LEG QUADRICEPS NEUROMUSCULAR ELECTROSTIMULATION: NEW THERAPEUTICAL PHYSICAL TRAINING OPTION IN HAEMODIALYSIS PATIENTS

V. Esteve, J. Carneiro, F. Moreno, M. Fulquet, M. Pou, A. Saurina, V. Duarte, M. Ramírez de Arellano
Servei de Nefrologia. Hospital de Terrassa. Consorci Sanitari Terrassa. Barcelona

BACKGROUND

- Haemodialysis (HD) patients are characterized by great muscle wasting, decreased physical function and poor quality of life.
- Recently, neuromuscular electrostimulation (EMS) results in great interest as adjunctive treatment of regular exercise in HD patients.
- Until date, scarce studies about the exclusive role of EMS in HD patients have been published.

OBJECTIVES

To analize the effect of an intradialysis quadriceps EMS training program in muscular strength, functional capacity and quality of life as well as efficacy, safety and tolerability in our HD patients.

MATERIAL AND METHODS

- A 12 weeks single-center prospective study.
- HD patients were assigned into EMS training program (EMS) or control group (C).
- An adaptative EMS program was performed using the Compex® Theta 500i device in both quadriceps muscles in the first two hours of HD session.
- C group received standard HD care.
- Analized data:
- 1.- Muscular data:
  - *Transversal Quadriceps Muscular Area (TQMA)*
  - *Maximum Length Quadriceps Strength (MLQS)*
  - *Hand-grip dominant arm (HG).*
- 2.-Functional capacity tests:
  - *"Sit to stand to sit" (STS10)*
  - *"six-minutes walking test"(6MWT).*
- 3.-Health questionnaire: EuroQol-5D(EQ-5D).
- 4.-Satisfaction degree:
  - *Visual Analogic Scale (VAS),*
  - *Subjective Rating Scale (SRS)*
  - *Own symptoms EMS questionnaire (SEQ)*

RESULTADOS

DEMOGRAPHICAL DATA

ESRD HD patients: 63 patients
Included patients: 38patients (54% men)
Mean age: 69.7± 18.4 years
Time on HD treatment: 32.1 months
22 EMS group / 16 C group

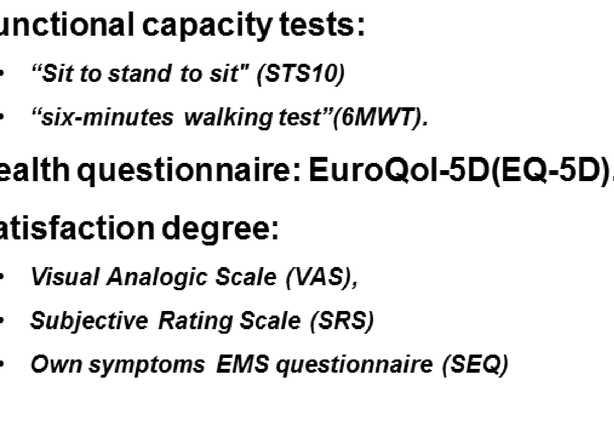


Figure 1.- Main EMS patients on HD (%) ESRD aethiology

BASELINE DEMOGRAPHICAL DATA

	EENM (22 pacientes)	CONTROL (16pacientes)
EDAD	67.9 ± 17.5	72.5 ± 10.03
I.CHARLSON	9.04 ± 2.27	8.7 ± 1.66
TIEMPO HD	35.5 ± 46.8	27.1 ± 21.5
IMC	25.6 ± 3.29	27.2 ± 4.37

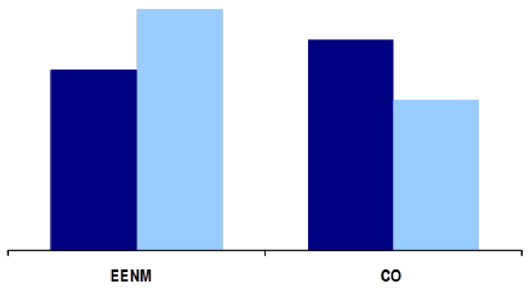
"No diferences beetwen groups regarding demographical data were found at baseline study"

