Neurogenic inflammation involves in systemic spread of oral infection

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Abstrak

Inflammasi neurogenik berperan pada penyebaran infeksi oral. Teori infeksi fokal rongga mulut telah diusulkan sejak awal 1900an, infeksi gigi menyebabkan berbagai penyakit sistemik. Namun, teori ini mulai ditinggalkan setelah banyak gigi telah dicabut tanpa memberikan hasil yang memuaskan. Penelitian terbaru membuktikan bahwa infeksi rongga mulut dapat menyebar secara sistemik. Walaupun demikian, penemuan terdahulu tidak dapat membuktikan bagaimana terapi periodontal “assisted drainage” (ADT), dapat mengurangi gejala migren dan asma dalam hitungan menit. Penelitian terkait interaksi keradangan imunogenik dan neurogenik yaitu mediator proinflamasi calcitonin gene-related peptide (CGRP), TNF-α dan vasoactive intestinal peptide (VIP) masih jarang dilakukan. Tujuan: Melakukan verifikasi penyebaran keradangan neurogenik mulut ke organ yang jauh setelah melakukan ADT melalui ekspresi CGRP, VIP dan TNF-α. Metode: 24 tikus wistar jantan disuntik intragingival dengan lipopolisakarida Porphyromonas gingivalis (PgLPS1435/1450). Setelah empat hari, 12 tikus diberikan ADT, kemudian semua sampel dikorbankan 40 menit setelah ADT. Ekpresi CGRP, VIP dan TNF-α dianalisis dengan imunohistokimia. Analisis statistik menggunakan ANOVA dilakukan untuk menganalisis perbedaan nilai ekspresi CGRP, VIP, dan TNF-α tiap kelompok uji. Hasil: Injeksi PgLPS meningkatkan CGRP, VIP an TNF-α walau tidak selalu bermakna pada kelompok kontrol. Ekspresi CGRP dan TNF-α menurun, tetapi ekspresi VIP meningkat pada kelompok ADT. Simpulan: Peradangan neurogenik terlibat dalam penyebaran keradangan rongga mulut ke seluruh tubuh yang dimungkinkan karena ADT mengurangi peradangan organ lain melalui stimulasi VIP.
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Focal infection theory proposed in early 1900’s stated that dental infection caused systemic disorders. Nevertheless, the theory was abandoned since large number of teeth were extracted with no satisfying result. Recent reports revealed that oral infections were able to spread systemically. However, there is no rationalization available to
explain how assisted drainage therapy (ADT), a periodontal therapy that could relief migraine and asthma within minutes. Oral neurogenic and immunogenic inflammation interaction involving pro-inflammatory markers such as calcitonin gene-related peptide (CGRP), TNF-α; and antiinflammatory vasoactive intestinal peptide (VIP) was still under investigation. Objective: To verify the spread of oral inflammation to distant organ after performing ADT by analysing CGRP, VIP and TNF-α expressions. Methods: Two different concentration of Porphyromonas
gingivalis lipopolysaccharide (PgLPS1435/1450) was injected intragingivally into two groups of 12 Wistar rats. After four days, 12 rats were given ADT and all samples were subsequently sacrificed 40 mins after ADT. Immunohistochemistry analysis using CGRP, VIP and TNF-α on the nasal and bronchus tissue was performed. ANOVA was used for statistical analyisis of the difference between CGRP, VIP and TNF-α expression between experimental groups. Results: PgLPS injections slightly increased CGRP, VIP and TNF-α expressions in the control group. Rats undergone ADT had lower CGRP and TNF-α

but higher VIP expressions. Conclusion: Neurogenic inflammation involved in systemic spread of oral infection. ADT was able to downregulate inflammation in distant organ posibly by stimulating VIP.