/kg or quercetin at a dose of 50, 250, 500 mg/kg from day 7 to 14. Behavioural test with the von Frey filament were carried out on day 0, 1, 3, 5, 7, 10, 14, 18, and 22.

Results: The results showed that oxaliplatin could induce mechanical allodynia by decreasing 50% withdrawal threshold of the mice. Curcumin increased the 50% withdrawal threshold with a dose of 30 mg/kg significantly at day 22, 60 mg/kg significantly from day 18, and 120 mg/kg significantly from day 14. Quercetin with a dose of 250 mg/kg and 500 mg/kg increased the 50% withdrawal threshold significantly from day 14 and 50 mg/kg significantly from day 18.

Conclusion: Injection of curcumin and quercetin intraperitoneally can significantly reduce the allodynia pain responses and increase the withdrawal threshold in animal which previously induced with oxaliplatin. However, further research on the mechanism of increasing the withdrawal threshold is needed.

Keywords: CIPN, Oxaliplatin, Curcumin, Quercetin.

von Frey

METHODS

Animals: Male Balb/C mice (6-7 weeks old, 24-32 g)

Drugs: Oxaliplatin Medac 5mg/mL, Curcumin (TCI, Japan), and Quercetin hydrate (TCI, Japan). Oxaliplatin were dissolved in 5% dextrose solution. Curcumin and Quercetin hydrate were dissolved in 5% TWEEN 80 solution immediately before use. All drugs were injected intraperitoneally.

Behaviour Test: a series von Frey Filaments with logarithmically incremental stiffness (force ranging from 0.02 to 2 g) at day 1, 3, 5, 7, 10, 14, 18, and 22.

TREATMENT TIMELINE

1 3 5 17 10 14 18 22 (days)

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GROUP 1: 5% Dextrose, 5% TWEEN 80

GROUP 2: Oxal 3 mg/kg, 5% TWEEN 80

GROUP 3: Oxal 3 mg/kg, Curc 30 or Quer 50 mg/kg

GROUP 4: Oxal 3 mg/kg, Curc 60 or Quer 250 mg/kg

GROUP 5: Oxal 3 mg/kg, Curc 120 or Quer 500 mg/kg

* Oxal = Oxaliplatin, Curc = Curcumin, Quer = Quercetin

RESULTS

The results of measuring the pain response of peripheral neuropathy in experimental mouse were described by the mean value of the withdrawal response. The 50% withdrawal threshold value is obtained using up and down methods. Oxaliplatin administration began to show a significant 50% reduction in withdrawal threshold in all groups against the normal control group from day 5. Whereas since the 22th day, there was an increase in the withdrawal threshold again in the group with curcumin and quercetin treatment, resulting in a threshold value that was not significant to the normal control group, but the difference was still not significant for the oxaliplatin group.

CONCLUSION

Based on the results of this study, it can be concluded that giving curcumin and quercetin in the condition of oxaliplatin-induced peripheral neuropathy pain can improve and even cure mechanical alldynia from day 10 to 22. But still, the curcumin and quercetin mechanism in increasing the threshold is still very limited, so further research is needed on this matter.

ACKNOWLEDGEMENT

This work was supported by research grants from PDUPT 2020 provided by the Indonesian Ministry of Research and Technology.

REFERENCES
