

RINGKASAN

**Pengaruh Sodium Diklofenak Terhadap Pembentukan Kalus Pada Penyembuhan
Fraktur Kruris Tikus Putih Jantan
(*Rattus norvegicus*)
Herry Wibowo**

Kasus fraktur yang disertai rasa nyeri, panas dan bengkak seringkali diatasi dengan obat golongan NSAID yang salah satunya adalah Sodium Diklofenak. Terdapat fenomena perlambatan penyembuhan fraktur yang disertai pemberian Sodium Diklofenak melalui penghambatan siklooksigenase yang mengakibatkan penghambatan produksi prostaglandin. Untuk mengetahui efek pemberian Sodium Diklofenak terhadap pembentukan kalus (diameter dan kekuatan kalus) pada penyembuhan fraktur maka dilakukan suatu penelitian eksperimental laboratoris. Rancangan penelitian yang digunakan adalah *post test only control group design* dengan tikus coba yaitu *Rattus norvegicus* galur Wistar jantan usia 2 bulan dan berat 200 gram yang sehat fisik.

Penelitian dilakukan di Laboratorium Biokimia, Laboratorium Anatomi dan Histologi dan Laboratorium Dasar FK UNAIR menggunakan 36 tikus jantan galur Wistar, usia 2 bulan, berat 200 gram dan sehat fisik. Sampel dibagi dalam 2 kelompok : kelompok perlakuan yaitu sampel yang diberikan preparat Sodium Diklofenak 1,8 mg/200g per hari per oral selama 4 minggu dan kelompok kontrol yaitu sampel yang diberikan larutan CMC Na 0,5% 9 mg/ kg BB per hari per oral selama 4 minggu. Setelah mencapai waktu 4 minggu (28 hari) semua sampel di-*euthanasia* dengan anestesi dalam (menggunakan ether) lalu diambil tulang beserta kalusnya untuk diukur diameter kalus

dengan *Dissecting Microscope* dan kekuatan kalus dengan alat Autograf.

Hasil yang diperoleh adalah tampak kekuatan kalus yaitu ($57,476 \pm 0,661$) N pada kelompok perlakuan dan kekuatan kalus yaitu ($76,595 \pm 0,375$) N pada kelompok kontrol.

Sedangkan pada diameter kalus pada kelompok perlakuan ($4,524 \pm 0,512$) mm dan diameter kalus pada kelompok kontrol ($7,381 \pm 0,590$) mm. Hasil ini menunjukkan perbedaan yang signifikan pada rerata kekuatan kalus antara kelompok perlakuan yang diberi sodium diklofenak 1,8 mg/200g dengan kelompok kontrol yang diberi larutan CMC Na 0,5% 9 mg/kg BB. Pada kelompok perlakuan rerata kekuatan kalus lebih rendah daripada pada kelompok kontrol. Demikian pula pada diameter kalus tampak perbedaan yang signifikan antara kelompok perlakuan (yang diberi Sodium Diklofenak) dengan kelompok kontrol (yang diberi larutan CMC Na 0,5%). Pada kelompok perlakuan rata-rata diameter kalus lebih rendah daripada pada kelompok kontrol.

Kesimpulan dari penelitian ini adalah pemberian Sodium Diklofenak 9 mg / kg BB pada tikus jantan galur Wistar (*Rattus norvegicus*) menurunkan rata-rata kekuatan dan diameter kalus yang berakibat terhadap penurunan pembentukan kalus. Penurunan pembentukan kalus ini akan memperlambat penyembuhan fraktur.

SUMMARY

The Influence of Sodium Diclofenac To The Callus Formation in The Cruris Fracture Healing of White Mice Male (*Rattus norvegicus*)

Herry Wibowo

Fracture case which always followed by pain, febris and swelling oftenly has been treated using NSAID, which one of them is Sodium Diclofenac. There is a phenomena of delayed fracture healing in the group with Sodium Diklofenac. This mechanism is through the inhibition of cyclooxygenase by Sodium Diclofenac which yield the inhibition of prostaglandine production. To know the effect of Sodium Diklofenac to the callus formation (callus diameter and callus strength) in the fracture healing then the experimental laboratory research has been carried out. Type of research design that has been used was post test only kontrol group design with the sample which is *Rattus norvegicus* Wistar Strain male 2 month old 200 gram in weight and in good physical condition.

This research has been carried out in Biochemistry Laboratory, Anatomy and Histology Laboratory, and Basic Laboratory Medical Faculty Airlangga University using 36 male rats Wistar Strain, 2 month old, 200 gram in weight, and in good physical condition. Sample has been divided into 2 group : treatment group that has been given Sodium Diklofenac 1,8 mg/ 200g Weight per day per oral for 4 weeks and control group that has been given CMC Na 0,5% solution 9 mg/ kg Weight per day per oral for 4 weeks.

After 4 weeks (28 days) all sample has been euthanasied with deep anaesthesia (using ether) then has been taken their bone and also the callus to be examine the callus diameter using Dissecting Microscope and callus strength using Autograph.

Result which were obtained showed callus strength ($57,476 \pm 0,661$) N in treatment group and callus strength ($76,595 \pm 0,375$) N in control group. Mean while callus diameter of treatment group were ($4,524 \pm 0,512$) mm and the callus diameter of control group ($7,381 \pm 0,590$) mm. It seem the significant difference of the callus strength between treatment group (which has been given sodium diklofenac) and control group (which has been given CMC Na 0,5% solution). In the treatment group the mean of callus strength was lower than in the control group. It seem also a significant difference of callus diameter between treatment group (which has been given Sodium Diklofenac) and control group (which has been given CMC Na 0,5% solution). In the treatment group the mean of callus diameter is lower than in the control group.

The conclusion of this research was that the Sodium Diklofenak 9 mg / kg Weight conferral to the male rat Wistar Strain (*Rattus norvegicus*) decreased the mean of callus strength and callus diameter that has been impact to the descent of callus formation. The descent of callus formation could retard the fracture healing.

ABSTRACT

The Influence of Sodium Diclofenac To The Callus Formation in The Cruris Fracture Healing of White Rat Male (*Rattus novergicus*)

Herry Wibowo

Sodium Diklofenac was concerned as drug of choice for the pain, febris and swelling. But unfortunately, the benefit of Sodium Diclofenac to cope the pain has been followed by the phenomena of delayed fracture healing. Many author mentioned the effect of Sodium Diclofenac on fracture healing, but the effect of Sodium Diclofenac on quality of callus (callus strength and callus diameter) remain not clear. This experimental study was performed to know the mechanism of Sodium Diclofenac's effect on callus.

Forty two *Rattus novergicus* rats were assigned into two groups. First 18 rats as treatment group has been given Sodium Diklofenak 9 mg / kg weight per day per oral for four weeks, and last 18 rats as control group has been given CMC Na 0,5% solution 9 mg / kg Weight per day per oral for four weeks. All groups were measured callus strength using Autograph and callus diameter using Dissecting Microscope and the result were compared.

It seemed significant difference of callus strength mean and callus diameter mean. The callus strength and callus diameter mean in the treatment group is lower than callus strength and callus diameter mean in the control group.

This study indicate that Sodium Diclofenac could retard fracture healing by inhibiting cyclooxygenase that would impact in inhibition of prostaglandine production as the important mediator for fracture healing.

Keywords : Sodium Diclofenac, Callus Strength, Callus Diameter, Fracture Healing

