EFEK PEMBERIAN PROBIOTIK *LACTOCOCCUS LACTIS D4* TERHADAP EKSPRESI *TRANSFORMING GROWTH FACTOR-B1* PADA TIKUS MODEL FIBROSIS GINJAL DENGAN UNILATERAL URETERAL OBSTRUCTION

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ABSTRAK

EFEK PEMBERIAN PROBIOTIK *LACTOCOCCUS LACTIS D4* TERHADAP EKSPRESI *TRANSFORMING GROWTH FACTOR-B1* PADA TIKUS MODEL FIBROSIS GINJAL DENGAN UNILATERAL URETERAL OBSTRUCTION

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Pendahuluan: *Unilateral ureteral obstruction* (UUO) adalah model hewan yang banyak digunakan untuk mempelajari patogenesis nefropati obstruktif. TGF-β1 berperan sebagai mediator utama dalam proses fibrogenik pada ginjal selama obstruksi melalui stimulasi aktivasi fibroblas. Efek anti fibrotik dari *Lactococcus lactis* D4 dikenal karena sifatnya dalam memodulasi respons imun dan mengurangi peradangan. Akan tetapi, penelitian mengenai efek *Lactococcus lactis* terhadap ekspresi TGF-β1 pada nefropati obstruktif masih jarang dan sukar ditemukan

Tujuan: Mengetahui efek pemberian probiotik *Lactococcus lactis D4* terhadap ekspresi TGF-β1 pada tikus model fibrosis ginjal dengan *unilateral ureteral obstruction*

Metode: Penelitian ini merupakan penelitian experimental laboratorik dengan desain "post test only randomized control grup design" menggunakan tikus Sprague-Dawley jantan berumur 6-7 minggu dengan berat badan 170 - 220 gram. Tikus dibagi menjadi 3 kelompok yaitu kelompok kontrol (hanya dilakukan laparatomi), Kelompok P1 yang mengalami *Unilateral Ureteral Obstruction* (UUO), dan kelompok P2 yang mengalami UUO disertai suplementasi *Lactococcus Lactis D4* (UUO+LLD4). Ekstrak *Lactococcus lactis D4* diberikan dengan dosis 8 x 10^9 CFU/mL sebanyak 0,5 mL selama 7 hari menggunakan sonde. Setelah 7 hari pasca operasi, jaringan dinjal diambil dan histopatologi ginjal dievaluasi. TGF-β1 dinilai menggunakan pemeriksaan imunohistokimia dengan mengukur persentase pewarnaan sel.

Hasil: Pada penelitian ini ditemukan ekspresi TGF-β1 masing-masing 33,06 ± 1,14 %; 42,67 ± 1,67 %; 29,11 ± 1,42% pada kelompok kontrol, P1, dan P2. Uji ANOVA mendapatkan nilai p=0,000 pada ekspresi TGF-β1 yang artinya terdapat hubungan bermakna dari pemberian *Lactococcus lactis* D4 terhadap ekspresi TGF-β1

Uji post-hoc mendapatkan nilai p=0,001 untuk perbedaan kontrol dengan P1 dan nilai p=0,000 untuk perbedaan P1 dan P2.

Kesimpulan: Penelitian ini menemukan bahwa pemberian *Lactococcus Lactis* D4 menurunkan ekspresi TGF-β1 pada ginjal tikus jenis Sprague Dawley pasca UUO

Kata kunci: Obstruksi ureter, Lactococcus lactis D4, TGF-β1

ABSTRACT

EFFECT OF PROBIOTIC LACTOCOCCUS LACTIS D4 ADMINISTRATION ON THE EXPRESSION OF TRANSFORMING GROWTH FACTOR-B1 FIBROSIS MODEL IN RATS WITH UNILATERAL URETARY OBSTRUCTION

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Introduction: Unilateral ureteral obstruction (UUO) is an animal model widely used to study the pathogenesis of obstructive nephropathy. TGF-β1 plays a major role as a mediator in kidney fibrogenic process during obstruction through stimulation of fibroblast activation. The anti-fibrotic effect of *Lactococcus lactis D4* is known for its properties in modulating immune responses and reducing inflammation. However, studies on the effects of Lactococcus lactis on TGF-β1 expression in obstructive nephropathy are still rare and difficult to find

Objective: To determine the effect of administering probiotic Lactococcus lactis D4 on TGF-β1 expression in a rat of renal fibrosis model with unilateral ureteral obstruction

Method: This is laboratory experimental study with a "post test only randomized control group design" using male Sprague-Dawley rats aged 6-7 weeks with body weight of 170 - 220 grams. Rats were divided into 3 groups (n=5 each) : the control group (laparotomy only), P1 unilateral ureteral obstruction (UUO), and P2 UUO with Lactococcus lactis D4 supplementation (UUO+LLD4). Lactococcus lactis D4 extract was given at a dose of 8 x 10^9 CFU/mL as much as 0.5 mL for 7 days. Seven days post-surgery, kidneys were harvested, and renal histopathology was evaluated. TGF-β1 was assessed using immunohistochemistry by measuring the percentage of cell staining.

Results: In this study, TGF-β1 expression were 33.06 ± 1.14%; 42.67 ± 1.67%; 29.11 ± 1.42% in the control, P1, and P2 groups, respectively. The ANOVA test resulted a p value of 0.000 in TGF- β1 expression, which means that there is a significant relationship between the administration of Lactococcus lactis D4 and TGF-β1 expression.

The post-hoc test then obtained a p value of 0.001 for the difference between control and P1 and a p value of 0.000 for the difference between P1 and P2.

Conclusion: This study found that Lactococcus Lactis D4 administration lowers the TGF-β1 expression in the kidneys of Sprague Dawley rats after UUO

Keywords: Ureteral obstruction, Lactococcus lactis D4, TGF-β1