Table 1.- Main baseline demographical data and comorbidities in our HD patients

MUSCULAR DATA

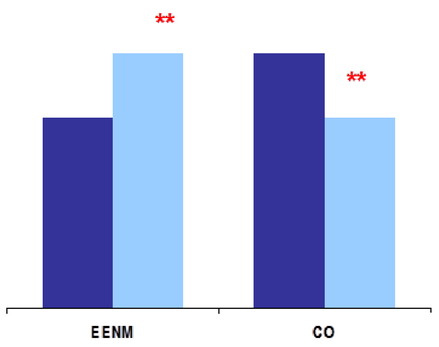
	Grupo EMS (22 pacientes)			Grupo CONTROL (16 pacientes)		
	INICIO	FINAL	p. est	INICIO	FINAL	p. est
Tono Quad D	49.3 ± 5.7	49.02 ± 4.2	0.667	50.1 ± 5.7	49.8 ± 5.8	0.769
Tono Quad I	49.3 ± 4.9	48.9 ± 4.5	0.485	50.3 ± 5.35	50.3 ± 5.3	0.926
Pliegue Quad D	36.3 ± 12.2	30.2 ± 11.4	0.004	31.3 ± 12.5	29.4 ± 12.4	0.261
Pliegue Quadr I	36 ± 11.8	30.7 ± 10.8	0.038	31.9 ± 14	28.6 ± 12.3	0.133
Area tras. Quad D	441.2 ± 372	334.8 ± 281.1	0.143	297.2 ± 399	358.9 ± 345.7	0.292
Area tras. Quad I	425.2 ± 363.5	366.9 ± 297.1	0.512	332.5 ± 420.4	240.09 ± 101.80	0.218

Figure 1.- Main Antrophometrical data:. Diferences beetwen groups during the study. Muscular Tone (cm), Quadriceps skinfold (mm) and Transversal Quadriceps Muscular Area (TQMA)



Hang Grip	Inicial	Final	SE
EENM	21.3 ± 7.1	22.9 ± 9.3	0.192
Control	22± 11.3	20.2± 10.4	0.267

Figure 2.- Hand Grip Dominant Arm (HG). Diferences beetwen groups during the study



FMEQ	Inicial	Final	SE
EENM	10.2 ± 6.68	13.1 ± 8.1	0.001
Control	12.1± 8.2	10.7± 7.2	0.071

Figure 3.- Maximun Lenght Quadriceps Strength (MLQS). Diferences beetwen groups during the study

EQ -5D HEALTH QUESTIONNAIRE

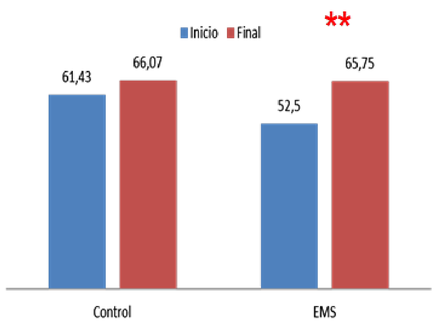
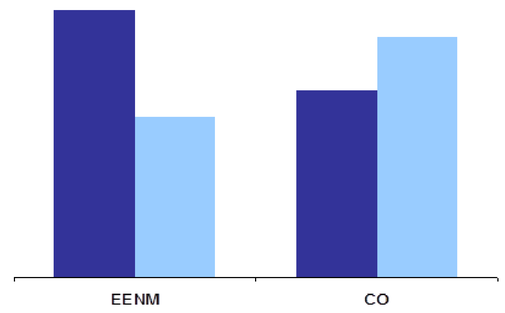
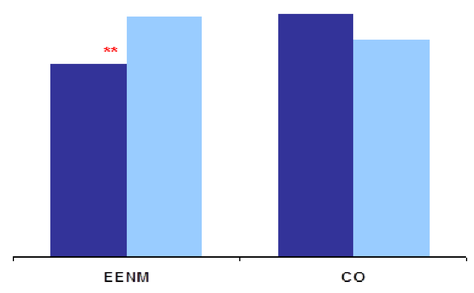


