Transfusion requirements in orthotopic liver transplantation
Hendriks, Herman George Dirk

IMPORTANT NOTE: You are advised to consult the publisher’s version (publisher’s PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2004

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

Copyright
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

Take-down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): http://www.rug.nl/research/portal. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.
34 patiënten was een tweede heroperatie noodzakelijk en 26 patiënten ondergingen drie of meer heroperaties. Meestal werden deze operaties uitgevoerd in verband met infecties (44%) of bloedingen (27%) in de buik. Daraanast werden heroperaties verricht omdat er

Chapter 8

Conclusions and recommendations
34 patiënten was een tweede heroperatie noodzakelijk en 26 patiënten ondergingen drie of meer heroperaties. Meestal werden deze operaties uitgevoerd in verband met infecties (44%) of bloedingen (27%) in de buik. Darnaast werden heroperaties verricht omdat er

**Intraoperative RBC transfusion requirement during liver transplantation is the main determinant of postoperative surgical reinterventions.**

Surgical reinterventions are a reflection of post transplant morbidity. The mortality in the re-intervention group was significantly higher compared to the non-reintervention group. This finding underscores the importance of reducing intraoperative blood loss. Every measure to reduce blood loss i.e. RBC transfusion requirements in liver transplantation is an important objective to improve morbidity and mortality after liver transplantation. This notion should specifically be incorporated in the training programs of anesthetists and surgeons seeking a career in this field.

**Independent predictors for RBC transfusion requirements are the Child-Pugh classification of the recipient, length of cold ischemia, plasma urea level, year of transplantation, and the use of autologous (cell saver) blood.**

The Child-Pugh classification is a measure of the severity of liver disease. Its impact on transfusion requirements can be translated directly to the timing of the transplantation. With longer waiting times the liver disease progresses, as reflected in a higher Child-Pugh score. Timely referral of patients for evaluation, placement on the waiting list and transplantation is of paramount importance. Long waiting times for transplantation are predominantly caused by a shortage of liver donors. Hence, every measure should be taken to increase the number of available grafts. Split liver procedures, living-related liver transplantation, domino liver transplantation and non-heart beating donors to shorten the waiting time should be an integrated part of the activities of each liver transplant program. The influence of the year of transplantation on peroperative transfusion requirements reflects the experience of the transplant team. This learning effect should be incorporated in training programs for new anesthetists and surgeons wanting a career in liver transplantation. The length of the cold ischemia time was directly negative related to the peroperative RBC transfusion requirements. This implicates that cold ischemia times should be kept as short as possible to reduce the intraoperative RBC transfusion requirements. Liver transplantation therefore is not an elective procedure, with consequences for hospital logistics. Autologous blood transfusion by a cell saver increases transfusion requirements. This unexpected finding emphasises a reappraisal of the cell saver in a properly designed prospective and randomized study. Until then autologous
34 patiënten was een tweede heroperatie noodzakelijk en 26 patiënten ondergingen drie of
meer heroperaties. Meestal werden deze operaties uitgevoerd in verband met infecties (44%)
of bloedingen (27%) in de buik. Darnast werden heroperaties verricht omdat er
blood by a cell saver in liver transplantation should only be used as an emergency in selected
cases.

Recombinant factor VIIa appeared to be an effective drug to reduce transfusion
requirements in liver transplantation. It enhances thrombin generation in a localised and
time limited manner without causing systemic coagulation.

Our experience with rFVIIa, although limited, suggests that it can be used to minimise blood
loss, despite the complexity of hemostatic abnormalities in liver transplant patients. However,
the administration of rFVIIa potentially increases the risk of thrombosis. Particularly
thrombosis of the liver graft vessels is unacceptable, considering its consequence as the need
for retransplantation. Further studies are warranted to establish the suggested efficacy of
rFVIIa, to assess the optimal dose regimen, and to define criteria for the selection of patients,
in whom rFVIIa may be beneficial. Whether rFVIIa should be administered alone, together
with plasma or other hemostatic drugs like aprotinin, are questions that need to be answered.

The peroperative thromboelastography showed that recombinant factor VIIa influences not
only the speed of clot formation, but also the physical properties of the clot.

Thromboelastography appeared to provide the most direct and adequate information during
the operation to assess hemostasis. It would be very helpful if a simple and rapid laboratory
test becomes available to assess hemostasis and the effects of correcting measures more
appropriately then the current available “classical” screening tests. Thromboelastography is a
candidate technique, which provides overall information about clot formation, as well as
additional information regarding the physical properties of clot formation. Although
thromboelastography has potential benefits, as compared with the classical tests, its
application in clinical practice needs to be validated in properly designed controlled clinical
trials, including the specific setting of liver transplantation.

All together, transfusion requirements during liver transplantation have decreased
considerably in our program. The proportion of primary liver transplant patients without
transfusion of units RBC’s gradually increased in the past years from 4% to 30%. However,
due to its still present negative influence on outcome, it merits ongoing attention of all
specialists involved in this procedure.

-95-
34 patiënten was een tweede heroperatie noodzakelijk en 26 patiënten ondergingen drie of meer heroperaties. Meestal werden deze operaties uitgevoerd in verband met infecties (44%) of bloedingen (27%) in de buik. Darnaast werden heroperaties verricht omdat er
34 patiënten was een tweede heroperatie noodzakelijk en 26 patiënten ondergingen drie of meer heroperaties. Meestal werden deze operaties uitgevoerd in verband met infecties (44%) of bloedingen (27%) in de buik. Darnaast werden heroperaties verricht omdat er

Nederlandse Samenvatting