Efek tegdma terhadap protein total dan profil protein sel-sel pulpa gigi (in vitro)

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Abstrak

Latar belakang: Trietylene glycol dimethacrylate (TEGDMA) merupakan salah satu monomer yang terkandung dalam bahan tambal resin komposit. Jika polimerisasi tidak sempurna, TEGDMA dapat dengan mudah terlepas ke dalam rongga mulut beberapa menit hingga jam setelah penambalan, dan dapat berpenetrasi ke dalam pulpa. TEGDMA yang terlepas dilaporkan bersifat toksik terhadap jaringan dan sel tubuh.

Tujuan: menentukan efek TEGDMA terhadap protein total dan profil protein sel-sel pulpa gigi.

Metode: sel-sel pulpa didapat dari jaringan pulpa gigi sehat yang baru diekstraksi, kemudian dikultur pada medium kultur DMEM. Setelah sel kultur tampak confluent (±2 malam), dilakukan subkultur dari kultur primer tersebut, yang kemudian diinkubasi kembali pada suhu 37° C dan 5% CO2 selama 1 malam pada 24-well plate. Kemudian dilakukan pemaparan TEGDMA dengan konsentrasi 4mM, 8mM dan 12mM, selama 24 jam, sedangkan pada kelompok kontrol tidak dilakukan pemaparan TEGDMA. Penentuan konsentrasi protein total sel pulpa dilakukan dengan menggunakan Bradford protein assay. Profil protein sel pulpa diidentifikasi dengan teknik SDS-PAGE. Analisa berat molekul protein sampel dilakukan dengan menggunakan Gel Doc (Band Analysis Quick Guide).

Hasil: Rerata konsentrasi protein total sel (µg/ml ± SD) pada kelompok perlakuan dengan TEGDMA 4mM (22762,27±3385,87) dan 8mM (20268,44±1701,14) memiliki nilai dibawah kelompok kontrol (24253,77±3072,88). Sedangkan kelompok perlakuan dengan TEGDMA 12mM (23706,51±3214,52) memiliki nilai konsentrasi protein total sel di atas kelompok 4mM dan 8mM, namun masih tetap di bawah kelompok kontrol. Berdasarkan uji statistik dengan one way ANOVA, hanya kelompok TEGDMA 8mM yang memiliki perbedaan rerata konsentrasi protein total sel yang bermakna (p=0.037) terhadap kelompok kontrol. Selanjutnya dari gambaran profil protein yang terbentuk pada gel elektroforesis, tampak perubahan profil protein sel pada setiap kelompok setelah paparan TEGDMA.

Kesimpulan: Pada penelitian ini terjadi penurunan konsentrasi protein total sel dan perubahan profil protein sel pulpa gigi setelah pemaparan TEGDMA dengan konsentrasi 4mM, 8mM, dan 12mM.
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Background: Trietylene glycol dimethacrylate (TEGDMA) is one of monomer that contained in composite resin restoration. When polymerization is incomplete, this compound could leache into oral cavity in minutes to hours after the restoration, and could penetrate the dental pulp. TEGDMA has been reported to be cytotoxic to the tissues and cells.

Objective: to determine the effects of TEGDMA on total protein and protein profile of the dental pulp cells.

Methods: the dental pulp cells were collected from the dental pulp tissues of the freshly extracted teeth, and cultured in culture medium of DMEM. After the growth of cultured cells was confluent (±2 nights), the cells were subcultured then incubated (37°C, 5% CO2) overnight in 24-well plate. Afterwards, the cells were exposed to TEGDMA with concentrations of 4mM, 8mM, and 12mM, for 24 hours, meanwhile in control group without TEGDMA exposure. The concentration of total cell protein was measured by Bradford protein assay. The protein profile of the dental pulp cells were identified by SDS-PAGE. The molecular weight of sample protein was analyzed by Gel Doc (Band Analysis Quick Guide).

Results: The mean of total cell protein concentration (µg/ml ± SD) on treatment groups of 4mM TEGDMA (22762,27±3385,87) and 8mM (20268,44±1701,14) were lower than the controls (24253,77±3072,88). Whereas, the total cell protein concentration of treatment group of TEGDMA 12mM (23706,51±3214,52) was higher than the treatment groups with TEGDMA 4mM and 8mM, but it was still lower than the controls. According to one way ANOVA statistic test, only the treatment group with TEGDMA 8mM was significantly lower than the controls ($p=0.037$). Furthermore, the protein profile identified by electrophoresis gel, showed the profile alteration after TEGDMA exposure.

Conclusion: In this research the total cell protein concentration was decreased and the protein profile of the dental pulp cells was altered after exposure with TEGDMA 4mM, 8mM, and 12mM.