Ultrasound liver and spleen stiffness are good biomarkers of complications in the 6 months following paediatric liver transplantation

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Context

- In Bicêtre hospital - Number 1 French paediatric liver transplantation (LT) centre – 40 / year, liver and spleen stiffness have become a routine measurement and a key element for decision-making in multidisciplinary staff meetings.

- Even when the acute post-transplantation period is problematic, ultrasound liver and spleen stiffness measurement (LSM) appear to be interesting to evaluate early graft condition and detect complications.

- However, liver and spleen stiffness measurement in the context of liver transplantation (LT) have been poorly studied until now, especially in children.

Plan

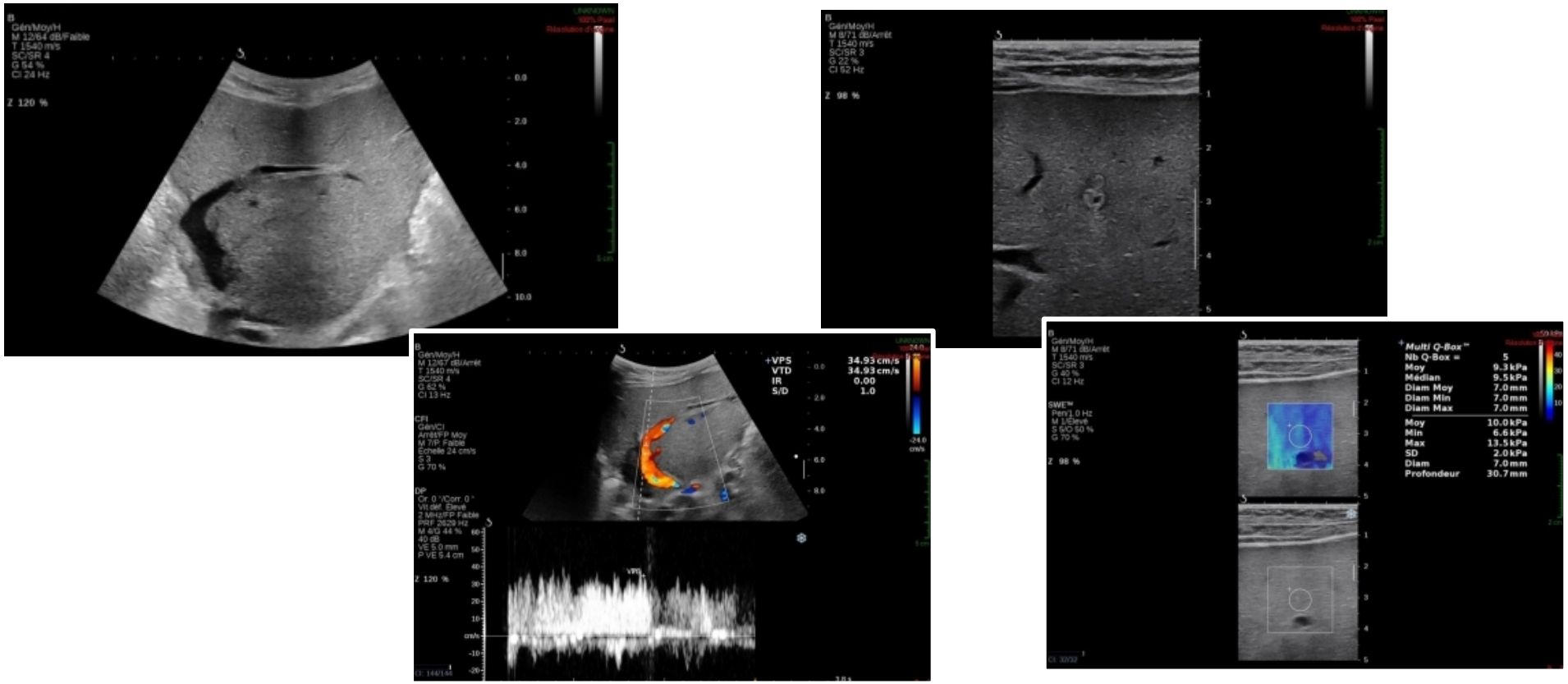
- Objective
- Methodology
- Results & discussion
- Perspectives

Objective

- The purpose of the study is to systematically evaluate the liver and spleen stiffness on a weekly basis for the first 8 weeks and then monthly until 6 months after transplantation, and to evaluate their performances for the diagnosis of graft complications.

