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Piet Mondrian, Molen: The Winkel Mill in Sunlight, 1908

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AZIENDA OSPEDALIERA SANT' ANDREA

HAEMODINAMIC CARDIAC MODIFICATION OCCURING AFTER HIGH FLOW REDUCTION BY PROXIMAL RADIAL ARTERY LIGATION OF RADIAL-CEPHALIC FISTULA FOR HAEMODIALYSIS

Scrivano J[1], Pettorini L[1], Rutigliano T[2] ,Ciavarella G.M.[2], De Biase L [2], Punzo G[1], Menè P[1], Pirozzi N[1]

[1]Department of Clinical and Molecular Medicine, Sapienza University,[1]Nephrology and [2]Cardiology Unit, Sant'Andrea Hospital, Rome.

e-mail: jacopo.scrivano@gmail.com *www.nefrologiainterventistica.com*

Introduction

AVF induces adaptive modifications of both left (LV) and right ventricle (RV). These modifications might evolve to LV hypertrophy, impaired function of right sections with pulmonary hypertension and high output heart failure.
When high flow AVF (**Qb>2 L/min/1.73m2**), along with increased cardio-pulmonary recirculation (**CPR = Qb/CO >20%)** exist, its reduction is suggested. As described by Bourquelot, proximal radial artery ligation (PRAL) is effective in flow reduction of distal radio-cephalic AVF (**RCAVF**).
We compared echocardiographic (**ECHO**) finding before (T0) and 1 and 6 months (T1, T6) after PRAL.

Patients and Methods

We observed 6 consecutive patients with a high flow RCAVF, increased CPR and symptoms of impaired cardiac function.
The patients characteristics are exposed in Table 1.

Age (yrs)	67 ± 10
Sex	5 M 1 F
NYHA class	IV: 1 pt; III: 1 pt; II 3 pts; I: 1 pt
Functional status	3 ESRD; 2 CKD V K/DOQI; 1 Tpx
AVF vintage (yrs)	7 ± 6

Tab 1: Patients characteristics (legend: CKD: chronic renal disease; ESRD: end stage renal disease; Tpx: transplantation)

By ECHO we evaluated tricuspid anular plane systolic excursion (**TAPSE**), pulmonary artery systolic pressure (**PAPs**), right ventricle telediastolic diameter (**RV TDD**), right ventricle ejection fraction (**RV EF**) at T0, T1 and T6.
Modifications of CPR (**Δ CPR**) and AVF Qb (**Δ Qb**) were assessed before and 1 month after PRAL.
During preoperative ECHO, a dynamic evaluation of TAPSE before (T0b) and after manual compression(T0c) of AVF anastomosis was performed.

Results

Qb was 2,3 ± 0,3 L/min/1,73 m^2 at T0 and 1,0 ± 0,1 L/min/1,73 m^2 at T1(flow reduction 56 ± 5,2 %, p<0,001). **CPR** was 36,5 ±10,4% at T0 and 18,5 ± 7,0 % at T1 (17,9 ± 11,9 % CPR reduction, p=0,005). An early (24h) improvement of cardiac functional status was observed in all pts. ECHO parameters are exposed in Table 2.

	T0 b	**T0 c**	**T1**	**T6**	**Δ T0b/T1**	**Δ T0b/T6**
TAPSE (mm)	16,6 ± 5,0	21,5 ± 0,8	22,5 ± 2,5	22,5 ± 3,3	**5,6 ± 3,6 (p= 0,03)**	**5,8 ± 3,6 (p=0,04)**
PAPs (mmHg)	45,8±10,3		36,0±11,6	30,8±6,8	9,5 ± 9,7 (ns)	**15±10 (p=0,014)**
RV TDD (mm)	30,1± 4,8		29,5± 5,9	29,3 ± 4,6	0,6 ± 4,8 (ns)	0,8 ± 5,9 (ns)
RV EF (%)	56,3 ± 7,9		56,5 ± 12,3	63,5 ± 8,8	0,1± 7,1 (ns)	7,1± 5,6 (ns)

Tab 2: ECHO parameters before and after PRAL (legend: Δ: difference)

We find a positive correlation (by Pearson's coefficient) between: **Δ TAPSE T0b/T0c and Δ TAPSE T0/T1** (0.84) as well as **Δ TAPSE T0b/T0c and Δ TAPSE T0/T6** (0.73); **Δ Qb T0/T1 and Δ PAPs T0b/T1** (0.74) as well as **Δ Qb T0/T1 e Δ PAPs T0b/T6** (0,66); **Δ Qb T0/T1 and Δ RV TDD T0/T1** (0.61) as well as **Δ Qb T0/T1 and Δ RV TDD T0/T6** (0.96)

Conclusion

After a successful reduction of RCAVF flow, significant haemodinamic changes occur. Our results seems to outline the effect of volume/pressure stress over the right section related to an high flow RCAVF (**Δ Qb vs Δ PAPs and Δ RV TDD**). The preoperative dynamic manoeuvre during ECHO (**Δ TAPSE T0b/T0c vs Δ TAPSE T0/T1**) could represent an adjunctive tool to asses AVF related heart impairment.

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