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REVIEW ARTICLE

Review article: the best of 2019

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ABSTRACT

In 2019, a total of 70 original scientific papers or reviews were published in Acta Cardiologica. In this paper, we focus on the 10 best papers that we selected based upon the innovative character and/or upon the clinical relevance of their research. In different domains of cardiology, we highlight the most important findings from these 10 best research papers.

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Introduction

In 2019, a total of 70 original scientific papers or reviews were published in Acta Cardiologica. In this paper, we focus on the 10 best papers that we selected based upon the innovative character and/or upon the clinical relevance of their research. In different domains of cardiology, we highlight the most important findings from these 10 best research papers.

Fragmentation of the QRS complex

The wording « fragmentation of the QRS complex » or « fragmented QRS » (fQRS) indicates the presence of high-frequency potentials (spikes) inside the QRS complex, being an additional R wave or notching in the nadir of S wave (see Figure 1). In CAD patients, as compared with the presence of a Q wave, fQRS had higher sensitivity (85.6%) and negative predictive value (92.7%) for detecting myocardial scar (review article of C Brohet [1]).

The value of fQRS as a predictor of myocardial scar in patients with hypertrophic cardiomyopathy (HCM) was studied by Ratheendran et al. [2]. They correlated fQRS and Q waves with the presence of late gadolinium enhancement (LGE) assessed, by contrast, CMR imaging in 39 HCM patients. Only 4 (11%) patients had pathological Q waves in contiguous leads on surface ECG while fQRS in two contiguous leads was present in 23 (64%) patients. The presence of fQRS was more in patients with LGE on CMR than those without (84.61 versus 10%, $p < 0.001$). The overall sensitivity, specificity, PPV and NPV of fQRS for predicting scar tissue were 84.6, 90.0, 95.6 and 69.2%, respectively. In addition, there was also a good topical correlation with the highest sensitivity (99%) for fQRS in lateral leads and the highest specificity (99%) for fQRS in anterior leads.

In view of the well-known correlation between fibrosis and ventricular arrhythmias (VAS), Eren et al. evaluated the association between fQRS and complex VAS recorded during a 24-h Holter monitoring in 336 diabetes patients and in 275 age- and sex-matched healthy individuals [3]. Complex VAs were significantly higher in patients with DM (14% vs. 0%, $p < 0.001$). Furthermore, complex VAs were significantly higher in DM patients with fQRS. (28.4% vs. 6.4%, $p < 0.001$) In multiple logistic regression analysis, the presence of fQRS was an independent predictor for complex VAs. (OR: 3.262, 95% CI: 1.443–7.376).

Atrial fibrillation and beyond

Concomitant surgical treatment of atrial fibrillation using modern ablation devices has proven to increase long-term survival and decrease the incidence of stroke without increasing short-term mortality. Van Hoof et al. reports the Belgian experience in 890 patients from 28 Belgian centres between 2011 and 2016 [4]. The majority (64%) underwent a concomitant mitral operation. The type of lesion set was a true Cox maze IV in 24.8% of cases while 45.8% underwent an ablation including a box lesion and 29.4% underwent an ablation including PVI. In-hospital mortality was

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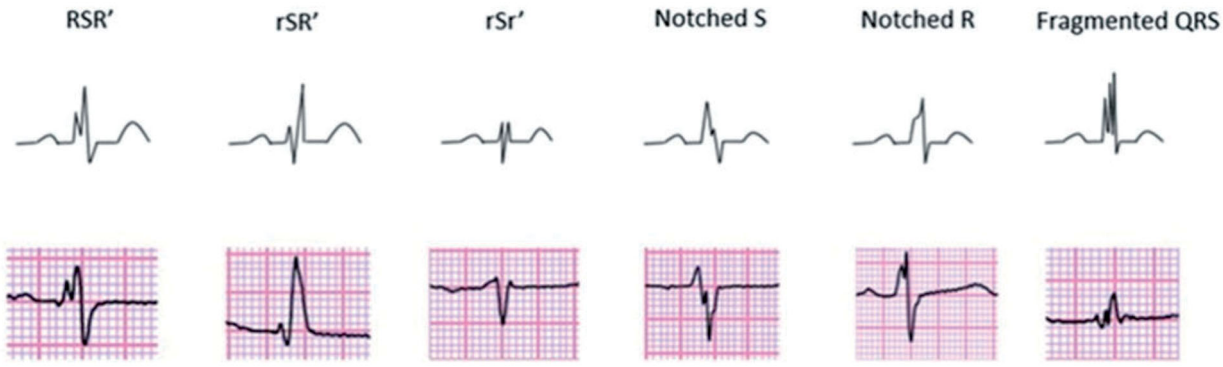

Figure 1. Different morphologies of fQRS on 12-lead ECG.

1.7% and postoperative bleeding requiring revision occurred in 1.4% while the need for in-hospital implantation of a permanent pacemaker was 3.7%.

Using a Kaplan–Meier estimate, freedom from AF was 89.3%, 74.9% and 59%, and freedom from antiarrhythmic drugs was 74.4%, 47.8% and 32.3% at 6, 12 and 24 months, respectively. These real-life data compare favourable with international registries and underscores the value of this technique in AF patients scheduled for cardiac surgery.

It is well established that degenerative mitral valve regurgitation (MR) can lead to atrial fibrillation (AF), but it is less well defined whether AF may induce functional MR through a process of atrial remodelling. Pype et al. identified the long-term effects of atrial fibrillation (AF) on atrial remodelling and on the progression of mitral/tricuspid valve regurgitation (MR/TR) in 37 patients with permanent AF, in 80 patients with non-permanent AF (of whom 43 were treated with ablation) and in 53 control patients with sinus rhythm [5]. Valve regurgitation severity was assessed by the colour jet area and by the multi-integrative approach. At baseline, AF patients had larger MR jet areas than control patients. After a period of 65 ± 10 months, the progression of MR was more pronounced in permanent AF than in non-permanent AF (see Figure 2). Severe MR at follow-up was observed in 8% and 2.5%, respectively. There was a significant positive correlation between the progression of MR and the increase of left atrium volume($r = 0.31$, $p < 0.001$). Comparable findings, albeit less pronounced, were observed for the association between AF and TR progression. The data showed a beneficial effect of sustained rhythm control, either medically or by ablation, on MR/TR progression.

Tachycardia-bradycardia syndrome (TBS) refers to long pauses (>3 s) that follow the termination of atrial fibrillation (AF) or atrial tachycardia (AT) [1]. Traditionally, the treatment for TBS involved the implantation of a pacemaker. Zhang et al. evaluate

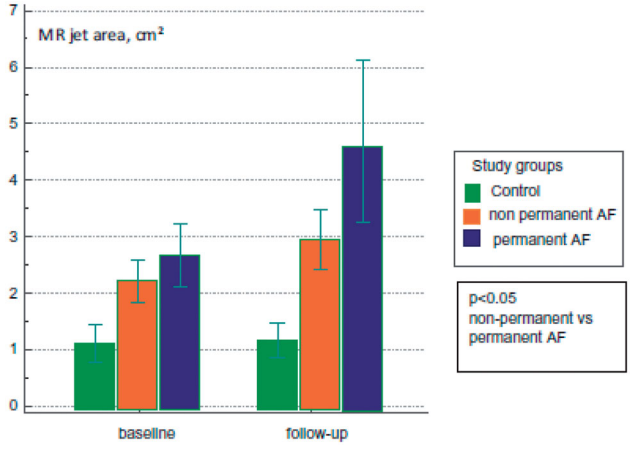

Figure 2. Evolution MR according to study group. Bar graph showing the mitral regurgitation (MR) jet area (mean and 95%CI) at baseline and at follow-up for the different study groups (control = sinus rhythm, non-permanent atrial fibrillation, permanent atrial fibrillation) (ANOVA for repeated meaurements, $p < 0.001$).

the long-term effect (up to 10 years) of catheter ablation on rhythm control and stroke in a total of 150 TBS patients [6]. 79 patients underwent catheter ablation (CA group) and 71 patients chose implantation of pacemaker (PM group).

Catheter ablation was effective for preventing both the tachycardia and bradycardia components for the majority (71%) of patients with TBS without the need for further pacemaker implantation. In contrast, no patient in the PM group was free of atrial fibrillation (AF) In addition, the incidence of new-onset stroke in the PM group was significantly higher than that in the CA group (15.4% vs. 5.1%, $p < 0.05$).

