Pengaruh Komposisi Monetite terhadap Daya Hambat Antibakteri Pelet Gipsum-Monetite Pembawa Gentamisin pada Bakteri Staphylococcus aureus = Effect of Monetite Composition on Antibacterial Inhibition of Gypsum-Monetite Pellet Carrying Gentamicin with Staphylococcus aureus Bacteria

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Abstrak

Latar Belakang: Osteomielitis merupakan proses inflamasi yang disebabkan oleh organisme piogenik, salah satunya bakteri. Bakteri yang paling umum ditemukan sebagai penyebab osteomielitis adalah bakteri Staphylococcus aureus. Tatalaksana osteomielitis dilakukan dengan penggabungan antara tindakan bedah dan penggunaan antibiotik. Saat ini, mulai dikembangkan penggunaan antibiotik secara lokal karena adanya keterbatasan apabila diberikan secara sistemik. Bone graft digunakan sebagai material pembawa antibiotik dan menjadi alternatif dari penggunaan PMMA (Polymethylmethacrylate). Pembuatan biphasic kalsium sulfat dan kalsium fosfat bertujuan untuk mengatasi kekurangan masing-masing fasa. Tujuan: Mengetahui daya hambat antibakteri material gipsum-monetite pembawa gentamisin terhadap bakteri Staphylococcus aureus (ATCC 25923). Metode: Kemampuan daya hambat antibakteri diuji menggunakan metode Kirby-Bauer yaitu dengan menghitung zona inhibisi yang terbentuk di sekitar pelet. Terdapat 4 kelompok komposisi pelet biphasic gipsum-monetite yang digunakan, yaitu 100:0, 90:10, 80:20, dan 60:40. Pelet direndam dalam larutan gentamisin dan dilakukan pengujian pada media agar Mueller-Hinton. Zona inhibisi diukur setelah waktu inkubasi selama 24 dan 48 jam, serta penurunan zona antara kedua waktu tersebut. Selanjutnya, hasil tersebut akan diuji menggunakan uji statistik One-Way ANOVA dan T-Test Dependen. Hasil: Terbentuk zona inhibisi di sekitar pelet biphasic gipsum-monetite untuk seluruh kelompok. Berdasarkan hasil uji One Way ANOVA didapatkan adanya perbedaan yang tidak bermakna antar setiap kelompok komposisi terhadap zona inhibisi yang terbentuk setelah inkubasi 24 dan 48 jam. Sedangkan, berdasarkan hasil uji T-Test Dependen didapatkan adanya perbedaan yang bermakna antara zona inhibisi 24 dan 48 jam pada setiap kelompok. Kesimpulan: Pelet biphasic gipsum-monetite dapat digunakan sebagai material pembawa antibiotik dan tidak terdapat pengaruh antara komposisi gipsum dan monetite terhadap daya hambat antibakteri. Zona inhibisi yang terbentuk mengalami penurunan seiring bertambahnya waktu inkubasi

.....Background: Osteomyelitis is an inflammatory process caused by pyogenic organism, such as bacteria. The most common bacteria found as a cause of osteomyelitis is Staphylococcus aureus. The management of osteomyelitis is carried out by combining surgery and the use of antibiotics. Antibiotic is currently being developed for localised uses due to limitations when administered systemically. Bone graft is used as a carrier for antibiotics and as an alternative to PMMA (Polymethylmethacrylate). Preparation of biphasic calcium sulfate and calcium phosphate is used to overcome the deficiency of each phase. Objectives: Determine the antibacterial inhibition of gentamicin-carrying gypsum-monetite material against Staphylococcus aureus (ATCC 25923). Methods: The capability of antibacterial inhibition was tested using the Kirby-Bauer method by calculating the inhibition zones formed around the pellets. There were 4 groups of biphasic gypsum-monetite pellet used, 100:0, 90:10, 80:20 and 60:40 respectively. The pellets were

soaked in gentamicin solution and tested on Mueller-Hinton agar media. The zone of inhibition was measured after 24 and 48 hours of incubation, including the decrease in the zone. Furthermore, these results will be tested using One-Way ANOVA statistical tests and Dependent T-Test. Results: Zone of inhibition were formed around the biphasic gypsum-monetite pellets for the entire group. Based on the results of the One Way ANOVA test, it was found that there was no significant difference between each composition group in the inhibition zone formed after 24 and 48 hours of incubation. Meanwhile, based on the results of the Dependent T-Test test, it was found that there was a significant difference between the 24 and 48 hour inhibition zones in each group. Conclusion: Biphasic gypsum-monetite pellets can be used as material for carrying antibiotics and there is no effect between the composition of gypsum and monetite on antibacterial inhibition. The inhibition zone formed decreased with increasing incubation time.