Hemoglobin trend in critically ill patients with long ICU stay

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Background and Goal of Study: Critically ill patients develop anaemia due to several reasons: bleeding prior or during ICU admission, frequent fluoroscopies, inflammatory status with altered erythropoiesis. The aim of the study was to assess the trend of hemoglobin (Hb) value during long ICU stay (>7 days) in transfused and non-transfused patients.

Materials and Methods: All patients admitted during 1 year in a 19-bed mixed ICU of a tertiary care university hospital with a longer ICU length of stay (LOS) >7 days were enrolled. Patients were divided into two groups: never transfused (NT) and ever transfused (ET). Collected data: demographic data, severity scores, Hb value during ICU stay, transfusion status. Statistical analysis was conducted with SPSS.

Results and Discussion: 132 patients were enrolled (54pts – NT, 78pts – ET).

| Hemoglobin trend | NT | ET |
|------------------|----|----|
| Admission        | 15.1±3 | 9.5±2.9 | 0.0009 |
| Day 7            | 9.3±1.8 | 9.0±1.73 | NS |
| Day 14           | 8.45±1.06 | 7.82±1.33 | NS |
| Day 21           | 9.16±1.02 | 7.61±1.04 | NS |

Hb value at ICU admission was 10.1±3g% in NT and 8.5±2.8g% in ET group. In our group Hb transfusion trigger was 7.8±2.3g%. During ICU stay (day 0-day 21) mean Hb decreases with 0.94g% in NT group and with 0.89g% in ET group (non-significant difference).

Conclusion(s): During the same period standard deviation (SD) decreases in NT (and ET group respectively) from 3g% (2.8g%) to 1.02g% (1.04g%).

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Initial distribution volume of glucose predicts hypovolemic hypotension after aortic surgery

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Background and Goal of Study: Assessing volemia is a major concern during peri-operative period. The initial distribution volume of glucose (IDVG) is calculated using a pharmacokineticone compartment model. During the first post operative day, we collected the hypovolemic hypotension events (systolic blood pressure < 90 mmHg responding to fluid challenge) and standard hemodynamic variables. For statistical analysis we used a Students t test and a Fisher test when appropriate.

Results and Discussion: Nine patients showed a hypovolemic hypotension (HH) event post operatively. IDVG was statistically lower in this group of patients (92.21±9 vs. 116.24±3 mL/kg; p=0.004). Between the hypotensive and normotensive patients there was no difference in heart rate, urine output and central venous pressure < 5 cm of water. Between the 2 groups, there was no difference in per operative fluid infusion (3505±1740 ml in HH patients vs. 4130±1133 ml in non HH patients; p=0.34). With a threshold of 100 mL/kg, IDVG can predict the occurrence of hypovolemic hypotension with an 89% sensibility and 85% specificity.

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|------------------|----|----|
| Admission        | 13.1±3 | 9.5±2.9 | 0.0009 |
| Day 7            | 9.3±1.8 | 9.0±1.73 | NS |
| Day 14           | 8.45±1.06 | 7.82±1.33 | NS |
| Day 21           | 9.16±1.02 | 7.61±1.04 | NS |

Conclusion(s): IDVG can predict the occurrence of hypovolemic hypotension after aortic surgery for anaemia. This method could be a useful tool to optimize the fluid infusion peri-operatively. This method need to be validated on a greater population and other types of surgery.

Liberal versus restrictive fluid administration in a goal-directed strategy: Toward a logic of optimisation of the patient circulatory status?

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Background and Goal of Study: Despite several studies concerning the influence of intraoperative fluid administration (liberal or restrictive) in high-risk surgery, the impact of such strategies has never been evaluated in a goal-directed strategy of optimization the patient circulatory status. Taking into account the risk of altered tissue perfusion during hypovolemia, this prospective and randomised study was designed to evaluate the influence of two strategies (liberal and restrictive) integrated in a goal-directed therapy in terms of hypovolemia and postoperative organs dysfunctions.

Materials and Methods: In this prospective study, 40 patients, ASA I-II, undergoing major abdominal surgery were randomised to 12 mL/kg/h (group Liberal, n=20) or 6 mL/kg/h (group Restrictive, n=20) intraoperative administration of colloid solution (NaCl 0.9% or Ringer lactate). In both groups, hemodynamic monitoring including oesophageal doppler, arterial pulse pressure variations (deltaPP) and oxygen delivery index (DO2). Hypovolemia were corrected by bolus of colloids (HE 130/0.4).

Results and Discussion: Pre-operatively, group L and R were comparable in terms of demographic data, ASA, P-Possum, types and duration of surgery. The amount of colloidul perfused was significantly lower in group R (median 3025 ml (2000-4500) vs 5570 ml (4000-8000), p<0.01). Compared with group L, hypovolemia as well as the amount of colloid necessary (125 ml (0-750) vs 625 ml (0-2000)) were significantly increased in group R (p<0.01). At the end of surgery, DO2 was comparable in both groups (450±108 ml/min/m² vs 491±161 ml/min/m², p=0.51). Post-operative complications were not significantly different in both group, except for the incidence of renal insufficiency (p<0.01) and a tendency to an increase incidence of sepsis (p=0.07) in group R. Post-operative recovery was not different according to groups.

Conclusion(s): Although promoted by recent work (1), according to the risk of hypovolemia, frequent and readily insidious, restrictive fluid administration expose to the risk of altered tissue perfusion and post-operative organ dysfunction. Early detection and correction of hypovolemia are fundamental. The application, in routine, of restrictive strategies of vascular filling does not seem to be able to be recommended within the framework of a more global strategy of optimization and monitoring of the hemodynamic profile of patients.

References:
1. Nenov V et coll. Effect of intraoperative fluid management on outcome after infrarenal aortic surgery. Anesthesiology 2005; 103: 25–32.