

## ABSTRACT

### THE DECREASE OF LACTATE DEHYDROGENASE ENZYME IN TEARS OF PATIENTS WITH CORNEAL EDEMA FOLLOWING CATARACT SURGERY AFTER TRANS-CORNEAL OXYGENATION THERAPY

Eunike Amelina Lahagu<sup>1</sup>, Suhardjo<sup>1</sup>, Wasisdi Gunawan<sup>1</sup>, Jajah Fachiroh<sup>2</sup>

1. Departement of Ophthalmology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada-dr. Sardjito General Hospital
2. Department of Biomolecular and Cell Biology, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

**Introduction and objective :** Corneal edema is one of the complications after cataract surgery due to manipulation or excessive exposure to the cornea resulting in damage to the corneal endothelial cells and eventually hypoxia in the cornea. One of the biological markers that often appears in corneal hypoxia is an increase in the enzyme lactate dehydrogenase (LDH) obtained from tears. Previous studies have shown that administration of trans-corneal oxygenation has an impact on the improvement of corneal edema and is one of the breakthroughs in new therapies in addition to conventional therapies.

**Material and methods :** This is a pre-post study on 15 patients including all patients diagnosed with corneal edema after cataract surgery receiving trans-corneal oxygenation therapy. Taking the first tear sample was carried out before trans-corneal oxygenation therapy, using Schimer paper sterilely, from the inferior fornix of the conjunctiva. Data recording and tear sampling were carried out on the second and fifth day postoperatively before and after trans-corneal oxygenation therapy; data include visual acuity, corneal endothelial density, central corneal thickness, and coefficient of variation corneal endothelial.

**Results :** There was a decrease in LDH tear concentration on the second day ( $p = 0.002$ ) and fifth day ( $p = 0.027$ ) after trans-corneal oxygenation therapy. The decrease in LDH concentration on the second day compared to the fifth day was also statistically significant ( $p = 0.041$ ). The mean increase in central corneal thickness decreased significantly after administration of trans-corneal oxygenation ( $p = 0.005$ ). The mean of visual acuity ( $p = 0.001$ ), coefficient of variation corneal endothelial ( $p = 0.027$ ) also increased significantly after administration of trans-corneal oxygenation. The mean of corneal endothelial density ( $p = 0.814$ ) did not experience a significant difference, although improvement was clinically found.

**Conclusions :** There was significant reduction in lactate dehydrogenase tear concentration and clinical improvement in corneal edema following cataract surgery which underwent trans-corneal oxygenation therapy.

**Keywords :** *corneal edema, lactate dehydrogenase, central corneal thickness, trans-corneal oxygenation*

## INTISARI

### PENURUNAN KADAR ENZIM LAKTAT DEHIDROGENASE AIR MATA PADA EDEMA KORNEA PASCA OPERASI KATARAK SETELAH TERAPI OKSIGENASI TRANS-KORNEA

Eunike Amelina Lahagu<sup>1</sup>, Suhardjo<sup>1</sup>, Wasisdi Gunawan<sup>1</sup>, Jajah Fachiroh<sup>2</sup>

1. Departemen Ilmu Kesehatan Mata, Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan Universitas Gadjah Mada/ RSUP dr. Sardjito
  2. Laboratorium Riset Terpadu, Fakultas Kedokteran, Kesehatan Masyarakat dan Keperawatan Universitas Gadjah Mada
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**Pendahuluan :** Edema kornea merupakan salah satu komplikasi pasca operasi katarak oleh karena manipulasi atau paparan yang terlalu lama atau berlebihan pada kornea sehingga terjadi kerusakan sel-sel endotel kornea dan akhirnya menimbulkan hipoksia pada kornea. Salah satu penanda biologis yang kerap muncul pada kondisi hipoksia kornea adalah kenaikan enzim laktat dehidrogenase (LDH) yang diperoleh dari air mata. Penelitian sebelumnya membuktikan bahwa pemberian oksigenasi trans-kornea berdampak pada perbaikan edema kornea dan menjadi salah satu terobosan terapi baru selain terapi konvensional.

**Metode :** Desain penelitian ini menggunakan rancangan penelitian *pre-post* yang dilakukan pada 15 pasien, meliputi semua pasien yang terdiagnosis edema kornea pasca operasi katarak dan memperoleh terapi oksigenasi trans-kornea. Pengambilan sampel air mata pertama dilakukan sebelum terapi oksigenasi trans-kornea, menggunakan kertas Schimer secara steril dari forniks inferior konjungtiva.. Pencatatan data dan pengambilan sampel air mata dilakukan pada hari kedua dan hari kelima pasca operasi sebelum dan sesudah terapi oksigenasi trans-kornea; data meliputi visus, densitas endotel kornea, ketebalan kornea sentral, dan koefisien variasi endotel kornea.

**Hasil :** Terdapat penurunan konsentrasi LDH air mata pada hari kedua ( $p = 0,002$ ) dan kelima ( $p = 0,027$ ) pasca terapi oksigenasi trans-kornea. Penurunan konsentrasi LDH pada hari kedua dibandingkan dengan hari kelima juga bermakna secara statistik ( $p = 0,041$ ). Rerata ketebalan kornea sentral ( $p=0,005$ ), visus ( $p=0,001$ ), dan koefisien variasi endotel kornea ( $p=0,028$ ) mengalami perbaikan klinis yang bermakna setelah terapi oksigenasi trans-kornea.

**Kesimpulan :** Adanya penurunan kadar LDH air mata yang bermakna pada edema kornea pasca operasi katarak yang telah dilakukan terapi oksigenasi trans-kornea disertai dengan perbaikan klinis meliputi perbaikan ketebalan kornea sentral, visus, dan koefisien variasi endotel kornea pada edema kornea pasca operasi katarak yang telah dilakukan terapi oksigenasi trans-kornea.

**Kata kunci :** *edema kornea, laktat dehidrogenase, ketebalan kornea sentral, oksigenasi trans-kornea*