Physician Clinical Experiences with FIR Therapy in the UK and Taiwan

ENGLAND

1. **Source:** Moore I [1], Adam JH, Sweeney D, et al. (2011).
Far infrared (FIR) therapy – An effective treatment for AV fistula maturation and maintenance. *J Am Soc Nephrol* 2011; 22: 564A (Poster FR-PO1947).

Results: "In one 3-month period, 63 patients benefited from the use of the FIR therapy. 146 individual sessions were completed (median FIR sessions 2, range 1-4). **15/20 patients had improvement of pain score on needling of AVF**. **23/27 AVF needle-site haematomas resolved quicker than expected with FIR therapy.** Some of those patients with pain on needling also developed haematomas responsive to FIR therapy. **15/20 AVFs matured with demonstrably better blood flow rates on Doppler in patients with previous AVF maturation failure."**

"We have found improvement in AVF maturation, patency, and blood flow rates. FIR therapy also reduces pain on needling and size of haematoma post-needle tissue."

Conclusions: "By using FIR therapy, we have reduced our vascular access failure rate and have also minimized surgical intervention and consequent patient co-morbidity. We have been able to demonstrate that FIR therapy is cost effective and reduces effort and resources in vascular access management."

"**Over the last 12 months due to overwhelmingly positive feedback from our patient group we have expanded our FIR programme to cover our central unit and satellite units. We believe this is the first systematic use of this effective, patient-centred innovation in the UK. "**

2. **ENGLAND. Source:** Shipley T[1], Sweeney D, Moore I, Fenwick S, Saheed A. **Far infrared therapy for arteriovenous fistulas** *British Journal of Renal Medicine*.2013; 18(4):30-31

The Sunderland experience (2013)

"FIR has now been adopted into a systematic programme of treatment for our predialysis and HD populations at City Hospitals Sunderland NHS. Patients are treated immediately after AVF formation with three FIR sessions per week… FIR continues for an average of six weeks or more".

"It is an extremely well-tolerated treatment, with no side-effects reported by any of the patients "…." Between January 2011 and April 2012, 1,272 individual FIR sessions took place at CHSFT on 139 patients – 903 for HD patients and 369 for predialysis patients. The average number of treatment sessions per patient was just under ten.

Dr. T Shipley et al (continued):

"Patients attended the renal outpatient department at the hospital three times a week for their treatment, which takes place in a dedicated room next door to the HD unit under the management and supervision of a team of specialist renal nurses. The flexibility of the treatment allows in-centre treatment during dialysis, clinic visits or inpatient admission, or treatment at home using a portable device (Figure 2 with WS FIR Therapy Unit).

"**Patients have objectively recorded a reduced pain score on needling an AVF under the influence of FIR, as well as improvement in haematoma resolution**. We surveyed 40 patients on our HD unit who underwent FIR of their AVF because of pain associated with needling (see Figure 3). Patient testimonials have been integral to developing our service further."

Conclusion

"The creation and preservation of an AVF is vital to ensure the best possible outcomes for HD patients. However, the high rate of complications associated with this process pose a significant challenge. **FIR is a safe and effective treatment modality that has been shown to reduce these complications and improve the efficiency of AVFs through its direct anti-inflammatory properties.**

At CHSFT, we have shown that it is possible to set up a dedicated, nurse-led FIR service within a busy dialysis unit, which is available to all patients with CKD who have AVFs. Our experience and feedback from patients informs us that it is a well-tolerated treatment that reduces pain for patients during needling, and has the potential to improve patient outcomes by optimizing their HD treatment through better vascular access."

TAIWAN

3. Source: Experiences with far infrared therapy described by cardiovascular surgeon, Dr. Jih-Chung Chiang, Show Chwan Memorial Hospital and by Dr. Poh Sung Lim, Nephrologist, and Fresenius Medical Director for Taiwan. [Please see full reference on last page]

3.1 Experience of Dr. Jih-Chung Chiang, Chairman of Taiwan Association for Dialysis Patients' Quality of Life, and cardiovascular surgeon at Show Chwan Memorial Hospital, Department of Cardiovascular Surgery

"**I have performed hemodialysis vascular access operations for 28 years, involving more than 16,000 patients, and encountered over 20 types of fistula complications**. With today's advances in surgical procedures, many patients still experience difficulties with fistula maturation, or have fistula survival of less than six months after maturation."

3.1 Dr. Jih-Chung Chiang (continued):

"I came across WS Far-infrared Therapy Unit 15 years ago [1998], and began applying the therapy for post fistula procedures and maturations. **The therapy has since been used to treat many difficult cases…**
My first case using the therapy was a patient with dysfunctional fistulae on both arms and legs. The patient developed superior vena cava stenosis and associated facial swelling following the placement of a Hickman catheter. After using WS Far-infrared Therapy Unit, the patient's facial swelling improved considerably. The patient subsequently benefited from routine use of far-infrared therapy, and was able to receive hemodialysis treatment through the arteriovenous fistula on the right arm again.

