

Status quo of need and potential role of machine perfusion for liver transplantation in Germany.



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Introduction

In Germany, donation after brain death (DBD) remains the sole source of organs. While potentially available, donation after circulatory death is not yet established and is unlikely to be implemented. Living donor liver transplantation (LDLT) also remains underrepresented.

Furthermore, the quality of DBD organs has declined: >60% are suboptimal (Donor Risk Index >1.5). Within the Eurotransplant region, particularly in Germany, the proportion of Extended Criteria Donor (ECD) livers now surpasses 50% and is projected to increase further. Concurrently, with the global rise in obesity, MASLD has become a significant concern in liver transplantation (LT) (~30% of post-mortem donations).

Several aspects of organ procurement introduce additional risks: limited qualification of procurement surgeons, inconsistent assessment, prolonged organ procurement times. The longstanding organ shipping system further exacerbates this, contributing to an extended cold ischemia time.

Collectively, these factors increase the marginality of grafts, leading to poorer outcomes and reduced survival rates after LT.

Methods

Traditional preservation methods, such as static cold storage (SCS), offer limited capacity to improve or assess the grafts. Unfortunately, SCS remains the predominant and often sole method of organ preservation in Germany. Machine perfusion (MP) represents a significant advancement, offering the potential to optimize preservation and facilitate pre-transplant assessment. Despite the fact that most German transplant centers recognize MP as a crucial innovation and are either actively performing MP or about to start, practical experience in Germany is still relatively limited.

Results

Only 6/22 centers have performed more than 30 perfusions, with Hypothermic Oxygenated Machine Perfusion being the most frequently used procedure. A recent survey¹ revealed: 71% of low-volume centers perfuse all accepted organs; 83% of high-volume centers primarily perfuse marginal organs. An average 15% increase in utilization unanimously acknowledged a clear advantage of MP for German programs.

However, several obstacles hinder the routine implementation of MP in LT in Germany: the absence of dedicated studies and economic challenges, primarily because there is no reimbursement nor specialized personnel dedicated to MP.

Conclusion

The current critical situation, characterized by organ scarcity and declining organ quality, clearly underscores the urgent need for the standardized utilization of MP in LT.

References:

1) Oldhafer, Felix et al. "Maschinenperfusion in der Lebertransplantation – was ist möglich und wo stehen wir in Deutschland? Übersicht der Literatur und Ergebnisse einer nationalen Umfrage" [Machine Perfusion for Liver Transplantation - What is Possible and Where Do We Stand in Germany? Review of the Literature and Results of a National Survey]. *Zentralblatt für Chirurgie* vol. 146,4 (2021): 382-391. doi:10.1055/a-1363-2520

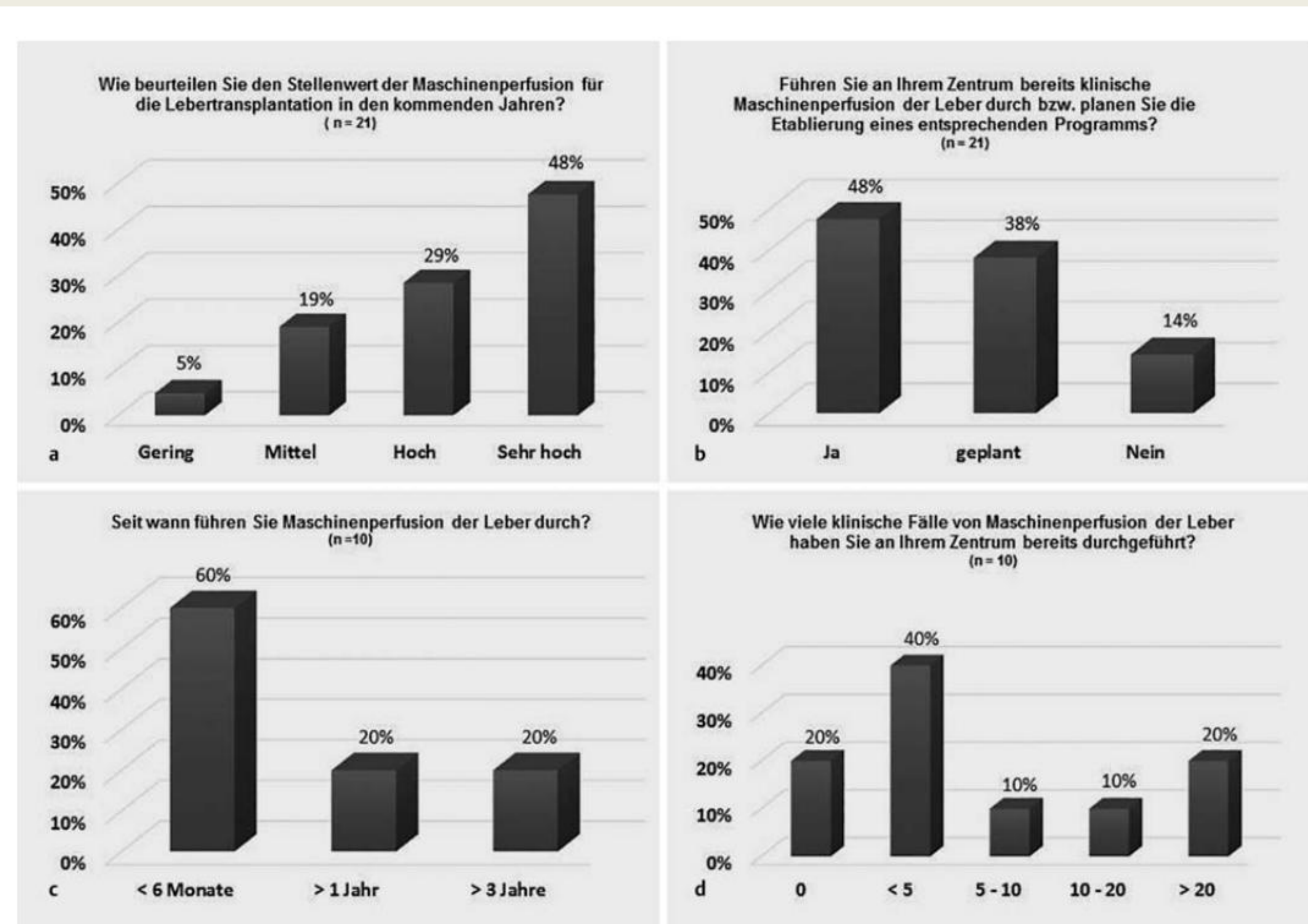


Figure: Summary of the most important results of survey on liver machine perfusion, with the participation of all German liver transplant centers (n = 21).