

## RINGKASAN

**Pengaruh Pemberian Asam Hialuronat Terhadap Peningkatan Jumlah Kondrosit dan Ketebalan Tulang Rawan Sendi Pada Tikus Putih**

Gute Rizal Kriswono

Asam hialuronat adalah merupakan salah satu modalitas terapi yang dapat digunakan untuk merangsang penyembuhan luka, termasuk cedera tulang rawan sendi. Banyak penelitian yang membuktikan tentang pengaruh asam hialuronat pada penyembuhan cedera tulang rawan sendi, akan tetapi prosesnya tetap belum dapat dijelaskan. Sedangkan tulang rawan sendiri adalah merupakan jaringan yang unik, karena ia merupakan jaringan yang tidak memiliki basal membran, avaskuler, hanya bergantung pada difusi untuk nutrisinya.

Penelitian ini ditujukan untuk membuktikan proses penyembuhan cedera tulang rawan sendi oleh asam hialuronat pada tikus putih. Ada dua Indikator penyembuhan cedera tulang rawan sendi yang dipakai, yaitu : jumlah kondrosit dan ketebalan tulang rawan sendi.

Dua puluh *Rattus norvegicus* terlebih dahulu dilakukan irisan horizontal pada permukaan medial tulang rawan sendi lutut kanan. Setelah itu dibiarkan beraktifitas seperti biasa. Dua puluh tikus tersebut kemudian dibagi menjadi dua kelompok, sehingga tiap kelompok terdiri dari sepuluh tikus. Kelompok 1 adalah kelompok kontrol yang tidak mendapat perlakuan terapi asam hialuronat. Kelompok 2 adalah kelompok perlakuan yang mendapat terapi asam hialuronat satu seri (lima kali) yang berselang tiap 7 hari. Semua tikus kemudian diperiksa secara histologis untuk mengetahui jumlah kondrosit dan ketebalan tulang rawan sendi.

Dari data hasil penelitian menunjukkan bahwa terdapat peningkatan jumlah kondrosit dan ketebalan tulang rawan sendi pada kelompok 1 dan 2. Dan hasil statistika menunjukkan terdapat perbedaan yang bermakna antara kedua kelompok tersebut, yakni pada kelompok 1 dibanding dengan kelompok 2 ( $p < 0.05$ ), artinya pada kelompok 2 terdapat peningkatan jumlah kondrosit dan ketebalan tulang rawan yang lebih besar bila dibandingkan dengan kelompok 1, serta terdapat korelasi yang bermakna (*pearson correlation*  $> 0.5$ ) antara jumlah kondrosit dan ketebalan tulang rawan sendi pada kelompok 2 dibanding dibandingkan kelompok 1.

Dengan demikian dapat disimpulkan bahwa asam hialuronat dapat merangsang penyembuhan cedera tulang rawan sendi melalui peningkatan jumlah kondrosit dan ketebalan tulang rawan sendi. Pada akhirnya diharapkan asam hialuronat dapat merangsang penyembuhan cedera tulang rawan sendi pada penderita osteoarthritis.

## SUMMARY

### **The Effect of Hyaluronic Acid in the Increasing Amount of Chondrocyte and The Thickness Of Cartilage on the Rat's Knee Joint**

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Hyaluronic acid was believed as one of the modality to promote wound healing, including cartilage healing. Many author described the effect of hyaluronic acid on cartilage healing, but the process remain not clear. Meanwhile, cartilage is a unique tissue, because it has no basement membrane, avascular and depend on diffusion for its nutrition.

This experimental study was performed to show the healing process of cartilage injury by hyaluronic acid. There were two indicators for cartilage healing : the amount of chondrocytes it self and the thickness of cartilage.

Twenty *Rattus norvegicus* which have been undergone horizontal incision on the medial surface of hyaline cartilage of the knee, and they were actived in the normal limit. After that they were assigned into two groups. First ten rats as control group were not given hyaluronic acid, second ten rats were performed injection of hyaluronic acid of one series (given every 7 days). All groups were compared each other, by quantified the amount of chondrocytes it self and the thickness of cartilage by histopathological investigation.

There were increases amount of chondrocytes it self and thickness of cartilage in 2 groups. There were strong increasing between those two variables in 2<sup>nd</sup> groups comparing 1<sup>st</sup> groups ( $p < 0.05$ ). And there were strong correlation also between amount of chondrocytes and thickness of cartilage in 2<sup>nd</sup> group comparing 1<sup>st</sup> group ( $p < 0.05$ ).

This study indicate that hyaluronic acid can promote healing of cartilage injury by increasing amount of chondrocytes and thickness of cartilage. These findings also suggest that hyaluronic acid may be promote cartilage healing for patients with osteoarthritis.

## ABSTRACT

### **The Effect of Hyaluronic Acid in the Increasing Amount of Chondrocyte and The Thickness Of Cartilage on the Rat's Knee Joint**

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Hyaluronic acid was believed as one of the modality to promote wound healing, including cartilage healing. Many author described the effect of hyaluronic acid on cartilage healing, but the process remain not clear. This experimental study was performed to show the healing process of cartilage injury by hyaluronic acid in the rat's knee joint which undergone horizontal incision on the medial surface of hyaline cartilage of the knee.

Twenty *Rattus norvegicus* rat which have been undergone horizontal incision on the medial surface of hyaline cartilage of the knee, and they were actived in the normal limit assigned into two groups. First ten rats as control group were not given hyaluronic acid, second ten rats were performed injection of hyaluronic acid of one series (given every 7 days). All groups were compared each other, by quantified the amount of chondrocytes it self and the thickness of cartilage by histopathological investigation.

Significant amount of chondrocytes it self and thickness of cartilage were demonstrated in the performed groups comparing control group. There were strong increasing between those two variables in 2<sup>nd</sup> groups comparing 1<sup>st</sup> groups ( $p < 0.05$ ). And there were strong correlation also between amount of chondrocytes and thickness of cartilage in 2<sup>nd</sup> group comparing 1<sup>st</sup> group ( $p < 0.05$ ).

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**Keywords :** Hyaluronic acid, Cartilage healing, Cartilage Injury