ABSTRACT

EXPRESSION OF MMP1 AND COLLAGEN TYPE 1 DENSITY IN RAT TEETH PULP CELL AFTER APLICATION COMBINATION OF CALCIUM HYDROXIDE AND PROPOLIS EXTRACT

Michael Golden Kurniawan*, Ira Widjiastuti**, Nanik Zubaidah**

** Resident of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Indonesia*

*** Staff of Conservative Dentistry Department, Faculty of Dental Medicine, Universitas Airlangga, Indonesia*

ABSTRACT

Background: Calcium hydroxide, the golden standart for pulp capping treatment was known to have some disadavantages such as high solubility and formation of tunnel defect. Propolis with its anti-inflammatory properties is expected to improve the treatment outcome when it is combined with calcium hydroxide as direct pulp capping agent.

Objective: Evaluating of the effect of calcium hydroxide and Propolis extract combination as a direct pulp capping agent based on its capability to form reparative dentin bridge which is represented by expression of MMP1 and Density of Collagen Type 1 in perforated rat teeth model.

Material and Methods: This experimental study using a total of 30 maxillary first molar of wistar rat which then randomly divided into experimental combination of calcium hydroxide and Propolis extract group, calcium hydroxide group, and control group. The cavities then sealed with Cention. After 3 and 7 days, rats then sacrificed from each group, and sections of the teeth were obtained. After being decalcified, specimens underwent histological evaluation under light microscope to identify the presence of odontoblast-like cell, inflammation cells, and dentin bridge. The immunohistochemistry (IHC) method using anti-MMP1 and anti-Collagen Type 1 was then performed to evaluate the expression of MMP1 and Collagen Type 1 density. The results then statistically evaluated by Kolmogorrov Smirnov, homogeneity, and one way ANNOVA tests.

Results: Combination of calcium hydroxide and Propolis extract group shows most cells expressing Collagen type 1 density and shows least cells expressing MMP1.

Conclusion: MMP1 expression after aplication of propolis extract combined with calcium hydroxide was smaller and collagen type 1 density after aplication of propolis extract combined with calcium hydroxide was higer than aplication with calcium hydroxide after 3 and 7 day.

Key words : *Calcium hydroxide, Propolis extract, reparative dentin bridge, MMP1, Collagen Type 1 , direct pulp capping*

DAFTAR ISI

Halaman

DAFTAR TABEL

DAFTAR GAMBAR

DAFTAR LAMPIRAN

DAFTAR SINGKATAN

ALP	*= Alkalin phospahatase*
ANOVA	*= Analysis of Variance*
APC	*= Antigen Presenting Cell*
Bis-GMA	*= Bisphenol A glycidyl methacrylate*
BMP-2	*= Bone morphogenetic protein-2*
BMP-4	*= Bone morphogenetic protein-4*
$Ca(OH)_2$	*= Kalsium hidroksida*
CAPE	*= Caffeic acid phenethyl ester*
DAB	*= Diamino Benzidine*
DCP	*= Tricyclodecan-dimethanol dimethacrylate*
DNA	*= Deoxyribonucleic acid*
Erk-2	*= Extracellular signal–regulated kinase 2*
FGF	*= Fibroblast Growth Factor*
HPA	*= Histopatologi anatomi*
HEMA	*= 2-hydroxyethyl methacrylate*
IHK	*= Imunohistokimia*
IL-1β	*= Interleukin-1-beta*
IL-2	*= Interleukin-2*
IL-4	*= Interleukin-4*
IL-12	*= Interleukin-12*
MAP kinase	*= Mitogen-activated protein kinase*
MEK ½	*= Mitogen-activated protein kinase kinase*
MMP	*= Matrixmetalloproteinase*
mRNA	*= Messenger RNA*
MTA	*= Mineral trioxide aggregate*
NF-κB	*= Nuclear factor kappa B*
OLC	*= Odontoblast-like cell*
PBS	*= Phosphate buffered saline*
PDGF	*= Platelet Derived Growth Factor*

PEG-400 DMA = *Polyethylene glycol 400 dimethacrylate*
PMN = *Polymorphonuclear leukocyte*
ROS = *Reactive oxygen species*
SC = *Stem cell*
SD = *Standar deviasi*
TEGDMA = *Triethylene glycol dimethacrylate*
TGFβ = *Transforming Growth Factor Beta*
TNFα = *Tumor necrosis factor alpha*
UDMA = *Urethane dimethacrylate*