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Document type : *Communication à un colloque (Conference Paper)*

Référence bibliographique

Gonzalez, Maria Cecilia ; Sluysmans, Thierry ; Shango-Lody La Ndjeka Pasu, Polycarpe ; Carbonez, Karlien ; Barréa, Catherine ; et. al. *Exercise Performance in Young Patients with Complete Atrio-ventricular Block: the Relevance of Synchronous AV Pacing*. 49th Annual Meeting of the Association for European Paediatric and Congenital Cardiology ((Czech Republic) Prague, du 20/05/2015 au 23/05/2015). In: *Cardiology in the Young*, Vol. 25, no.Suppl 1, p. O6-1 (2015)

Exercise Performance in Young Patients with Complete Atrio-ventricular Block: the Relevance of Synchronous AV Pacing.

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Introduction:

There are currently many pacing strategies for young patients with CAVB. The most frequent policy is to attempt a dual chamber system when possible. However, there is a group of patients that are still functioning with a non-synchronous ventricular pacing, raising the question of the ideal timing and circumstances to upgrade their systems. To solve this interrogation, we investigated the exercise performance of a group of children and young adults with CAVB and DDD pacemakers in both single and dual chamber pacing modalities.

Methods:

Fifteen patients performed maximal exercise stress testing (EST) after programming VVIR or DDD modes with two hours of interval in a double blind protocol of study.

Results:

Compared to VVIR pacing, DDD pacing resulted in: 1- Increase in the peak VO₂ (27,28 +/- 6,40ml O₂/kg/min to 29,65 +/- 6,34ml O₂/kg/min). 2- A longer test (9,73 +/- 2,05 minutes to 10,82 +/- 1,73 minutes) (Refer to Figure I for point 1 and 2). 3- A major increase in the heart rate achieved during peak exercise (VVIR 125,86 +/- 15,36 bpm to 173,93 +/- 12,97 beats per minute). 4- Decreased systemic non-invasive arterial blood pressured measured at maximal exercise (163,73 +/- 26,44mmHg to 150,06 +/- 22,25mmHg). 5- Higher maximal workload (172,66 +/- 81,73 Watts to 199,73 +/- 95,43). 6- Prolongation of the anaerobic threshold timing (7,69 +/- 1,77 minutes to 9,64 +/- 1,70 minutes) (Refer to Table I for point 3 to 6). 7- Better self-rate performance perception in all the patients (estimated by a numerical scale from 1 to 10).

Conclusions:

Synchronous AV pacing contributes to increase both the exercise performance and the performance perception in 100% of the patients. This difference contributes to create a sense of “fitness” with repercussions in the overall health, self-esteem and life quality and encourages youngster to practice sports. Our experience tends to favour upgrading patients’ systems to dual chamber before reaching the adolescent years, even if the centre policy is to prolong as long as possible the epicardial site in order to avoid long years of right ventricular pacing.

	Peak HR		Peak SBP		Watts		AT	
	VVI	DDD	VVI	DDD	VVI	DDD	VVI	DDD
	91	150	126	132	108	137	6,27	11,01
	136	160	183	172	229	249	11,56	13,40
	118	185	155	145	135	145	5,45	7,54
	151	180	156	153	116	182	8,21	9,18
	110	186	172	168	235	239	9,57	9,50
	144	179	226	187	364	430	9,50	11,44
	134	190	172	175	180	213	8,00	8,07
	123	171	140	141	89	114	7,19	10,03
	133	160	153	143	184	181	7,58	9,08
	103	165	129	113	78	98	8,06	10,08
	131	171	156	142	158	178	6,29	10,19
	129	159	180	143	140	146	7,32	10,27
	129	185	201	183	314	389	9,29	10,57
	130	193	149	124	127	162	5,07	7,36
	126	175	158	130	133	133	6,02	7,00
Media	125,86	173,93	163,73	150,06	172,63	199,73	7,69	9,64
SD	15,36	12,97	26,44	22,25	81,73	95,43	1,77	1,70
P	< 0.01		< 0.01		< 0.01		< 0.01	

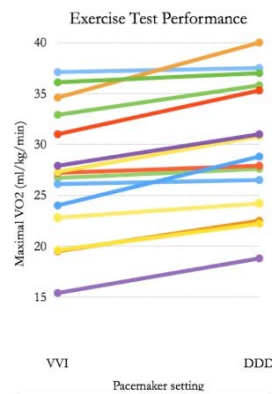


Fig. 1a- Graphic comparing maximal VO₂ during the VVI and the DDD modes exercise tests in the 15 patients.

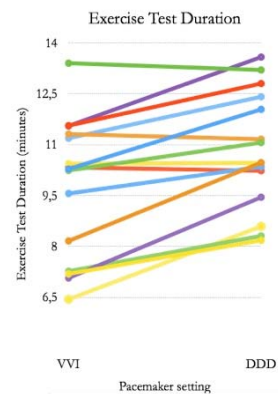


Fig. 1b- Graphic comparing the exercise test duration during the non-synchronous and synchronous pacing modalities.