SHORT COMMUNICATION

Changes in the Inflammatory Markers with Supplementation of *Channa striatus* Extract in Post Lower Segment Caesarean Section

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ABSTRACT

Objective: ***Channa striatus*** **or Haruan was found to have beneficial effect for wound healing and anti-inflammatory due to its' amino acids and fatty acids content. The objective of this study was to determine the effect of *C.striatus* supplementation on inflammatory markers which are high sensitive C-reactive protein (hsCRP), total white cell counts (TWCC) and platelet counts in post Lower Segment Caesarean Section (LSCS) patients.**

Design: **This was a randomized; double blinded, placebo-controlled study among post LSCS women conducted in Hospital Universiti Sains Malaysia from March 2010 to December 2012.**

Material and Methods: **A Total of 33 patients from *C.striatus* and 27 patients from placebo group were included in this study. Participants in the treatment group consumed 500 mg of freeze dried *C.striatus* extract daily while the participants in placebo group consumed 500 mg of placebo daily for 3 days. Venous bloods for hsCRP, TWCC and platelet counts were taken from each participant postoperatively at day 1 and day 3.**

Results: **Within *C. striatus* group, there were significant reduction in hsCRP ($P < 0.001$) and TWCC ($P < 0.001$), with significant increase in platelet count ($P < 0.001$) from day 1 to day 3. Similar pattern of changes were observed within control group. Between group comparison at day 3 post operatively indicates no significant difference in hsCRP ($P = 0.275$), TWCC ($P = 0.983$) and platelet count ($P = 0.206$) between the two groups.**

Conclusion: **In conclusion, there is no significant difference in the inflammatory markers during wound healing in post LSCS women.**

KEY WORDS

Channa striatus**, wound healing, inflammatory markers, high sensitivity C-reactive protein**

INTRODUCTION

Wound healing is a dynamic process of three overlapping phases which is inflammation, tissue formation and tissue remodeling. The processes involve complex interactions of extracellular matrix molecules, soluble mediators and various immune cells[1]. Inflammation is the first stage of wound repair and it occurs immediately after tissue damage. Hemostasis is achieved by the formation of a platelet plug, followed by a fibrin matrix. After activation of the complement and the degranulation of platelets, neutrophils are recruited to the wound. Monocytes which then differentiate into macrophages will appear in the wound after 2 to 3 days. The second stage of wound repair which is new tissue formation occurs 2 to 10 days after injury. In this stage, there is cellular proliferation and migration of different cell types. Angiogenesis then follows which will later replace the fibrin matrix with granulation tissue that makes a new substrate for keratinocyte migration at later stages of the wound healing. The last stage is remodeling that begins 2 to 3 weeks after injury and can lasts for a year or more. In this stage, all the processes wind down and cease in which all the cells (endothelial cells, macrophages and my fibroblasts) undergo apoptosis or exit from the wound[2]

Received on April 25, 2016 and accepted on October 26, 2016

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nificant increase in the count post-operatively. All the inflammatory markers showed significant changes as it represent normal wound healing process. However, when compared between the two groups, the results did not showed significant changes.

The result of this study did not show that *C.striatus* has effect on hsCRP level at day 3 post-operatively. It is in contrast to the study done by Theilla *et al.* (2012) that showed administration of a feeding formula enriched with fish oil on pressure ulcers in critically ill patients was associated with decreased in blood concentration of C-reactive protein. In that study, the contents of the fish oil used were Eicosapentaenoic acid (EPA), Docosahexaenoic acid (DHA) and protein[22]. Supposed this study could demonstrate better reduction in the level of hsCRP in *C.striatus* group as it has high level of DHA and protein that can fastens the rate of inflammation during inflammatory phase of wound healing. *C.striatus* group should also demonstrate the changes in TWCC and platelet counts compare to the placebo group. The insignificant results were probably due the nature of the product that was used in this study itself. *C.striatus* extract that was used in this study is in capsules form, not in oily formulation as the above study. The mechanism of action during inflammation may differ between these two forms. May be, if *C.striatus* extract was in oily formulation, it could demonstrate the similar findings.

The result of current study is also not parallel to the study done by *Abedi et al.* that support the previous studies on animal models that showed *C.striatus* has an anti-inflammatory effect during healing. *Abedi et al.* suggested that the anti-inflammatory effect of *C.striatus* based cream is contributed to its bioactive substances which is linoleic acid, stearic acid and oleic acid which was evidence by inhibition of myeloperoxidase (MPO) activity during inflammation in croton oil induced mice ear edema model. MPO is a pro-inflammatory enzyme that released by activated neutrophils and macrophages (marker of polymorphonuclears accumulation)[23]. The similar result goes for platelet counts in which it could not determine the changes in *C.striatus* group. It was in contrast to study done by Abdul Manan 2007. In his study, it was proved that *C.striatus* extract can induce platelet aggregation during wound healing not only in normal people but also in diabetic patient[24].

The limitation in this study was non-compliance of the patients that need to exclude them from this study. There were other possibilities that could contribute to these findings. The participants of this study were post LSCS women with the mean age of 28 years old which is young mother. The characteristic of the healing process may differ from older mother. Perhaps, if this study involves older aged group of mother, the result could be different. The dosage of the *C.striatus* extract also might contribute to the insignificant result of this study. The patients were given 500 mg of *C.striatus* tablet extract. This dosage might not be sufficient for better wound healing process. The dosage probably should be increased in future study.

Besides that, in the ward, the patients received non-steroidal anti-inflammatory drugs (NSAIDs) which were suppository Diclofenac sodium 100 mg twice a day until the third day post operatively. This is standard post-operative pain relief. NSAIDs inhibit cyclooxygenases that involved in prostaglandin production during wound healing, leading to a marked decrease in prostaglandin synthesis that eventually inhibit inflammation which is part of the wound healing process[25]. Perhaps the inflammatory markers will show significant changes if NSAIDs were not given to the patients. In this study, we are not able to compare our results with any studies with similar findings. This might be due to publication bias as many studies with non-statistically significant results go unpublished.

SUMMARY

Based on this current study, supplementation with *C.striatus* have equivalent effect on hsCRP, TWCC and platelet counts during wound healing compared to placebo. Further studies are required to demonstrate the changes in these parameters during wound healing.

ACKNOWLEDGEMENT

This study was fully supported by Research University (RU) Grant (1001/PPSP/812081), Universiti Sains Malaysia, Malaysia

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