# Internal Validation of Coagulation Factor V as a Predictive Tool for Early Graft Dysfunction

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## INTRODUCTION

Early allograft dysfunction (EAD) is a major complication after liver transplantation (LT), often leading to retransplantation or death. However, no consensus definition exists.

The most widely used criteria rely on parameters measured on postoperative day (POD) 7, limiting early decision-making. More recent models require complex scores and pre-established calculators, hindering bedside applicability.

Coagulation Factor V (FV) and ALT reflect liver synthesis and hepatocellular injury, and may offer a simple, early alternative for risk stratification.

## AIM

To internally validate the prognostic value of Factor V and ALT on postoperative day 2 as early predictors of graft loss after liver transplantation.

## METHOD

We conducted a retrospective cohort study including **513 adult liver transplant** recipients from 2012 to 2023 at the **Regional University Hospital of Malaga**.

Based on previously published pilot results, **FV<37.5% and ALT >1539 U/L on POD2** were used as cut-off points to classify patients into four risk groups.

This combination constitutes the predictive model referred to here as the **FLAG model** *(Factor V and ALT for Graft loss).*

The primary outcome was **90-day graft loss**, defined as retransplantation or death. A secondary outcome was **7-day graft loss** due to severe dysfunction.

**Kaplan–Meier survival curves, Log-Rank** tests, and **logistic regression** analyses were performed.

## RESULTS

Among the 513 patients, 43 (8.4%) experienced graft loss within 90 days, and 15 (2.9%) within 7 days due to severe graft dysfunction.

The combination of FV <37.5% and ALT >1539 U/L on POD2 yielded a **specificity of 99%, 90% sensitivity for liver-related causes,** and an OR of 74 for predicting 90-day graft loss. Based on these thresholds, patients were classified into four risk groups with predicted probabilities of graft loss of 68%, 36%, 11%, and 3.2%, respectively.

In the 7-day subanalysis, the model showed **100% sensitivity, 98% specificity**, and an OR of 807. Predicted graft loss probabilities for each group were 95%, 26%, 17%, and 0.4%, respectively.

*Kaplan–Meier curves showed significant differences in graft and patient survival between patients who fulfilled both thresholds and those who did not (**Log-Rank p < 0.001**).* **Patient survival exceeded graft survival**, highlighting the potential **benefit of timely retransplantation** when a high risk of graft loss is identified early.

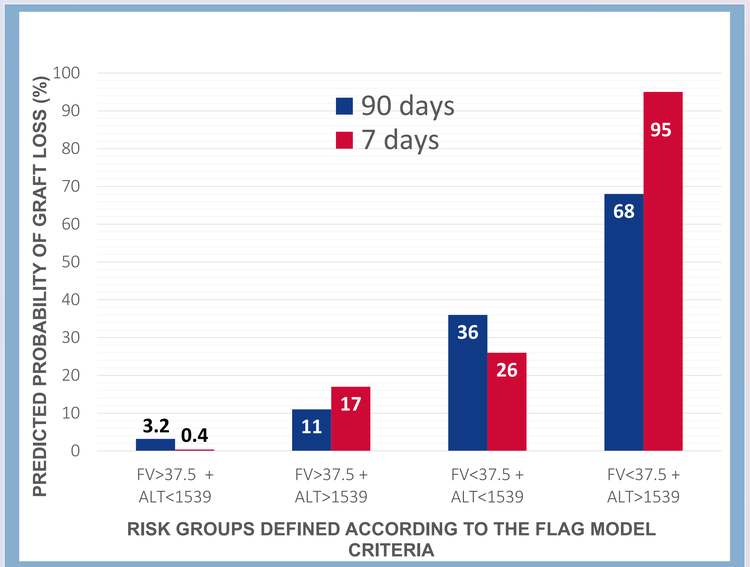


**Figure 1.** Predicted probability of graft loss at 90 and 7 days by risk group based on POD2 Factor V and ALT thresholds

