Overview of FIR Therapy for HD Vascular Access

FIR Therapy reduced AVF malfunction by 58% in a 1-yr. clinical study


RESULTS: When compared with controls, the FIR group experienced:

- **58.4% REDUCTION** in AVF malfunction rate
- **27% IMPROVEMENT** in AVF unassisted patency
- Significantly lower incidence of AV fistula malfunction (1 episode per 67-7 patient months vs 1 episode per 26-7 patient months.)  P=0.03

**Figure**: Comparison of 1-year AV fistula survival

FIR Therapy stimulates production of potent anti-inflammatory agents such as heme oxygenase (HO-1), and effectively reduces inflammatory markers created during HD.

- **RESULTS**: This anti-inflammatory cascade reduces endothelial dysfunction, inhibits neointimal hyperplasia, and lowers oxidative stress. It also increases access blood flow and angiogenesis.1-7

- **DETAILS**: Clinically, FIR Therapy has been found to lower the increase of inflammatory markers induced by hemodialysis; such as hypersensitive C-reactive protein (hsCRP), soluble ICAM-1 (sICAM-1), soluble VCAM-1 (sVCAM-1), and asymmetric dimethylarginine (ADMA).2,5

- **ICAM-1 protein** is an intercellular adhesion molecule. Upon cytokine stimulation, its concentrations in the membranes of leukocytes and endothelial cells greatly increase. ICAM-1 can be induced by interleukin-1 (IL-1) and tumor necrosis factor alpha (TNFα) and is expressed by the vascular endothelium, macrophages, and lymphocytes. **VCAM-1 protein** mediates the adhesion of lymphocytes, monocytes, eosinophils, and basophils, to vascular endothelium. It also functions in leukocyte-endothelial cell signal transduction, and it may play a role in the development of atherosclerosis and rheumatoid arthritis.

- **ADMA** is an endogenous molecule which acts as an inhibitor of nitric oxide (NO) synthesis, and NO produced in endothelial cells is a vasodilator and antithrombogenic agent. Therefore ADMA has been studied extensively, and an elevated level of ADMA is shown to be a marker for impaired endothelial function and cardiovascular risk.
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FIR Therapy Research:

Access flow, AVF maturation, Surgical intervention Rates

- **Lin CC et al 2007.** In a clinical study of CKD patients with end stage kidney disease (ESRD),\(^1\) one group was given 40 mins. of FIR therapy 3x/ wk., for 1 year during AVF hemodialysis. Compared to controls, the FIR group’s blood flow increased more significantly after 1 x 40-minute treatment, and continued to improve for a year. After one year, blood flow of the FIR group had *increased* by 6.8 % compared to the control group without FIR therapy, whose blood flow in a year, had *reduced* by 5.2%.

- **Bashar K et al Meta-analysis 2014:** In a review of 4 RCTs using FIR therapy with ESRD patients 40 minutes day during dialysis, 3 times a week for a year, this study found that the FIR therapy group achieved a 51% reduction in surgical interventions to save a threatened fistula compared to controls. They also found that “FIR therapy was shown to have improved access flow and a one year effect of increasing AVF patency by about 18% over controls” 1.6-8

- **Now approved in 6 Asian countries and in the EU, FIR is used for HD in the UK’s National Health Service and is standard vascular access care in Taiwan:**

  “This novel non-invasive therapy has become a standard of access care in Taiwan since 2007, where it is being used in 90% of the dialysis centers. **FIR Therapy has been proven to improve vascular access care and to reduce the economic impact of ESRD**”  
  Dr. Yuh-Feng Lin, Taiwanese Society

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References: