

## INTRAPORTAL HUMAN ALLOGENEIC MESENCHYMAL STEM CELLS INFUSION FOR POSTHEPATECTOMY LIVER FAILURE PREVENTION: THE PILOT CASE SERIES EXPERIENCE

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### INTRODUCTION

Mesenchymal stem cells (MSCs) have been demonstrated to stave off the progression of liver injury and potentially improve liver function. It has shown exciting therapeutic effects in drug-induced liver failure, while only a few studies have been reported in liver surgical models.

We have previously shown that intraportal local infusion of allogeneic adipose tissue MSCs during liver transplantation is safe and feasible with promising immunomodulatory effect.

### AIM

The aim of this study was to assess *feasibility and safety* of the **allogeneic adipose tissue MSCs local intraportal infusion** for PHLF prevention

### METHOD

Prospective case-control study  
Period: 03/2020 – 01/2022

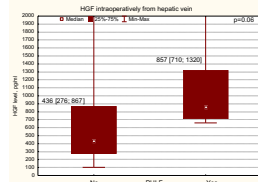
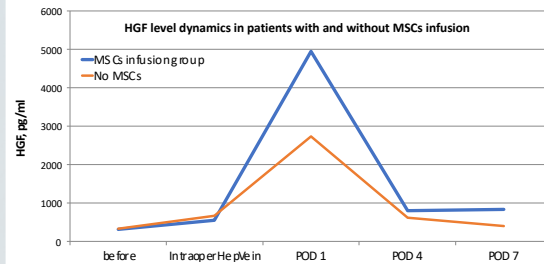
**Major (4 and more segments) liver resection (LR)**  
37 patients included: 33 pts with malignant;  
4 pts with benign lesions

Indication for intraportal MSCs infusion (4 pts) – future liver remnant (FLR) volume < 30%  
~20 million allogeneic human adipose MSCs were infused intraportally during major hepatectomy after direct intraportal pressure measurement subsequent to surgical removal of specimen before wound closure

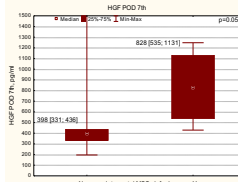
Serological probes from peripheral vein before, on the 1st, 4th and 7th postoperative days (POD) as well as intraoperative probes from portal and hepatic veins have been taken

Liver remnant biopsy was taken before wound closure. Ultrasound was performed postoperatively (PVT?)  
Primary outcome: PHLF based on ISGLS criteria  
Complimentary Luminex assay and immunohistochemistry were done to investigate the main cytokines and pathways involved

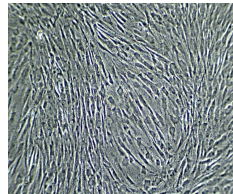
### RESULTS



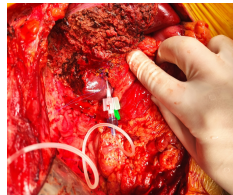
Statistically significant difference of HGF level in hepatic vein (intraoperatively) in patients with and without PHLF



Statistically significant difference of HGF level in peripheral blood on the 7<sup>th</sup> POD in MSCs infusion group



Allogeneic adipose tissue MSCs.  
Immunophenotype:  
CD105+CD90+CD73+CD29+CD13+CD44+  
CD14-CD34-CD45-HLA-DR-



Intraportal MSCs infusion into the left portal vein.

#### MSCs infusion group:

Indication: 3 out of 4 pts – liver Alveococcosis, one – multiple FNH  
FLR = 31% [25;35]

1 ALPPS procedure and 1 portal vein embolization before LR

During ALPPS procedure MSCs were infused twice (during the 1st and the 2nd stage of LR)

There were no PHLF

1 patient deceased due to PDR Klebsiella cholangitis and sepsis on the 15th POD.

No PVT or other MSCs infusion complications were revealed.

	MSCs group, n=4	No MSCs group, n=33
Age	55 [53; 62]	55 [46; 67]
PHLF (B+C)	0% (0/4)	15% (5/33)
Mortality	25% (1/4)	9% (3/33)
Bloodloss, ml	300 [225; 300]	300 [200; 400]
T. Bil before, mmol/l	10 [8; 17]	10 [7;16]
T. Bil POD 5, mmol/l	25 [21; 27]	18 [10; 30]
INR POD 5	1,1 [1,0; 1,4]	1,2 [1,1; 1,5]

### CONCLUSIONS

Clinical intraportal MSCs infusion during major hepatectomy is **feasible and safe** intervention with no severe adverse events revealed.

The future clinical investigation is needed to provide evidence of PHLF prevention by intraportal MSCs infusion

### REFERENCES

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