Anti-thrombotic therapy

The transradial approach (TRA) has increasingly become the default strategy for cardiac catheterisation. However, TRA can result in several complications; radial artery occlusion (RAO) is the most unwilling

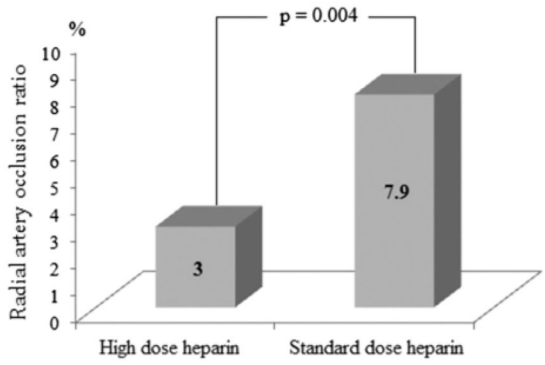

Figure 3. Comparison of radial artery occlusion ratios between standard and high dose heparin groups.

complication. Besli et al. evaluated whether weight-adjusted high dose UFH (100 IU/kg) reduces the rate of RAO after diagnostic cardiac catheterisation compared to weight-adjusted standard dose UFH (50 IU/kg) in 868 consecutive patients [7]. RAO was evaluated with vascular Doppler ultrasonography at 10 days after cardiac catheterisation RAO was significantly higher in the standard dose UFH group than high dose UFH group (7.9% vs. 3.0%) with an adjusted OR of 2.8 (95% CI: 1.35–5.87, $p = 0.006$) (see Figure 3).

The standard medical treatment after the MitraClip procedure, in the absence of risk factors requiring antithrombotic therapy such as atrial fibrillation, is dual antiplatelet therapy using aspirin and clopidogrel. ESC/EACTS and ACC/AHA surgical guidelines show a Class IIa indication for temporary antithrombotic therapy after mitral valve repair/bioprosthetic valve replacement within the first three months even in patients with no additional risk factors. Geis et al. reported the incidence of stroke, as well as major adverse events such as bleeding in 470 patients who received oral anticoagulation (Coumadin: INR 2.0–3.0) instead of dual antiplatelet therapy for at least 30 days after the MitraClip procedure [8]. Incidence of stroke within 30 days was significantly reduced as compared to German, EU and US large registries and multicenter studies (0.2% vs. Median 1.3% [0.7–2.6%]; $p < 0.05$). In addition, bleeding complications were not significantly increased due to temporary oral anticoagulation therapy (4.6% vs. Median 7.4% [3.4–13.6%]; ns). More studies are needed to define the optimal antithrombotic therapy post-MitraClip.

Heart failure

Malnutrition and poor dietary behaviours have been shown to be associated with adverse outcomes in patients with heart failure and reduced ejection fraction (HFrEF). Agus et al. examined the value of the prognostic

Table 1. Multivariate analysis for the prediction of primary composite endpoint of all-cause death and hospitalisation for heart failure at 12 months.

	Univariate			Multivariate		
	Odds ratio	95% CI	*p*-Value	Odds ratio	95% CI	*p*-Value
Albumin	1.16	0.51–2.45	0.042	1.35	0.34–3.45	0.356
C-reactive protein	1.45	1.31–3.33	0.045	1.13	0.28–3.45	0.215
Age (per 1 year)	1.32	0.78–4.56	0.013	2.55	1.04–4.85	<0.01
NYHA functional class III/IV	1.95	0.94–7.56	0.015	1.42	0.44–3.21	0.048
NT-proBNP > 396 pg/mL	1.86	0.64–5.23	0.011	3.11	1.14–5.33	<0.01
PNI < 37	1.85	0.65–5.44	0.002	2.51	1.19–5.46	0.005

NYHA: New York Heart Association; NT-proBNP: N-terminal pro B-type natriuretic peptide; PNI: Prognostic Nutritional Index.

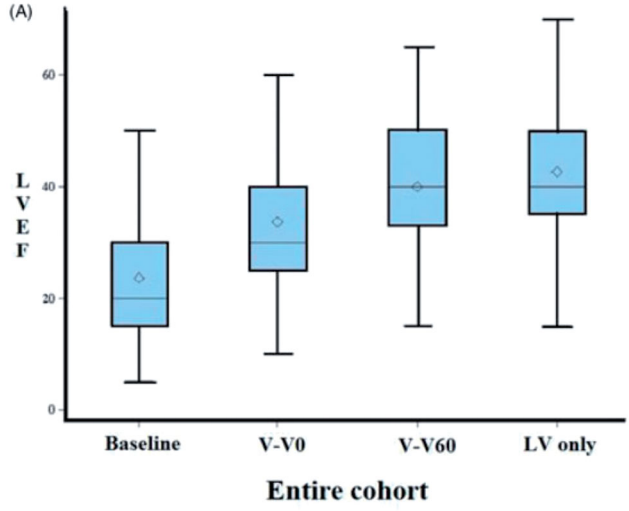

Figure 4. Changes in the left ventricular ejection fraction (LVEF) seen with different pacing timings.

nutritional index (PNI) to predict the one-year outcomes in 285 patients with heart failure and preserved ejection fraction (HFpEF) [9]. PNI was calculated from the following formula: 10 × serum albumin (g/dL) + 0.005 × total lymphocyte count (per mm3). The primary composite endpoint was all-cause death and hospitalisation for heart failure at 12 months and occurred in 42 patients (15%). PNI <37 was independently associated with worse outcomes (OR: 2.5 see Table 1).

Response to cardiac resynchronisation therapy (CRT) in patients with heart failure depends on the degree of correction of electromechanical dyssynchrony between the left and right ventricles (LV, RV). Singh et al. evaluated the relationship between acute changes in LV ejection fraction (LVEF%) and speckle tracking strain patterns at different interventricular (VV) intervals programmed pacing in 338 patients with CRT [10]. With different pacing protocols, LVEF improved from 23.7 ± 10.2% at baseline to

42.6 ± 11.2% for LV-only (see Figure 4). In addition, an incremental improvement in strain occurred with VV0, VV60, and LV-only pacing; greatest with LV-only pacing. Thereafter, devices were programmed chronically to VV60 (=sequential LV–RV), and long-term clinical outcomes were assessed. In the total cohort, there was a significant improvement in LVEF, from baseline 22.4 ± 9.0% to 40.0 ± 10.1% ($p < 0.001$). At 1 year, 23% of patients had NYHA III-IV compared to 96% at baseline ($p < 0.001$).

Disclosure statement

No potential conflict of interest was reported by the author(s).

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References

[1] Brohet C. Fragmentation of the QRS complex: the latest electrocardiographic craze? Acta Cardiol. 2019; 74(3):185–187.
[2] Ratheendran AC, Subramanian M, Bhanu DK, et al. Fragmented QRS on electrocardiography as a predictor of myocardial scar in patients with hypertrophic cardiomyopathy. Acta Cardiologica. 2020; 75(1):42–46.
[3] Eren H, Kaya Ü, Öcal L, et al. Presence of fragmented QRS may be associated with complex ventricular arrhythmias in patients with type-2 diabetes mellitus. Acta Cardiol. 2021;76(1):67–69.
[4] Van Hoof L, De Brabandere K, Fieuws S, et al. The Belgian experience with concomitant surgical ablation of atrial fibrillation: a multi-Centre prospective registry. Acta Cardiol. 2020;75(3):200–208.
[5] Pype L, Embrechts L, Cornez B, et al. Long-term effect of atrial fibrillation on the evolution of mitral and tricuspid valve regurgitation. Acta Cardiologica. 2020; 75(7):639–639.
[6] Zhang S, Yang Y, Xia Y, et al. Long-term effect of catheter ablation on tachycardia-bradycardia syndrome: evidenced by 10 years follow up. Acta Cardiol. 2020;75(6):537–543.
[7] Besli F, Gungoren F, Tanriverdi Z, et al. The high dose unfractionated heparin is related to less radial artery occlusion rates after diagnostic cardiac catheterisation: a single centre experience. Acta Cardiol. 2021; 76(2):168–167.
[8] Geis N, Raake P, Kiriakou C, et al. