

## ABSTRAK

**Latar Belakang.** Pacu jantung telah menjadi management yang sangat efektif bagi penderita bradiaritmia simptomatik. Pacu jantung pada ventrikel kanan (*right ventricle/RV*) merupakan modalitas terapi utama pada pasien-pasien dengan blokade atriventrikular lanjut oleh karena kemudahan akses dan efektifitasnya. Studi-studi terbaru mendapati bahwa pacu jantung pada apikal RV secara kronis berhubungan dengan penurunan fungsi sistolik jantung. Efek buruk *pacing* pada RV juga dikaitkan akibat beban *pacing* tinggi yang terjadi secara kronis. Lokasi *pacing* alternatif telah diteliti untuk mencegah efek buruk dari *pacing* apikal RV, seperti *right ventricular outflow tract (RVOT)*, septum RV, maupun *his bundle pacing*. Pemasangan *pacing* pada posisi ini lebih fisiologis dibandingkan apikal RV, sehingga dapat mengurangi atau mencegah disinkronisasi elektromekanis ventrikel. Studi yang meneliti gangguan fungsi dan struktur RV masih sangat terbatas, sehingga membutuhkan penelitian lebih lanjut.

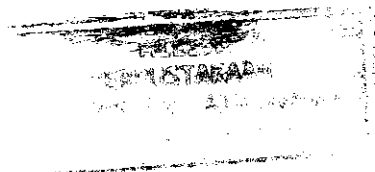
**Tujuan.** Membandingkan antara lokasi pemasangan *lead* PPM pada apikal RV dibandingkan dengan RVOT terhadap kejadian dilatasi dan fungsi sistolik RV.

**Metode.** Penelitian observasional analitik dengan rancangan penelitian kohort retrospektif. Subyek penelitian adalah pasien dengan PPM *single chamber RV pacing*, dengan durasi minimal 2 tahun di RSUD dr. Soetomo, Surabaya. Pengumpulan data berupa data karakteristik dasar, interograsi PPM, dan ekokardiografi untuk menilai dimensi ruang jantung dan fungsi sistolik RV.

**Hasil.** Subjek penelitian sebanyak 56 pasien, dengan *lead* apikal RV sebanyak 37 pasien dan RVOT sebanyak 19 pasien. Parameter ekokardiografi fungsi sistolik RV berbeda bermakna antara kelompok *lead* apikal dibanding RVOT (median TAPSE 1,9 (1,31 – 2,63) cm vs 2,1 (1,20 – 2,90) cm,  $p=0,019$ ; median S'10,00 (8,40 – 14,94) cm/s vs 11,12 (7,93 – 14,40),  $p=0,035$ ; median FAC 39,40 (23,80 – 51,00)% vs 43,80 (31,40 – 54,40)%,  $p=0,018$ ; RVFWLS -22,10 (-14,50 – [-27,00]) vs -25,00 (-15,70 – [-29,40]),  $p=0,01$ ; dan 3D RV EF 48,30 (32,00 – 60,00)% vs 57,20 (41,40 – 58,40),  $p=0,004$ ). Tidak terdapat perbedaan kejadian disfungsi RV antara kelompok *lead* apikal RV dibanding RVOT ( $p=1,000$ ). Tidak terdapat perbedaan kejadian dilatasi RV antara kelompok *lead* apikal RV dibanding RVOT ( $p=1,000$ ).

**Kesimpulan.** Tidak terdapat perbedaan kejadian dilatasi maupun disfungsi sistolik RV yang signifikan antara kelompok apikal RV *pacing* dengan RVOT *pacing*. Nilai parameter ekokardiografi fungsi sistolik RV (TAPSE, S', FAC, RVFWLS, maupun 3D RV EF) pada kelompok apikal RV *pacing* lebih rendah dan berbeda bermakna dibanding kelompok RVOT *pacing*.

**Kata kunci.** dilatasi ventrikel kanan, fungsi ventrikel kanan, pacu jantung ventrikel kanan. *pacing* apikal RV, *pacing* RVOT



## ABSTRACT

**Background.** Cardiac pacing has become a highly effective management for symptomatic bradyarrhythmia patients. Right ventricular (RV) pacing is the main therapy modality for patients with advanced atrioventricular block due to its ease of access and effectiveness. Recent studies have found that chronic apical RV pacing is associated with a decrease in cardiac systolic function. The negative effects of RV pacing are also attributed to the high pacing burden that occurs chronically. Alternative pacing locations have been studied to prevent the adverse effects of apical RV pacing, such as right ventricular outflow tract (RVOT), RV septum, and his bundle pacing. Pacing in these positions is more physiological than apical RV pacing, thus it can reduce or prevent ventricular electrical and mechanical dyssynchrony. Studies investigating LV dysfunction due to permanent pacemaker (PPM), especially apical RV pacing, are abundant. However, studies investigating RV function and structure impairment are still very limited, thus further research is needed.

**Aim.** To determine the differences between apical RV pacing compared to RVOT pacing on the occurrence of dilatation and RV systolic function in patients with PPM.

**Method.** This is an analytical observational study with a prospective cohort design. The study subjects were patients with single-chamber RV pacing PPM, with a minimum duration of 2 years at RSUD dr. Soetomo, Surabaya. Data collection includes basic characteristic data, PPM interrogation, and echocardiography to assess cardiac chamber dimensions and RV systolic function.

**Result.** The study subjects comprised 56 patients, 37 apical RV pacing patients and 19 RVOT pacing patients. Echocardiographic parameters of RV systolic function differed significantly between the apical pacing group and the RVOT pacing group (median TAPSE 1.9 (1.31 – 2.63) cm vs 2.1 (1.20 – 2.90) cm,  $p=0.019$ ; median  $S'$  10.00 (8.40 – 14.94) cm/s vs 11.12 (7.93 – 14.40),  $p=0.035$ ; median FAC 39.40 (23.80 – 51.00)% vs 43.80 (31.40 – 54.40)%,  $p=0.018$ ; RVFWLS -22.10 (-14.50 – [-27.00]) vs -25.00 (-15.70 – [-29.40]),  $p=0.01$ ; and 3D RV EF 48.30 (32.00 – 60.00)% vs 57.20 (41.40 – 58.40),  $p=0.004$ ). There was no difference in the incidence of RV dysfunction between the apical RV pacing group and the RVOT pacing group ( $p=1.000$ ). There was no difference in the incidence of RV dilatation between the apical RV pacing group and the RVOT pacing group ( $p=1.000$ ).

**Conclusion.** There was no significant difference in the incidence of systolic dysfunction or RV dilatation between the apical RV pacing group and the RVOT pacing group. Echocardiographic parameters of RV systolic function (TAPSE,  $S'$ , FAC, RVFWLS, and 3D RV EF) were significantly lower in the apical RV pacing group compared to the RVOT pacing group.

**Keywords.** right ventricular function, right ventricular dilatation, right ventricular pacing, apical RV pacing, RVOT pacing.