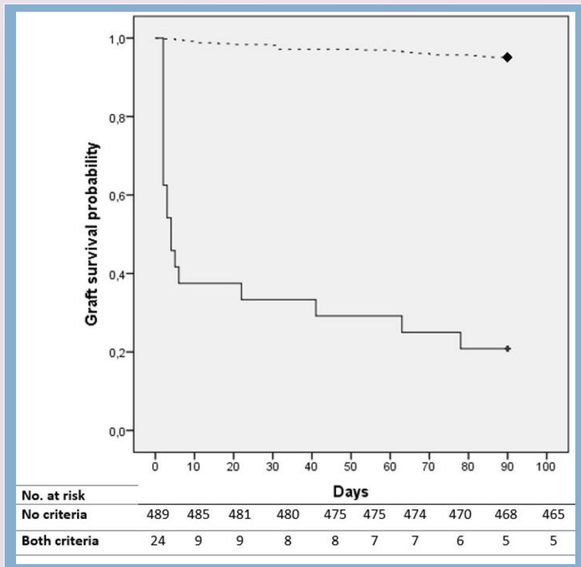


**Figure 2.** Graft survival by FV and ALT fulfilment

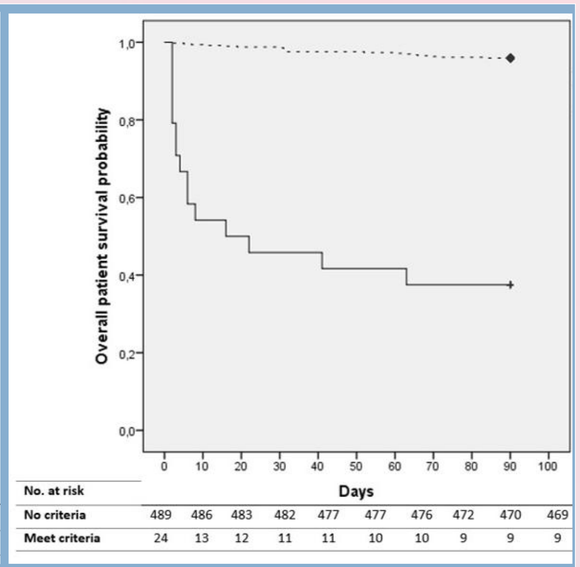


**Figure 3.** Patient survival by FV and ALT fulfilment

## CONCLUSION

- FV and ALT levels on POD2 are **early markers for predicting graft loss**, enabling risk stratification and guiding clinical decision-making.
- **FV<37.50 + ALT>1539** identifies patients at high risk of graft loss with **high specificity and** is also associated with patient survival in the first week and 90 days.
- Notably, **patient survival exceeded graft survival**, highlighting the potential value of this model to guide **early consideration of retransplantation.**
- These findings lay the groundwork for **future multicentre studies** to externally validate the utility of the **FLAG model** in broader populations.

## REFERENCES


- Sanchez-Gonzalez C, Fernández Aguilar JL, Sánchez Pérez B, et al. Primary graft dysfunction: Factor V's value for its early diagnosis. Transplant Proc. 2022;54(9):2531–2534.
- Sanchez-Gonzalez C, Fernández Aguilar JL, Sánchez Pérez B, Santoyo Santoyo J. Value of factor V in the diagnosis of early graft dysfunction after liver transplantation: internal validation. *Liver Transpl*. 2025;31(4):489–497.
- Pareja E, Cortes M, Hervás D, et al. A score model for the continuous grading of early allograft dysfunction severity. Liver Transpl. 2015;21(1):38-46..
- Agopian VG, Harlander-Locke MP, Markovic D, et al. Evaluation of Early Allograft Function Using the Liver Graft Assessment Following Transplantation Risk Score Model. *JAMA Surg.* 2018;153(5):436-444
- Olthoff KM, Kulik L, Samstein B, et al. Validation of a current definition of early allograft dysfunction in liver transplant recipients. Liver Transpl. 2010;16(8):943–949.


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