

# Supra Ventricular Tachycardia significantly reduces Stroke volume and causes minimal reduction of Cardiac output: study of Pediatric Patients

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**Introduction:** Supra ventricular tachycardia (SVT) may decrease cardiac stroke volume (SV) and output (CO) secondary to decreased filling time. The patients with SVT manifest variable clinical symptoms ranging from mild chest discomfort, dizziness, loss of energy to syncope. The phenomenon of variable stroke volume and cardiac output from patient to patient has not been studied adequately. In this study we aim to measure the SV and CO changes before, during and after SVT.

**Methods:** Patients with clinically diagnosed SVT undergoing electrophysiology study (EP) were included in the study. All the patients received general anesthesia for the EP procedures. Non-invasive monitor from Cardiotronc was used to measure SV(in ml/cycle) and CO(L/min) by Electrical Velocimetry™ (OSYPKA Inc.). These parameters were obtained in each patient at baseline(BL), during SVT and immediately after(after) converting the rhythm to sinus rhythm (SR). Each measurement was averaged over 30 cycles in each of the mentioned condition.

**Results: The study cohort consisted of** 16 patients (10 males and 6 females). The demographic parameters and variables (mean +/- standard deviation) as described in Table 1 and Figure 1. are as follows: Average age 8.99+/-4.6 yrs, weight 41.6+/-22.7 kg and height 134.4+/-27.3 cm. The heart rate at BL 98.2+/-18.1, during SVT 206.7+/-24.94 and immediately after reverting to SR were 112.4+/-16.8. The SV decreased from BL 55.1+/-32.5 to 27.6+/-19.3 during SVT (46.7+/-21.9 % reduction from BL) p<0.001, and then recovered to 58.0 +/-34.1(138.8+/-114.6 % increase from SVT) p<0.001. The CO decreased from BL 5.23+/-3.1 to 4.7+/-4.6 during SVT (6.43 +/-3.6% reduction from BL) p<0.05 then recovered to 6.2+/-3.9 (39.1+/-20.4% increase from SVT) p<0.05

**Conclusion:** During SVT, significant reduction in the SV more than the CO occurs. The reduction of CO is not significant during SVT, possibly because of compensatory increase in the heart rate with lower SV. The recovery causes overshooting in both SV and CO probably to sudden improvement of filling time and preload. The vast scattering of the amount of changes in the SV and CO between patients reflect diversity of physiological factors in each patient and explain the diversity of the patients' symptoms severity

Table 1.

Age (yr)	Height (cn	Weight (Kg)	Baseline HR	Baseline SV	Baseline CO L/Mz	SVT HR	SVT SV(ml)	SVT CO(L/Mz)	HR post SV	Post SV SV	Post SV CO
8	133	39	82	38.5	3.21	160	22.95	3.67	98	50.4	4.92
7	126	29	105	47.7	5.14	179	38.2	5.3	119	50.8	5.71
6	117	19	111	38	4.26	190	12.33	2.35	111	29.44	3.27
10	131	35	72	49.1	3.53	218	22.73	4.62	98	56.35	5.28
9	132	34	99	34.7	3.46	200	12.11	2.54	116	40.35	4.67
12	149	55	92	109.9	11.57	188	81.61	9.33	96	112.6	10.81
14	170	58	98	113.5	11.2	197	53.6	10.73	97	115.6	11.97
4	108	18	109	23.14	2.52	231	14.91	2.24	113	25.63	3.01
15	160	49	85	68.83	5.86	261	23.59	5.19	97	67.3	6.51
10	150	59	101	61.7	6.22	226	11.77	2.67	107	60.91	6.53
16	162	88	81	111.83	9.01	200	39.35	7.87	102	114.1	11.6
12	162	71	89	54.12	4.96	226	17.2	3.89	108	69.7	7.54
1	97	11	125	13	1.62	214	10	1.5	138	13.62	1.88
0.9	72	9	141	9.79	1.38	226	7.76	1.43	148	9.96	1.48
10	147	50	79	50.14	3.88	211	45.89	6.88	138	52.97	7.31
11	132	41	86	58.23	5.9	180	27.77	4.97	91	61	6.1
		Average	98.2	55.14	5.23	206.7	27.61	4.7	112.4	57.98	6.17
		STDV	18.13	32.48	3.06	24.94	19.29	4.63	16.8	34.09	3.29

Figure 1.

