

Role of Lung Ultrasonography in Detecting Extravascular Lung Water (EVLW) in Major Oncological Surgeries.

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Abstract

Introduction

During major Oncosurgeries fluid administration by conventional methods may cause increased EVLW leading to postoperative cardiorespiratory complications. We studied immediate postoperative EVLW with Lung US in patients receiving Central venous pressure CVP and Pleth Variability Index PVI guided fluids intraoperatively, This is prospective, interventional, diagnostic, 2-arm study conducted after approval from IRB and ClinicalTrials.gov ID: NCT04659681

Methodology

Inclusion Major Oncosurgeries, age 18-80 years, both sex under GA. Exclusion LVEF < 40%, BMI > 30, COPD. Standard GA and monitoring for all patients CVP, PVI in study group. Postintubation baseline Lung US was performed with non-linear probe in 4 zones on Right and Left Lung Zone I Right Midclavicular in 2 intercostal space, Zone II Right Parasternal in 3 IC space, Zone III Anterior axillary line in 4 IC space Zone IV Posterior axillary line in the 5 IC space. Zone V to VIII corresponding spaces on the Left side. In CVP Group fluids were given to maintain CVP between 10-16 cms H₂O, for CVP values < 10 cms H₂O colloid bolus 200ml was given. In PVI Group fluids were given to maintain PVI < 12 for increase in PVI value > 12 Colloid bolus 200 ml was given and total fluids transfused was calculated, After completion of surgery Lung US was performed in 4 Zones in both lungs to calculate Total number of B lines, EVLW Grading was done as B Lines < 5 Nil, between 5-10 Mild, between 10-30 Moderate > 30 severe, ABG analysis Postintubation as Baseline and after the completion of surgery. Primary Outcome: EVLW detection (Total no of B lines) by Lung Ultrasonography. Secondary Outcome: Adequacy of Perfusion by Lactate levels at end of surgery in both groups.

Results

The total number of patients were 119 (CVP-59, PVI-60), Demographic data age, sex, BMI, ASA Grading, Duration of surgery, Intraoperative Mean HR, MBP was comparable between two Groups. Total Crystalloids given in CVP Group were 2132.6 ± 504.5 in PVI Group 1875.8 ± 593.9 ml. (P = 0.012), Colloid Bolus in CVP Group were 778.2 ± 242.2 in PVI Group 584 ± 358.5 ml (P = 0.001), PVI Group received less intraoperative crystalloids and colloids and difference is statistically significant. Table 1 Shows B Lines in both Groups Mild Category 44.1% patients in CVP Group and 23.3% in PVI Group (P = 0.042), Moderate - 5.1% and 5.0% in both groups, No patient had severe EVLW. Graph 1 shows Distribution of B-Lines in all the Zones. Number of Patients in PVI Group had less B Lines compared to CVP Group: CVP/PVI- Zone III (50/49), IV (75/63), VII (61/47) and VIII (83/66). ABG Analysis - In CVP Group decrease in Po₂, Po₂(A-a), Pao₂/Fio₂ at the end of surgery compared to baseline is statistically significant (p < 0.05), In PVI Group the baseline and end of surgery parameters are comparable with no difference statistically.

Conclusion

We recommend Lung ultrasonography after completion of major Oncosurgeries to detect EVLW and intraoperative PVI guided GDFT as these patients received less fluids, had less B-lines (Mild) and no decrease in Pao₂, Po₂(A-a) levels at end of surgery.