

## INTISARI

**Latar Belakang:** Penurunan kapasitas vital paru terjadi pada penderita diabetes. Pada diabetes terjadi inflamasi. Inflamasi dapat meningkatkan kerusakan serabut elastik dan fibrosis sehingga kemungkinan menurunkan volume paru.

**Tujuan:** Penelitian ini bertujuan untuk membandingkan volume paru dan distribusi serabut elastik dan serabut kolagen paru antara tikus model diabetes dan kontrol normal.

**Metode:** Dua belas ekor tikus Sprague-Dawley jantan usia 12 minggu dibagi menjadi 2 kelompok, yaitu kontrol normal dan diabetes. Induksi diabetes dilakukan dengan injeksi Streptozotocin (STZ). 16 minggu setelah induksi, tikus dikorbankan. Paru kiri digunakan untuk estimasi volume paru menggunakan teknik stereologi dan melihat distribusi serabut elastik dan kolagen pewarnaan Verhoeff.

**Hasil Penelitian:** Volume paru tikus diabetes (dalam fiksatif  $772.00 \pm 224.27 \text{ mm}^3$  dan irisan histologi  $61.68 \pm 25.96 \text{ mm}^3$ ) lebih kecil dari kontrol normal ( $1334.67 \pm 376.98 \text{ mm}^3$  dan irisan histologi  $105.60 \pm 24.19 \text{ mm}^3$ ;  $P=0.01$ ). Volume parenkim paru tikus diabetes ( $34.78 \pm 20.02 \text{ mm}^3$ ) juga lebih kecil dari volume parenkim kontrol normal ( $63.80 \pm 18.62 \text{ mm}^3$ ;  $P=0.03$ ). Secara kualitatif, serabut elastik yang terwarnai hitam lebih banyak pada kontrol normal dan kurang terlihat pada tikus diabetes, sedangkan persebaran kolagen yang terwarnai merah muda sulit tidak berbeda distribusinya pada kedua kelompok.

**Kesimpulan:** Volume paru tikus diabetes lebih kecil daripada tikus kontrol, distribusi serabut elastik lebih rendah di tikus diabetes, dan tidak terdapat perbedaan distribusi serabut kolagen pada kelompok diabetes dan kontrol.

**Kata Kunci:** Diabetes, Matriks ekstraseluler paru, volume paru, serabut kolagen, volume serabut elastik, stereologi

## ABSTRACT

**Background:** Decreased vital lung capacity occurs in diabetics. There is inflammation in diabetes. Inflammation can increase the breakdown of elastic fibers and fibrosis, thereby reducing lung volume.

**Aim:** This study aims to compare lung volume and distribution of elastic and collagen fibers in the lungs between diabetic rats and normal controls.

**Methods:** Twelve male Sprague-Dawley rats aged 12 weeks were divided into two groups, namely normal control and diabetes. Induction of diabetes was conducted by injection of Streptozotocin (STZ). At 16 weeks after induction, the rats were terminated. The left lung was used to estimate the lung volume using point counting techniques and examine the distribution of elastic and collagen fibers in histological sections stained with Verhoeff staining.

**Result:** Lung volume in the diabetic group (in fixative  $772.00 \pm 224.27 \text{ mm}^3$  and in histological section  $61.68 \pm 25.96 \text{ mm}^3$ ) was significantly smaller than normal control ( $1334.67 \pm 376.98 \text{ mm}^3$  and in histological section  $105.60 \pm 24.19 \text{ mm}^3$ ;  $P=0.01$ ). The lung parenchymal volume of diabetic rats ( $34.78 \pm 20.02 \text{ mm}^3$ ) was also smaller than the parenchymal volume of normal control ( $63.80 \pm 18.62 \text{ mm}^3$ ;  $P=0.03$ ). Qualitatively, the distribution of elastic fibers were more abundant in normal controls and less visible in diabetic rats, while the distribution of collagen was similar in both groups.

**Conclusion:** The lung volume of diabetic rats was smaller than that of control rats, the distribution of elastic fibers was lower in diabetic rats, and there is no different amount of collagen distribution in between diabetic rats and control

**Keywords:** Diabetes, Lung extracellular matrix, lung volume, collagen fibers, elastic fiber volume, stereology.