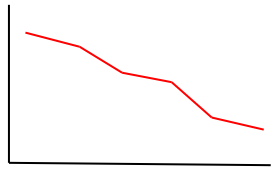
Patients & Methods

- 2D + Doppler + Elastography

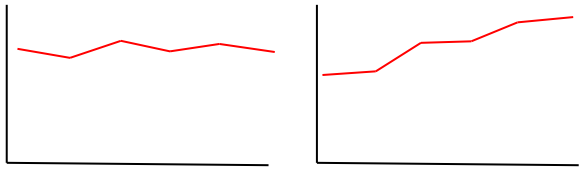


Patients & Methods

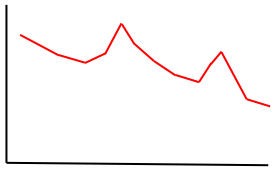
- Prospective longitudinal cohort study with systematic inclusion of paediatric liver recipients.
- Collection of clinical and biological data and liver and spleen stiffness measurement (LSM) every week until week 8 and then every month until month 6. Supersonic ShearWave Elastography.
- For each patient and both measurements, changes over time were categorized by 2 experts into 3 groups:



1. continuous decrease (normal)



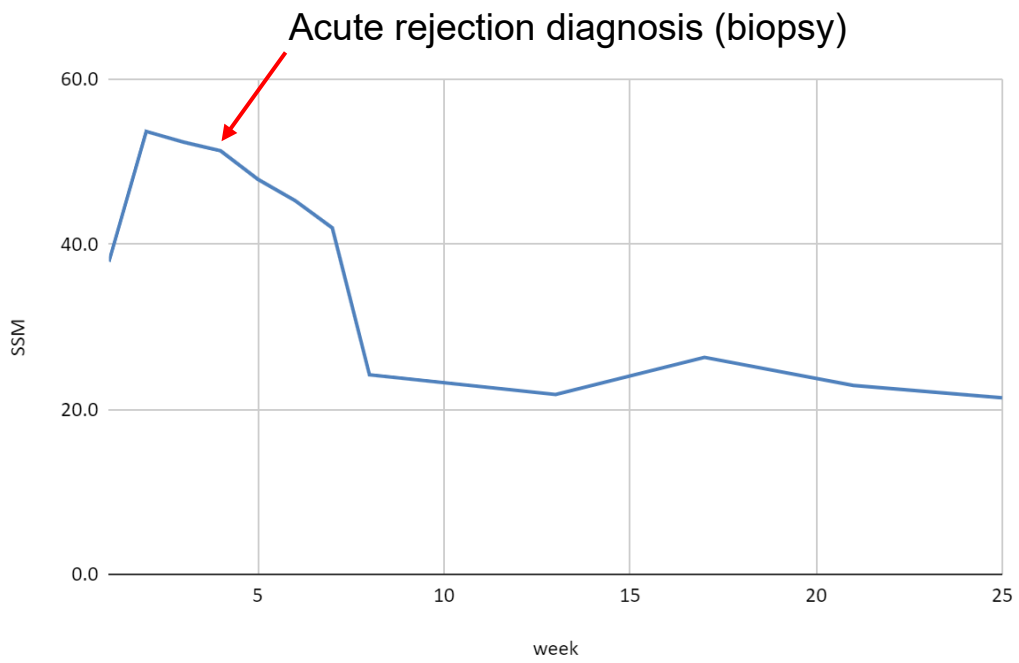
2. plateau at a high level or continuous increase (abnormal)



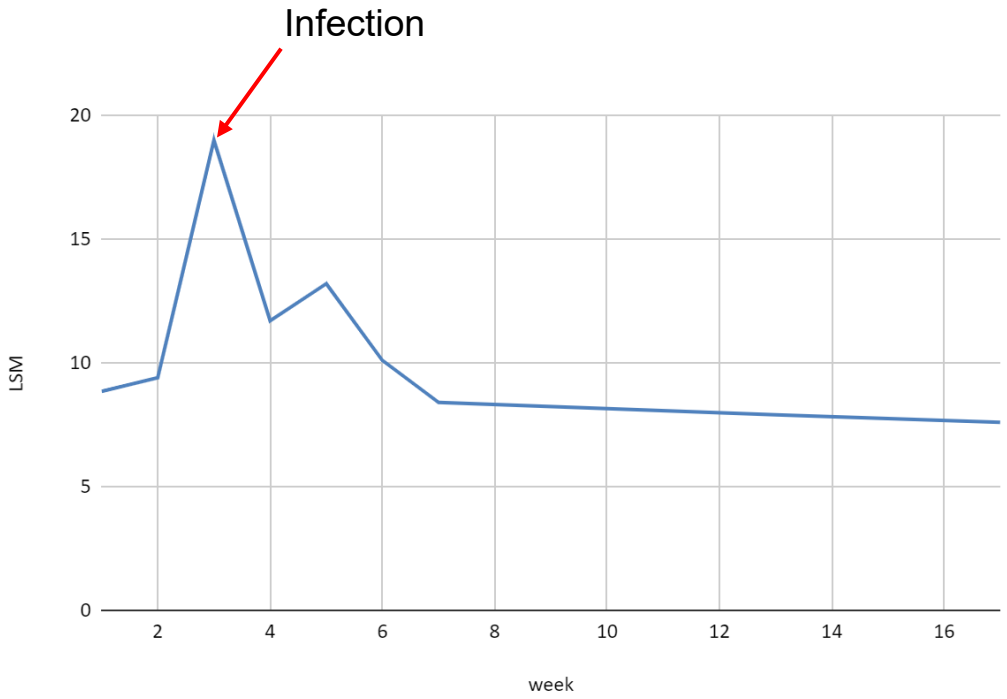
3. sporadic increase (abnormal)

- The 2 experts evaluated how stiffness changes and graft complications correlated over time.

