

DISERTASI

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**HUBUNGAN EKSPRESI GEN *WT1* DAN *TIMP3* TERHADAP RASIO
TRANSKRIP GEN *COLLAGEN TYPE 1 ALPHA 1 (COL1A1)* DENGAN
COLLAGEN TYPE 3 ALPHA 1 (COL3A1) PADA PASIEN ANAK
DENGAN HERNIA INGUINALIS UNILATERAL**



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ABSTRAK

HUBUNGAN EKSPRESI GEN *WT1* DAN *TIMP3* TERHADAP RASIO TRANSKRIP GEN *COLLAGEN TYPE 1 ALPHA 1 (COL1A1)* DENGAN *COLLAGEN TYPE 3 ALPHA 1 (COL3A1)* PADA PASIEN ANAK DENGAN HERNIA INGUINALIS UNILATERAL

Jon Efendi

Hernia adalah penonjolan kantong abnormal dari celah di dinding abdomen, bisa disebabkan oleh kelainan struktural kongenital atau kelainan jaringan ikat. Kolagen tipe I dan III berperan dalam patogenesis hernia inguinalis, dengan rasio (*COL1A1:COL3A1*) yang rendah pada pasien hernia. Gen *WT1* menjaga homeostasis elastin dan kolagen, serta mengaktifkan *TIMP3* yang menginhibisi *MMP*, mempengaruhi rasio (*COL1A1:COL3A1*).

Penelitian ini menggunakan desain potong lintang dengan 32 pasien, terdiri dari 16 pasien hernia inguinalis lateralis dan 16 kontrol. Sampel aponeurosis *m. obliquus eksternus* diperiksa menggunakan PCR untuk ekspresi gen *WT1*, *TIMP3*, *COL1A1*, *COL3A1*, dan rasio (*COL1A1:COL3A1*). Analisis statistik dilakukan dengan *Mann Whitney* dan korelasi *Spearman*.

Hasil menunjukkan ekspresi mRNA berbeda antara kelompok hernia dan kontrol. Ekspresi *WT1* lebih tinggi pada hernia (4.18 vs 0.17), sementara *TIMP3* lebih rendah (2.02 vs 12.35). Ekspresi *COL1A1* lebih tinggi pada hernia (4.85 vs 4.18), sedangkan *COL3A1* lebih rendah (0.42 vs 1.65). Rasio (*COL1A1:COL3A1*) lebih tinggi pada hernia (24.77 vs 2.50), dengan rasio 4:1 antara kelompok hernia dan non-hernia. Korelasi menunjukkan hubungan positif sangat lemah antara *WT1* dengan *COL1A1*, *COL3A1*, dan rasio (*COL1A1:COL3A1*), hubungan negatif sangat lemah antara *TIMP3* dengan *COL1A1*, dan hubungan negatif lemah antara *TIMP3* dengan *COL3A1* serta rasio (*COL1A1:COL3A1*) pada pasien hernia inguinalis lateralis.

Penelitian ini menyimpulkan terdapat perbedaan ekspresi gen *WT1*, *TIMP3*, *COL1A1*, *COL3A1*, dan rasio (*COL1A1:COL3A1*) antar kelompok. Uji statistik menunjukkan perbedaan bermakna signifikan hanya pada *COL3A1* ($p < 0,05$).

Kata Kunci : *WT1*, *TIMP3*, *COL1A1*, *COL3A1*, Hernia Inguinalis Lateralis.

ABSTRACT

THE RELATIONSHIP BETWEEN *WT1* AND *TIMP3* GENE EXPRESSION TO THE TRANSCRIPT RATIO OF *COLLAGEN TYPE 1 ALPHA 1 (COL1A1)* GENE WITH *COLLAGEN TYPE 3 ALPHA 1 (COL3A1)* IN UNILATERAL INGUINAL HERNIA PATIENTS

Jon Efendi

Hernia is the abnormal protrusion of a sac through a hole in the abdominal wall, which can be caused by congenital structural abnormalities or connective tissue disorders. Collagen types I and III play a role in the pathogenesis of inguinal hernias, with a low (*COL1A1:COL3A1*) ratio observed in hernia patients. The *WT1* gene maintains elastin and collagen homeostasis and activates *TIMP3*, which inhibits *MMP* and affects the (*COL1A1:COL3A1*) ratio.

This study utilized a cross-sectional design with 32 participants, consisting of 16 lateral inguinal hernia patients and 16 controls. Samples of the external oblique muscle aponeurosis were examined using PCR for *WT1*, *TIMP3*, *COL1A1*, *COL3A1* gene expression, and the (*COL1A1:COL3A1*) ratio. Statistical analysis was conducted using Mann Whitney and Spearman correlation tests.

The results showed differential mRNA expression between the hernia and control groups. *WT1* expression was higher in hernias (4.18 vs. 0.17), while *TIMP3* was lower (2.02 vs. 12.35). *COL1A1* expression was higher in hernias (4.85 vs. 4.18), whereas *COL3A1* was lower (0.42 vs. 1.65). The (*COL1A1:COL3A1*) ratio was higher in hernias (24.77 vs. 2.50), with a 4:1 ratio between hernia and non-hernia groups. Correlation analysis showed a very weak positive relationship between *WT1* and *COL1A1*, *COL3A1*, and the (*COL1A1:COL3A1*) ratio, a very weak negative relationship between *TIMP3* and *COL1A1*, a weak negative relationship between *TIMP3* and *COL3A1*, and the (*COL1A1:COL3A1*) ratio in lateral inguinal hernia patients.

The study concludes there are differences in *WT1*, *TIMP3*, *COL1A1*, *COL3A1* gene expression, and the (*COL1A1:COL3A1*) ratio between the groups. Statistical tests showed a significant difference only in *COL3A1* ($p < 0.05$).

Keywords: *WT1*, *TIMP3*, *COL1A1*, *COL3A1*, Lateral inguinal hernia.

