Pengaruh Manuver Rekrutmen Paru Terhadap Displasia Bronkopulmoner dan Status Hemodinamik Bayi Prematur yang Mengalami Sesak Napas Berat = The Impact of Lung Recruitment Maneuver in 24â32 weekers with Severe Respiratory Disstres, to Their Hemodynamic Status and the Occurment of Bronchopulmonary Dysplasia.

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Abstrak

Manuver rekrutmen paru (MRP) adalah strategi mencegah kerusakan paru saat bayi menggunakan ventilator mekanis (VM). Dengan meningkatkan tekanan akhir ekspirasi (TAE) secara bertahap, MRP membuka alveolus, menurunkan kebutuhan oksigen hirup (FiO2) sekaligus meningkatkan ambilan oksigen paru. Hingga kini, belum cukup bukti ilmiah terkait pengaruh MRP menggunakan VM terhadap luaran bayi prematur.

Penelitian ini adalah uji klinis tidak tersamar, dilakukan di RS Cipto Mangunkusumo dan RSIA Bunda Menteng, bertujuan mencari hubungan MRP dengan kejadian DBP dan atau kematian, curah jantung, cedera alveolus-endotel, penurunan diameter duktus arteriosus (DA), dan mikrosirkulasi kulit. Penelitian berlangsung Maret 2021–April 2022. Subjek penelitian adalah bayi prematur 24–32 minggu yang menggunakan ventilator mekanis saat usia < 48 jam. Protein surfaktan-D (SP-D) diukur menggunakan metode ELISA, mikropartikel endotel (CD-31+/CD-42–) menggunakan flowsitometri, curah jantung dan diameter DA menggunakan ekokardiografi, TcCO2–PaCO2, TcO2/PaO2 menggunakan monitor gas darah transkutan dan gas darah arteri, strong ion difference (SID) menggunakan elektrolit darah arteri. Pada usia koreksi 36 minggu, tidak terdapat perbedaan bermakna kejadian DBP atau kematian antara kelompok MRP dan tanpa MRP 38 (69,09%) vs. 43 (78,18%), p = 0,216. Pada 72 jam pasca-penggunaan VM, tidak didapati perbedaan kadar SP-D, CD 31+, Diameter DA, curah jantung, TcCO2 gap dan SID antara kelompok MRP dan tanpa MRP . Terdapat perbedaan bermakna TcO2 indeks 1,00 (1,00; 1,02) vs. 1,00 (0,99; 1,00), p = 0,009* antara kelompok MRP dibanding tanpa MRP. Pada bayi penyintas, MRP mempercepat waktu untuk mencapai FiO2 ter-rendah 60,0 (54,00; 75,00) vs. 435,00 (375,00; 495,00) menit, p < 0,0001 dan lama penggunaan alat bantu napas 25,0 (19,00; 37,00) vs. 36,83 (SB 19,11) hari, p = 0,044. Simpulan, MRP bayi prematur tidak terbukti mengurangi kejadian DBP dan atau kematian pada usia 36 minggu. Tidak ada perbedaan cedera alveolar-endotel, curah jantung kiri-kanan, dan diameter DA pada usia 72 jam. Tindakan MRP meningkatkan mikrosirkulasi. Pada kelompok penyintas, MRP mempersingkat waktu mencapai FiO2 terendah dan penggunaan alat bantu napas.

.....Lung recruitment maneuver (LRM) is a strategy during mechanical ventilation which aim to open collapsed alveolus in order to increased oxygenation. This maneuver could be done by application of a stepwise increments of positive end expiratory pressure (PEEP) until lowest FiO2 (< 30%) is achieved. There is still lack of evidence regarding relationship between LRM and neonatal outcome. This study aimed to evaluate effectivity of LRM in order to reduce chronic lung disease and it’s influence to neonatal hemodynamic as well. This was unblinded randomized clinical trial which aimed to investigate relationship between LRM and neonatal death, bronchopulmonary dysplasia (BPD), cardiac output, reduction of ductus

arteriosus (DA) diameter, skin microcirculations and alveolar-endotel injury. The study was conducted on March 2021 until April 2022 in Cipto Mangunkusumo and Bunda Menteng Hospital. Plasma surfactant protein-D (SP-D) was measured with ELISA, Microparticel endotel (CD-31+) with flowcytometri, left and right cardiac output (LVO and RVO) and DA diameter were measured by echocardiography, TcCO2–PaCO2, tcO2/PaO2 were measured form arterial blood gas and transcutaneous monitor and strong ion difference (SID) from plasma electrolyte. At 36 weeks follow up, there ware no significant difference of incident of DBP and/or death between MRP vs. without MRP groups 38 (69.09%) vs. 43 (78.18%), p = 0.216 (CI 95% 0.141–0.295). There were no difference between MRP and without MRP group at 72 hours, regarding : plasma SP-D, microparticle endotel, cardiac output, DA diameter, tcCO2 gap and SID. At. 72 hours, tcO2 index was better in MRP compared to control group 1.00 (1.00; 1.02) vs. 1.00 (0.99; 1.00), p = 0.009. There were no significant difference regarding other neonatal morbidity between the two group. Among survival subject, LRM reduced time to achieved lowest FiO2 60.00 (54.00; 75.00) vs. 435.00 (375.00; 495.00) hours, p < 0.0001 and length of respiratoy support 25.0 (19.00; 37.00) vs. 36.83 (SD 19.11) days, p=0.044.

Conclusion When applied to 24–32 weeks preterm baby with invasive mechanical ventilation, LRM could not reduced DBP or death at 36 weeks of age. There was no any difference at 72 hours regarding alveolar and endothelial injury, left and right cardiac output and diameter DA. LRM was associated with better microcirculation. Among the survivor, LRM reduced high oxygen concentration exposure time and length of respiratory support.