Examples



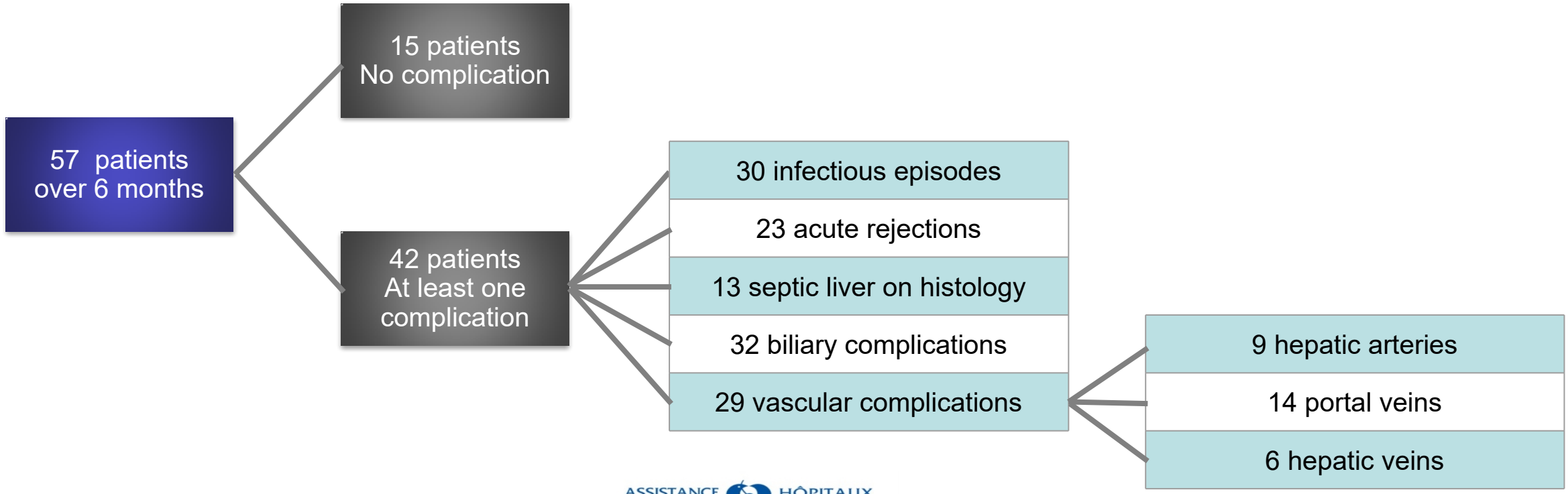
patient #98
Spleen stiffness



patient #86
Liver stiffness

Results

- From December 2015 November 2019, 57 liver recipients were studied,
- Median age 2.3 y (from 0.3 to 15.2 y).



Results

Liver stiffness and graft complication

Positive Predictive Value	88%
Negative Predictive Value	33%
Sensitivity	88%
Specificity	66%

Association of complications with abnormal liver stiffness curve

Acute rejection	100%
Refractory ascites	100%
Infection	86.7%
Biliary complication	75%
Multiple complications	100%

Results

Spleen stiffness and graft complication

Positive Predictive Value	97.6%
Negative Predictive Value	46.6%
Sensitivity	83.7%
Specificity	87.5%

Association of complications with abnormal spleen stiffness curve

Portal vein complication	100%
Acute rejection	85.7%
Refractory ascites	100%
Infection	100%
Biliary complication	85.7%
Multiple complications	100%

Results

- Liver and spleen stiffness decrease regularly after transplantation when there is no complication.
- Sporadic increase, continuous increase or plateauing at a high level, of LSM and SSM have very good PPVs for complications.
- However a normal trend of LSM and SSM does not preclude the occurrence of a complication.

Perspective

- LSM and SSM are good biomarker of complications following liver transplantation in children. LSM and SSM decrease after LT without complication.
- The analysis of the complete cohort of 110 patients over 6 months should allow to define cutoffs for liver stiffness and spleen stiffness to help diagnose complications.
- Based on our experience and preliminary results, it is strongly advised to include LSM and SSM in routine follow-up of children after liver transplantation.

Thank you for your attention

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