Indocyanine green elimination measurement may detect a procoagulant imbalance following major liver resection.

Preliminary results

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Background and Goal of Study:

The liver plays a central role in maintaining physiological hemostasis and preventing thrombosis. Major liver surgery is occasionally associated with liver dysfunction. Bleeding complication after hepatectomy has been traditionally recognized. However, the risk of postoperative hypercoagulability has been underestimated and only recently its relevance has become acknowledged.

In one hand, procoagulant imbalance has been previously defined by an increased ratio between FVIII levels and protein C in cirrhotic patients. This ratio has not been investigated after major hepatectomy. On the other hand, indocyanine green elimination by pulse spectrophotometry is a non-invasive monitoring system, validated to determinate liver function. The aim of this study is to establish a potential relationship between FVIII/protein C ratio and Indocyanine green clearance (ICG) in patients after a major liver resection on the basis of potential temporary postoperative liver dysfunction.

Materials and Methods:

33 patients scheduled for mayor liver resection were selected. ICG plasma disappearance rate (ICG PDR % min), procoagulant (Factor II, V, VII, VIII, IX, X, XI and XII) and anticoagulant (protein C, protein S and antithrombin III) factors were obtained preoperatively and on postoperative day 1 and day 2. This study is registered in ClinicalTrials.gov under the number NCT02813538.

	Day 1	Day 2
Factor VIII	186	192
Protein C	60	55
VIII/Protein C	3,3	4
ICG PDR	16	16,035

Results and Discussion:

The mean Factor VIII levels were high, protein C levels were low and factor VIII/protein C ratio was high on both postoperative day 1 (186 ± 47 , 60 ± 20 and 3.3 ± 1.4 respectively) and 2 ($192,3 \pm 43,05$, $55,4 \pm 21,8$ and $4,0 \pm 2,04$ respectively). The median ICG PDR was $16 \pm 6,99$ on postoperative day 1 and $16,0.35 \pm 6,88$ on postoperative day 2. Significant correlation was found between factor VIII/protein C ratio and ICG PDR measured on postoperative day 1 ($r = -0.42$, $p < 0.02$) and 2 ($r = -0.48$, $p < 0.008$).

Conclusions:

Our results suggest that low ICG PDR might be associated with an increased FVIII/protein C ratio, likely meaning that liver dysfunction (measured by ICG PDR) is linked to a procoagulant status. Further studies are required to confirm these results.