"In the following three years, after extensive clinical experiences, I observed the therapy's effectiveness and began recommending use of the therapy in various hemodialysis centers. **Currently, there are more than 500 dialysis centers in Taiwan, more than 90% of which use WS Far-infrared Therapy Unit for routine fistula care. Meanwhile, an increasing number of medical researchers are contributing to relevant clinical and fundamental studies."**

Important Application Concepts by **Dr. Jih-Chung Chiang:**

"I am pleased to see a new treatment that improves the arteriovenous fistula flow rate patency, and would like to share several important application concepts with you:

A. Begin treatment just before, and right after fistula construction:

Once the patient consents to receive hemodialysis and fistula construction, WS Far Infrared Therapy Unit *can be applied before the surgery* to dilate blood vessels and assist in the subsequent implementation of the surgery. Application of WS Far-infrared Therapy Unit on the day following the surgery facilitates healing, promotes fistula dilation, and prevents arteriovenous stenosis and sclerosis."

"Routine far-infrared therapy during the fistula maturation stage ensures smooth fistula functioning in later dialysis, reduces the rate of fistula thrombosis, sclerosis, and insufficient blood flow, and extends the life-span of the fistula. Combined with adequate fluid control, patients can avoid the problem of regular vascular access intervention or fistula reconstructions."

Important Application Concepts (continued):

B. Improved effectiveness with daily application

"Although most dialysis centers in Taiwan are equipped with **WS Far-infrared Therapy Unit** for hemodialysis patients, patients generally receive a maximum of three treatments weekly,
I have observed that a once daily FIR treatment regimen enhances patients' fistula conditions. **Specifically,** ***for patients with poor vascular functioning, daily treatment significantly improves their vascular access and the delivery of dialysis. Moreover, the treatment enables fluid in the tissue to enter the blood vessels rapidly, stabilizes circulation, reduces the rate of acute fistula embolization, and alleviates post-dialysis symptoms including insomnia, muscle ache, and gastrointestinal distress."***

C. Newly created fistula requires daily FIR Therapy treatment.

"In optimal cases, with daily treatment, the maturation time may be reduced and be used for dialysis more rapidly."

"In summary, appropriate and active use of WS Far-infrared Therapy Unit benefits the patients and their family. I wish to use my clinical experiences to help more hemodialysis patients to resolve their fistula problems."

By Dr. Jih-Chung Chiang, 2013
Show Chwan Memorial Hospital, Department of Cardiovascular Surgery

4.0 TAIWAN

Experience of Dr. Poh Sung Lim, Fresenius Medical Director, Taiwan

"When I first entered the field of hemodialysis, our professor indicated that the fistula is the patient's lifeline. Being the patient's physician, it is our responsibility to touch and manage the patient's fistula conditions. These words have stayed with me for more than 20 years while working in clinical dialysis"

"We began learning about Far infrared therapy when]we were informed by a surgical physician about his application experience with the WS Far-infrared Therapy Unit after fistula procedures, which effectively improved poor vessel conditions. At the time, we had a patient undergoing pre-dialysis assessment who showed weak Bruit and Thrill…

"Generally, we would determine that a patient who was an unsuitable candidate for dialysis would be referred to surgery for vascular reconstruction or vascularization.

4.0 **Dr. Poh Sung Lim** (continued)**:**

"However, we tried WS Far-infrared Therapy Unit, and 20 minutes into the therapy, the vessel sound and pulsation was substantially enhanced. This was an indication of increased blood flow, and the patient's fistula returning to function for dialysis.

"Since then, we incorporated WS Far-infrared Therapy Unit as a part of the routine fistula care for patients who were difficult to cannulate or had incomplete fistula maturation. These patients received 40 minutes treatment pre or post dialysis, depending on the situation. In the beginning, nursing staff felt an increase in workload. However, as time progressed, the nurses reported that their workload was in fact reduced.

"This was mainly contributed by several factors. Firstly, patients have stable blood flow, which decreases the possibility of emergency events during dialysis. Additionally, for patients who resisted dialysis and had a tense relationship with the nursing staff because of cannulation difficulty, WS Far-infrared Therapy Unit helped improve cannulation, relieve pain, and increase the patients' acceptance for dialysis. This was mainly contributed by several factors. Firstly, patients have stable blood flow, which decreases the possibility of emergency events during dialysis. Additionally, for patients who resisted dialysis and had a tense relationship with the nursing staff because of cannulation difficulty, WS Far-infrared Therapy Unit helped improve cannulation, relieve pain, and increase the patients' acceptance for dialysis.

"Over the years, I have also I have also observed and recorded patients' fistula conditions. I found an extended fistula life, reduced number of interventions, and decreased emergency fistula events. These benefits cannot be perceived immediately; however, the long-term use of WS Far-infrared Therapy Unit improves the dialysis quality in dialysis centers and the nurse-patient relationship"

By Dr. Poh Sung Lim, Fresenius Medical Director, Taiwan 2013

REFERENCE: Excerpts by Dr. Jih-Chung Chiang, and Dr. Poh Sung Lim are quoted from:

Experiences with the WS Far-infrared Therapy Unit in Hemodialysis Patients.
English Translation, 2013. WS Far IR Medical Technology Co., Ltd. Taipei, Taiwan