

**STUDI KOMPENSASI KONTRALATERAL GINJAL SECARA
HEMATOLOGIS, HISTOPATOLOGIS, DAN ULTRASONOGRAFIS
PADA TIKUS PUTIH PASCA LIGASI URETER UNILATERAL
PROKSIMAL DAN DISTAL**

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Intisari

Efek obstruksi ureter total unilateral terhadap ginjal sangat fatal apabila tidak segera ditangani karena dapat menyebabkan kerusakan ginjal ipsilateral maupun kontralateral. Penelitian ini dilakukan untuk mengetahui efek kompensasi ginjal kontralateral pasca obstruksi ureter total unilateral secara hematologis, histopatologis, dan ultrasonografis. Tiga puluh enam ekor tikus *Sprague Dawley* betina usia 2,5 bulan dibagi menjadi 3 kelompok. Kelompok I (kontrol) dioperasi laparotomi kemudian dijahit kembali. Kelompok II dioperasi dengan ligasi ureter sebelah kanan pada bagian proksimal. Kelompok III dioperasi dengan ligasi ureter kanan pada bagian distal. Satu minggu pasca ligasi tiga ekor tikus diambil secara acak dari masing-masing kelompok lalu diambil darahnya untuk analisis BUN, kreatinin, eritrosit dan hemoglobin. Setelah itu dilakukan pemeriksaan USG yang dilanjutkan dengan euthanasia. Perubahan makroskopis dihitung dan dicatat. Ginjal kanan dan kiri diambil untuk dibuat preparat histopatologi. Perlakuan yang sama dilaksanakan pada minggu ke-2, 3, dan ke-4 pasca operasi. Analisis statistik menunjukkan terjadi peningkatan BUN dan kreatinin, sedangkan eritrosit dan hemoglobin masih berada pada angka normal hingga minggu ke-4 pasca operasi. Hidronefrosis ginjal ipsilateral terjadi mulai minggu pertama pasca ligasi ureter unilateral, yang ditandai dengan dilatasi pelvis renis, penipisan parenkim, terbentuknya vakuola, dan timbunan cairan pada ginjal. Pemeriksaan histopatologi ginjal ipsilateral menunjukkan adanya atropi glomerulus dan dilatasi tubuli di minggu pertama pasca ligasi. Minggu ke-2 hingga ke-4 terjadi pembentukan kista dan fibrosis interstisial pada ginjal ipsilateral yang semakin parah seiring dengan lama waktu sumbatan. Pada ginjal kontralateral ditemukan terjadinya reaksi kompensasi berupa dilatasi tubulus konvolutus proksimal dan distal mulai minggu pertama pasca ligasi. Pemeriksaan ultrasonografis menunjukkan hidronefrosis terjadi pada ginjal ipsilateral mulai minggu pertama pasca ligasi yang ditandai dengan adanya zona anekoik, sedangkan ginjal kontralateral tidak mengalami perubahan secara ultrasonografis. Dari penelitian tersebut dapat disimpulkan bahwa ligasi ureter unilateral pada daerah proksimal dan distal menyebabkan peningkatan BUN dan kreatinin serta hidronefrosis ginjal ipsilateral yang tampak secara makroskopis, histopatologis, dan ultrasonografis, namun reaksi kompensasi hanya terlihat secara histopatologis.

Kata kunci: Obstruksi ureter, ginjal, kompensasi, hematologi, histopatologi, ultrasonografi.

**CONTRALATERAL COMPENSATORY STUDY OF KIDNEY
OF SPRAGUE DAWLEY RAT POST PROXIMAL AND DISTAL
UNILATERAL URETERAL LIGATION BASED ON HEMATOLOGY,
HISTOPATHOLOGY, AND ULTRASONOGRAPHY PARAMETERS**

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Abstract

Unilateral ureteral obstruction can cause some serious problems without proper treatment and even can be life threatening. This research studied about renal contralateral compensatory study of white rat after proximal and distal unilateral ureteral ligation from hematology, histopathology, and ultrasonography parameters. Thirty six female *Sprague Dawley* rats were used in this research. We divided rats into 3 Groups, twelve rats each group. Group I as control with laparotomy surgery. Group II get laparotomy operation and ureteral ligation on the proximal part, 5 mm from the renal pelvis. Group III get laparotomy operation and ureteral ligation on the distal part, 5 mm from the vesica urinaria. A week after the surgery, we take 3 rats from each group and take the blood sample for BUN, creatinine, erythrocyte, and hemoglobin evaluation. After that we make ultrasound examination under anaesthesia. The rats euthanized to collect the gross pathological finding and measure the real size of the kidneys with vernier caliper and micro scale. After that we keep the kidneys in the 10% formalin for histopathological analysis. We repeat the same procedure on the second, 3rd, and 4th week after the surgery. Statistical analysis shows that BUN and creatinine value increase, but erythrocyte and hemoglobin still on the normal range until 4th week after the surgery. Hydronephrosis occur in the first week after the ureteral ligation with pelvic dilatation, renal parenchyma depletion, vacuolization, and liquid accumulation in the kidney. Histopathological analysis on the ipsilateral kidney shows that there were glomerular atrophy and tubular dilatation on the first week after ligation in group II and III. Cysts and fibrosis interstitial were found the 2nd week until 4th week after ligation and getting worse with the duration of time. Compensatory reaction was found in the contralateral kidney. Tubular dilatations occur in the contralateral kidney start from the first week after ligation. Ultrasonographic findings shows that hydronephrosis occur in the ipsilateral kidney start from the first week of ligation with anechoic zone, but contralateral kidneys still look normal in the ultrasound examination. From this research we know that unilateral ureteral ligation in the proximal or distal increase BUN and creatinine value, and create hydronephrosis in ipsilateral kidney that can be analyzed from the gross anatomy, histopathology, and ultrasonographic, but compensatory reaction only can be seen histopathologically.

Key words: ureteral obstruction, kidney, compensatory, hematology, histopathology, ultrasonography