Figure 4.- Health Questionnarie (EQ-5D). Diferences beetwen groups during the study (%)

FUNCTIONAL CAPACITY TESTS



STS10	Inicial	Final	SE
EENM	41 ± 18.7	32.8 ± 14.1	0.064
Control	36.6 ± 8.9	40.4 ± 20	0.571



6MWT	Inicial	Final	SE
EENM	280.5 ± 136.4	312.4 ± 149.3	0.009
Control	308.13± 144.8	291.1± 134	0.382

Figure 5. – Functional capacity Tests: Sit to stand to sit 10 and 6MWT. Diferences beetwen groups during the study

SATISFACTION DEGREE

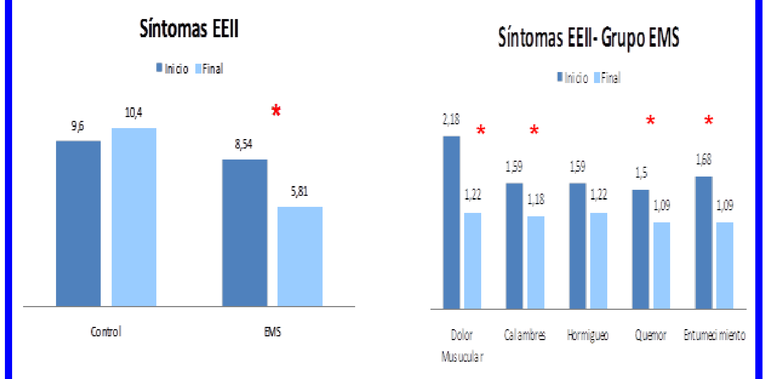
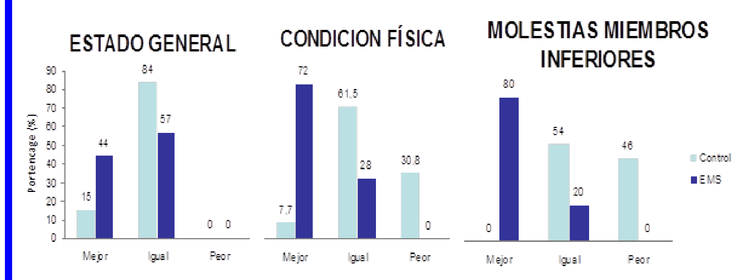


Figure 7 . – Homemade EMS symptoms questionnaire:relevant muscular pain, cramps, numbness or pricks in the EMS group.



The VAS satisfaction degree was 7.8 points for the EMS group

Figure 7 . – Subjective Rating Scale: General being, physical condition and lower limbs symptoms beetwen groups

CONCLUSIONS

1.-The intradialytic neuromuscular electrostimulation of both quadriceps improved muscular strength, functional capacity and quality of life in our HD patients.

2.-Neuromuscular electrostimulation was safe, effective and well tolerated in our HD patients.

3.-With the obtained results, neuromuscular electrostimulation constitutes a novel therapeutic alternative to improve the deteriorated physical condition and quality of life of these patients.

4.-However, it could be an effective alternative to those patients in whom the intradialytic exercise program is physically difficult or is contraindicated.

CST: CONSORCI SANITARI DE TERRASSA

51ERA-EDTA
508-SP
M) Dialysis. M8) Epidemiology, outcome research, health services research in CKD 5D.
Vicent Esteve Simó
DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM THE NETHERLANDS MARCH JUNE 2014
PosterSessionOnline.com