INTISARI

Kalsium hidroksida adalah *gold standard* perawatan *direct pulp capping*, tetapi memiliki kelemahan seperti menyebabkan *tunnel defect* dan resorbsi internal gigi sulung. Material komposit pada penelitian merupakan matriks polimer organik alami (gelatin dan kitosan) yang berikatan dengan mineral anorganik $Ca(OH)_2$ melalui TEOS sebagai *crosslinker.* Penelitian ini bertujuan untuk mengetahui perbedaan respon pulpa gigi setelah aplikasi Komposit Gelatin-Kitosan-TEOS-$Ca(OH)_2$ dan $Ca(OH)_2$ pada fase regenerasi.

Penelitian pada model *direct pulp capping* gigi molar 1 rahang atas tikus wistar. Preparasi dilakukan pada bagian oklusal gigi molar pertama rahang atas dengan *diamond round* bur no 10 sampai atap kamar pulpa terbuka. Bahan $Ca(OH)_2$ dan Komposit G/CH/TEOS/$Ca(OH)_2$ diaplikasikan menggunakan aplikator di atas pulpa yang terbuka pada gigi tikus wistar kemudian tumpatan sementara digunakan untuk menutup kavitas. Terminasi dilakukan pada 16 ekor tikus di hari ke-7 dan ke-14 kemudian dilakukan pembuatan blok parafin pada spesimen dan pewarnaan imunohistokimia untuk mengamati ekspresi TGF-β1 dan pewarnaan hematoksillin eosin untuk mengamati jumlah *odontoblast-like cell*. Pengamatan menggunakan mikroskop cahaya dengan bantuan OptiLab. Analisis statistik menggunakan uji *Kruskal-Wallis* dilanjutkan dengan uji *Mann-Whitney* pada ekspresi TGF-β1, dan *Two-Way ANOVA* dilanjutkan uji LSD untuk mengamati *odontoblast-like cell.* Penelitian ini menggunakan tingkat kepercayaan sebesar 95%.

Hasil penelitian menunjukkan terdapat perbedaan signifikan ekspresi TGF-β1 di hari ke-7 dan ke-14 di antara bahan kalsium hidroksida dengan G/CH/TEOS/$Ca(OH)_2$ ($p=0,01$), sedangkan untuk *odontoblast-like cell* terdapat perbedaan signifikan jumlah *odontoblast-like cell* yang dihasilkan di antara bahan $Ca(OH)_2$ dan G/CH/TEOS/$Ca(OH)_2$ di hari ke-7 dan hari ke-14 ($p=0,008$). G/CH/TEOS/$Ca(OH)_2$ memiliki potensi untuk menjadi bahan alternatif selain $Ca(OH)_2$ pada perawatan *direct pulp capping.*

Kata Kunci: $Ca(OH)_2$, Ekspresi TGF-β1, G/CH/TEOS/$Ca(OH)_2$, *Odontoblast-like cell*

ABSTRACT

Calcium hydroxide is the gold standard treatment for direct pulp capping, but it has weaknesses such as causing tunnel defects and internal resorption of primary teeth. The composite material in this study consists of an organic polymer matrix (gelatin and chitosan) bonded with inorganic smineral $Ca(OH)_2$ through TEOS as a crosslinker. This study aims to determine the difference in dental pulp response after the application of Gelatin-Chitosan-TEOS-$Ca(OH)_2$ composite and $Ca(OH)_2$ in the regeneration phase.

This study is used direct pulp capping model of the maxillary first molar in Wistar rats Preparations were made on the occlusal part of the upper first molar with a round diamond bur no.10 until the pulp chamber roof was exposed. $Ca(OH)_2$ and G/CH/TEOS/$Ca(OH)_2$ were applied using an applicator onto the exposed pulp of Wistar rat teeth, then temporary fillings were used to cover the cavities. Termination was carried out on 16 rats on the 7th and 14th days, then paraffin blocks were made from the specimens and immunohistochemical staining was performed to observe TGF-β1 expression, and hematoxylin-eosin staining was performed to observe the number of odontoblast-like cells. Observation was conducted using a light microscope with the assistance of OptiLab. Statistical analysis was performed using Kruskal-Wallis test followed by Mann-Whitney test for TGF-β1 expression, and Two-Way ANOVA followed by LSD test to observe odontoblast-like cells. This study used a confidence level of 95%.

The results showed a significant difference in TGF-β1 expression on days 7 and 14 between calcium hydroxide and G/CH/TEOS/$Ca(OH)_2$ materials ($p=0.01$), while for odontoblast-like cells, there was a significant difference in the number of odontoblast-like cells produced between $Ca(OH)_2$ and G/CH/TEOS/$Ca(OH)_2$ materials on days 7 and 14 ($p=0.008$). G/CH/TEOS/$Ca(OH)_2$ has the potential to be an alternative material for direct pulp capping treatment alongside $Ca(OH)_2$.

Keyword; $Ca(OH)_2$, TGF-β1 expression, G/CH/TEOS/$Ca(OH)_2$, Odontoblast-like cell