**Dep. Of Postgraduate studies and Research Affairs**
National Liver Institute
Menofiya University
Egypt

# RESEARCH GRANT

## Application form

**PERSONAL DETAILS**

| | |
|---|---|
| **Family name:**<br>Mostafa | **Other name:**<br>Sira |
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| **Degree:**<br>MD | **Title:**<br>Associate Professor |
| **Collaborator (if any):**<br>Behairy Elsayed Behairy; Elsayed Ibrahem Salama; Khaled Refaar Zalata and Mohamed Ahmed Abd-Allah | |

**A. PROJECT TITLE**

Transient Elastography Compared to Liver Biopsy and Morphometry for Predicting Fibrosis in Pediatric Chronic Liver Disease: Does Etiology Matter?

**B. OTHER RESEARCH GRANTS CURRENTLY HELD AND/OR APPLIED FOR**

None

**C. PROJECT DETAILS** (maximum of 2 pages)

***Proposal activities***

Liver fibrosis is observed in a large proportion of children with chronic liver disease regardless its cause. Early treatment of the cause can limit the progression of fibrosis but not always prevent its development until its advanced stage, known as cirrhosis. In all of the cases follow-up of liver fibrosis appearance and progression is required for the initiation of treatment and anticipation of the possible necessity for liver transplantation.

Liver biopsy followed by conventional histological analysis is the gold-standard to evaluate liver fibrosis; however, liver biopsy can have life-threatening complications in both adults and children. It is

therefore difficult to use as a follow-up tool for liver fibrosis. Moreover, the accuracy of liver biopsy has also been questioned because of sampling errors and intraobserver and interobserver variability, which lead to an overstaging or understaging of fibrosis. In addition, fibrosis is evaluated by histological semi-quantitative scores, among which the METAVIR, Knodell, Ishak and Scheuer.

Digital image analysis (Morphometry) is a method for quantitative assessment of fibrosis in liver biopsy using pixel counting to calculate fibrosis area fraction on picrosirius red (staining of collagen) stained sections. The advantage of digital image analysis over semi-quantitative scores is that it is truly quantitative, providing more objective data and detecting smaller changes between biopsies particularly in patients with early stage fibrosis.

These drawbacks justify an intensive research on non-invasive alternatives, that are safe, inexpensive and reliable, to be a priority (Rockey and Bissell, 2006). Proposed approaches, including physical examination, routine biochemical and hematological tests and surrogate serum fibrosis markers such as Fibrotest and aspartate transaminase to platelets ratio index (APRI), are not accurate enough, not routinely available, and were suggested to be useful in reducing but not replacing the need for liver biopsy.

Ultrasonography is a noninvasive method that has been used to assess fibrosis in the entire liver. The sensitivity of this imaging modality can be as high as 90% for diagnosing cirrhosis, but it is not widely used in practice because the results are operator-dependent and the performance has been shown to be inferior to clinical examination and laboratory tests.

Fibroscan is a new medical device based on transient elastography which measures liver stiffness in a noninvasive rapid painless and reproducible way (Mendoza et al., 2010). With this method, an ultrasound transducer probe is mounted on the axis of a vibrator. Vibrations of mild amplitude and low frequency are transmitted by the transducer, inducing an elastic shear wave that propagates through the underlying tissues. Pulse-echo ultrasound acquisition is then used to follow the propagation of the shear wave and measure its velocity, which is directly related to tissue stiffness. It measures the tissue stiffness in a volume that approximates a cylinder 1 cm wide and 4 cm long, with a measurement depth between 25 and 65 mm below the skin surface. This volume is at least 100 times larger than a biopsy sample and therefore far more representative of the hepatic parenchyma.

In recent studies, fibroscan evaluation of liver stiffness was found to be a useful non-invasive method for the evaluation of patients with chronic hepatitis C in clinical practice, and is suggested to replace liver biopsy in many cases for the decision of therapy.

***How will this grant add value to your project?***

Most of needed investigations are routinely performed for patients in the hospital. Further costs will be for Elastography and liver biopsy morphometry which are the cornes stone of the research

***How does your research align with the priorities outlined in the National Liver Institute?'***

The expanding spectrum of liver diseases in pediatric age group neccesitation the repition of liver biopsy either for treatment decision or treatment cessation inforced us to search for relaible non-invasive alternative to liver biopsy which is one of the major research points in the National Liver Institute.

**D. BUDGET DETAILS**

| Item | Amount (LE) |
|---|---|
| Elastography | 18,000 |
| Morphometry | 8,000 |
| Travel cost | 5,000 |
| papers and documents | 1,000 |
| Other costs | 3,500 |
| **Total** | LE 35,500 |

Declaration

I have discussed the contents of this application with my research team and I certify that to the best of my knowledge all documentation and information submitted is true, accurate and complete.

**Signature** **Date**

January 3, 2011

Mostafa Mohamed Sira