

## RINGKASAN

### **PENGARUH OKSIGEN KADAR 50% DIBANDINGKAN OKSIGEN KADAR 100% PADA ANESTESI TERHADAP KADAR MALONDIALDEHYDE SERUM DAN SUPER OXIDE DISMUTASE ERITROSIT**

**Abi Noerwahjono**

Kajian pengaruh oksigen terhadap stres oksidatif sudah banyak dilakukan, tetapi pada umumnya memakai hewan coba, sedangkan untuk dipakai pada manusia hanya sedikit sekali. Sementara pemakaian kadar oksigen 100 % telah lama dilakukan dalam tindakan anestesi, hal ini dilakukan untuk memenuhi kebutuhan oksigen yang menjadi meningkat karena penurunan fungsi pernafasan akibat pengaruh obat anestesi yang menekan pusat nafas. Sedangkan pemakaian oksigen dengan kadar yang tinggi dari berbagai penelitian mempunyai potensi untuk merugikan kesehatan. Untuk itu perlu dilakukan kajian mendalam apakah memang pemakaian oksigen dalam dosis tinggi merugikan kesehatan atau tidak.

Penelitian ini bertujuan untuk membuktikan bahwa dengan memakai oksigen dengan kadar 50 % pada anestesi akan didapatkan kenaikan kadar hasil oksidasi lemak tak jenuh yang lebih kecil dibandingkan dengan pemakaian oksigen dengan kadar 100% dan membuktikan penurunan kadar antioksidan yang lebih kecil dengan memakai oksigen kadar 50% pada anestesi dibandingkan dengan pemakaian oksigen dengan kadar 100%.

Dilakukan pemeriksaan darah melalui arteri pada pasien meliputi darah rutin, gas darah, kadar malondialdehyde (MDA) serum dan kadar superoksida dismutase (SOD) eritrosit sebelum tindakan anestesi dan setelah tiga puluh menit tindakan anestesi berlangsung. Pemakaian jenis obat anestesi serta prosedur tindakan anestesi dan tindakan bedah sama pada kedua kelompok. Diharapkan hasil pemeriksaan laboratorium yang didapat adalah semata-mata berasal dari pemakaian oksigen dengan kadar yang berbeda.

Hasil uji t dua berpasangan didapatkan perbedaan ( $p < 0,05$ ) untuk kenaikan kadar MDA sedangkan untuk penurunan SOD tidak didapatkan perbedaan antara anestesi yang menggunakan kadar oksigen 100% dan kadar oksigen 50%. Hasil dari penelitian ini adalah:

1. Paparan dengan anestesi yang menggunakan kadar oksigen 50% menghasilkan kenaikan kadar MDA yang lebih rendah dibandingkan dengan anestesi yang menggunakan oksigen dengan kadar 100%.
2. Paparan dengan anestesi yang menggunakan kadar oksigen 50% tidak menghasilkan penurunan kadar SOD yang lebih rendah dibandingkan dengan anestesi yang menggunakan oksigen dengan kadar 100%.

Dengan hasil penelitian ini, diperlukan penelitian lebih lanjut pada manusia dengan waktu paparan oksigen yang lebih lama serta memakai indikator stres oksidatif lain yang bisa menggambarkan derajat stres oksidatif dengan lebih baik. Diperlukan juga penelitian pada manusia selain secara laboratoris yaitu secara histopatologi, radiologis maupun secara klinis. Hal ini untuk mengetahui akibat pemakaian oksigen dengan kadar yang tinggi bagi kesehatan.

## SUMMARY

### **THE COMPARISON OF 50% OXYGEN CONCENTRATION AND 100% OXYGEN CONCENTRATION IN ANESTHESIA THAT INFLUENCE OF LEVEL MALONDIALDEHYDE SERUM AND SUPEROXIDE DISMUTASE ERYTHROCTE IN BLOOD**

**Abi Noerwahjono**

The study of oxygen effect in oxidative stress have been done a lot, but in animal, not in human. Meanwhile, the use of 100% oxygen concentration in anaesthesia have been done in many years. This purpose to sufficient the oxygen demands that increase because the use of anesthesia drugs that depress respiratory center. But, the use of high oxygen concentration is potentially dangerous. Extensive study was needed whether the use of high oxygen concentration is harmful or not.

The aim of this study is to prove that use of 50% oxygen concentration will generate lesser oxidation on unsaturated fatty acid and decrease lesser antioxidants level than use 100% oxygen concentration.

Aterial blood samples were taken before the start of anaesthesia and thirty minutes after intubation. The routine blood test, blood gas analysis, concentration malondialdehyde in serum and concentration superoxide dismutase in erythrocyte was measured. The kind of anaesthesia drugs, the procedure of anaesthesia and surgical were similar in the both of group. So, the result is merely from the difference of use oxygen concentration.

The result of paired t test shows significant increases level of malondialdehyde in serum but not level of superoxide dismutase in erythrocyte.

The result of this study is:

1. Exposure of 50% oxygen concentration in anesthesia was increasing level of malondialdehyde in serum lower than 100% oxygen concentration in anesthesia.
2. Exposure of 50% oxygen concentration in anesthesia was not decreasing level of superoxide dismutase in erythrocyte lower than 100% oxygen concentration in anesthesia.

Based on this study, further research is still have been needed in human with longer exposure of high oxygen concentration and use the other indicator of oxidative stress that reperesent better than this study.

## ABSTRACT

### **THE COMPARISON OF 50% OXYGEN CONCENTRATION AND 100% OXYGEN CONCENTRATION IN ANESTHESIA THAT INFLUENCE OF LEVEL MALONDIALDEHYDE SERUM AND SUPEROXIDE DISMUTASE ERYTHROCYTE IN BLOOD**

**Abi Noerwahjono**

The usage of high oxygen concentration have been applied in anesthesia for many years. Despite of benefits, potential complication known as oxidative stress cause by reactive oxygen species.

The purpose of this research was to measure level of malondialdehyde in serum, a lipid peroxidation that can predictive the free radical activity and level of erythrocyte superoxide dismutase in blood. The superoxide dismutase is an antioxidant that scavenge the reactive oxygen species which generated by hyperoxia.

This was cross sectional study using pretest and posttest control group design. The level of serum malondialdehyde and the level of erythrocyte superoxide dimutase was measured in patients who had an orthopaedy operation with status ASA I and was given anesthesia with 50% oxygen concentration as a treatment group and with 100% oxygen concentration as a control group. Samples were taken using random sampling method. A number of 16 individuals were allocated to each group. The dependent variables in this study were the differences of increasing level malondialdehyde in blood serum, and decreasing level superoxide dismutase in erythrocyte.

The results are significant increase level serum malondialdehyde in both groups. But, the increasing level of serum malondialdehyde was lower in group with 50% oxygen concentration than the control group and non significant decrease of level erythrocyte superoxide dismutase in both groups.

**Keywords:** high oxygen concentration in anaesthesia, malondialdehyde, superoxide dismutase.