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The relation between the variation of CL and atrial tachycardia

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Background: Complex ATs with a complicated circuit have been increasing because of the native or iatrogenic scars in atrium. However, development of resolution in the EAM allows us to reach the correct diagnosis. The purpose of this study was to reassess the relationship between characteristics of ATs and cycle length based on the correct diagnosis with high-resolution mapping system.

Method: Among 85 consecutive AT patients treated with with high-resolution mapping system "Rhythmia", patients with at least one mappable AT during procedure were prospectively included in this study. Maximal, minimal, and variation of ATCL was calculated from the decapolar in the coronary sinus (CS) during 2minutes, and the relation between CL and respiration was measured on the Rhythmia (Figure 1). These values were compared to AT types.

Results: 90 ATs in 65 patients (mean 59±13 yrs, 16 females, 55 post-AF ATs) including 4 focal-ATs, 23 localized-AT, and 63 macroreentrant ATs were analyzed. As shown in the table 1, the maximum and minimum CL was similar between focal-AT, localized-AT, and, macroreentrant-AT. However, both absolute CL-variation and ratio of CL-variation were significantly smaller in macroreentrant ATs (P=0.009 and P=0.0012, respectively). Table 2 described the comparison between 66 left-ATs and 24 right-ATs. Although the maximum and minimum CL were similar, both absolute CL-variation and ratio of CL-variation were significantly larger in right ATs (P=0.001 and P=0.007, respectively). Additionally, the correlation of CL to the respiration was significantly more frequently seen in the right-ATs (3.0% in left-ATs and 62.5% in right-ATs, P<0.0001).

Conclusions: CL-variation of ATs may be significantly smaller in macroreentrant ATs and significantly larger in right ATs. CL-variation correlated to the respiration may suggest right-ATs. These information may be helpful to diagnose ATs before mapping.

Table 1.

	Focal AT (N=4)	Localized AT (N=23)	Macroreentrant AT (N=63)	P-value	Multiple comparison P-value
Maximum cycle length (MCL), ms	438 [302-590]	305 [250-348]	297 [261-349]	0.16	
Minimum cycle length (mCL), ms	412 [294-552]	292 [236-342]	289 [252-341]	0.19	
Absolute cycle length variation (MCL-mCL), ms	25 [8-39]	10 [6-16]	6 [4-10]	0.0009	Localized vs Focal; 0.29 Macro vs Loclaized; 0.007 Macro vs Focal; 0.04
CL variation ratio (MCL-mCL)/MCL, %	5.0 [2.7-6.9]	3.6 [1.9-5.8]	2.0 [1.3-2.8]	0.0012	Localized vs Focal; 0.60 Macro vs Loclaized; 0.008 Macro vs Focal; 0.04
Correlation to the respiration	1 (25.0%)	2 (8.7%)	14 (22.2%)	0.35	
Alternating CL	1 (25.0%)	1 (4.4%)	5 (8.1%)	0.36	

Table 2.

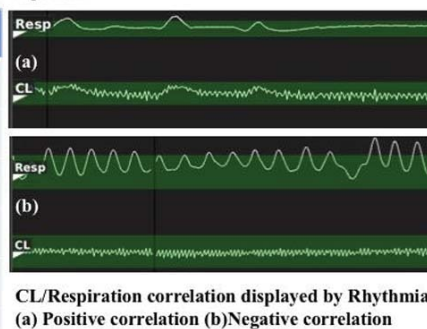|	Left AT (N=66)	Right AT (N= 24)	P-value
Maximum cycle length (MCL), ms	297 [254-348]	305 [274-405]	0.12
Minimum cycle length (mCL), ms	293 [244-340]	297 [269-398]	0.2
Absolute cycle length variation (MCL-mCL), ms	6 [4-10]	12 [7-14]	0.001
CL variation ratio (MCL-mCL)/MCL, %	2.0 [1.4-3.1]	3.1 [2.1-4.3]	0.007
Correlation to the respiration	2/66 (3.0%)	15/24 (62.5%)	<0.0001
Alternating CL	4/66 (6.1%)	3/24 (12.5%)	0.37

Figure 1.

CL/Respiration correlation displayed by Rhythmia.
(a) Positive correlation (b)Negative correlation

Table 1, 2 and Figure 1