

HAEMODIALYSIS PARAMETERS AND NEUROMUSCULAR ELECTROSTIMULATION IN RADIOCEPHALIC FISTULA: A SINGLE CENTER EXPERIENCE

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BACKGROUND

• Radio-cephalic fistula (RCAVF) is the gold standard vascular access for end-stage chronic kidney disease patients.

• Nevertheless, no articles are published regarding neuromuscular electrostimulation (NMES) in AVF maturation and their impact during haemodialysis (HD) sessions.

OBJECTIVES

To analyse the effect of RCAVF previously matured with a NMES programme on HD treatment parameters and AVF complications.

MATERIAL AND METHODS

• An 8 weeks single-centre prospective study.

• NMES programme RCAVF previously matured.



Fig. 1. Patient with electrodes placed on the skin underwent low-intensity electrical stimulation in the forearm muscles of the RCAVF upper limb during HD session.

• Analyzed data:

• 1.- HD parameters:

- blood flow (Qb)
- dialysate flow rate (Qd),
- venous pressure (PV),
- total litres deputed (TLD),
- adequacy HD dose (sktV)

• 2.- Haemodynamic data: SBP, DBP, HR

• 3.- Medical or surgical complications related to RCAVF were analysed at 4 and 8 weeks.

RESULTS

DEMOGRAPHIC DATA

-11 ESG radio-cephalic forearm fistulae (RCAVF)

-Median age 65,4 ± 15.1 years.

-18% were females.

-82% were left sided.

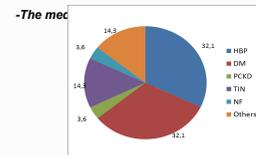


Figure 2.- Main aetiology chronic kidney disease

| | ESG (n = 11) |
|------------------------------|--------------|
| Age (years; mean and SD) | 65.4 ± 19.2 |
| Sex (% men) | 70.6 % |
| Charlson index (mean and SD) | 8.7 ± 3.9 |
| Hypertension (%) | 90.9 % |
| Diabetes Mellitus (%) | 63.6 % |
| BMI (mean and SD) | 25.5 ± 4.7 |
| RCAVF side (left %) | 81.8 % |
| Handgrip (kg; mean and SD) | 25.6 ± 11.4 |

Table 1.- Main Demographical data: No relevant differences were observed at baseline in demographic data between groups

| | ESG (n = 11) |
|-------------------------------------|---------------|
| Forearm cephalic vein diameter (mm) | 6.2 ± 1.5 |
| Radial artery diameter (mm) | 3.2 ± 0.6 |
| Anastomosis PSV (cm/s) | 409.6 ± 66.4 |
| Humeral artery BFR (ml/min.) | 870.2 ± 578.1 |
| Doppler US maturation (%) | 81.8% |

Table 2.- Eco Doppler US data: PSV: Peak Systolic Velocity; BFR: Blood Flow rate; US: Ultra sound

HAEMODYNAMIC DATA

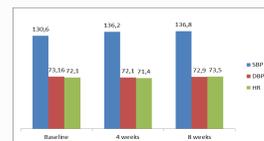


Figure 3.- Haemodynamic data: No relevant changes in haemodynamic data and antihypertensive treatment were observed at the end of the study

HAEMODIALYSIS PARAMETERS

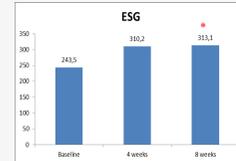


Figure 4.- Blood flow rate (Qb) ml/min

*p < 0.05 (Baseline - 8 weeks)

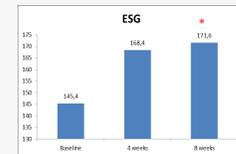


Figure 5.- Dynamic Venous Pressure (DVP) mmHg

*p < 0.05 (Baseline - 8 weeks)

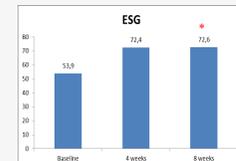


Figure 6.- Total Litres deputed (TLD) (litres)

*p < 0.05 (Baseline - 8 weeks)

| | Initial | Final | p-value |
|-----|---------|-------|---------|
| ESG | 1,45 | 1,54 | 0,119 |

RCAVF COMPLICATIONS

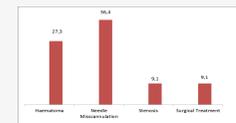


Figure 7.- RCAVF complications. Surgical treatment: Proximal RCAVF re-anastomosis (2CG, 1 ESG)

CONCLUSIONS

Effective HD parameters could be achieved after an 8 weeks RCAVF formerly matured with a NMES programme.

These results reinforce the role of NMES programme in the short-term follow up RCAVF maturation process.

Nevertheless, further studies are required to confirm our results and evaluate the effect of NMES in these group of patients.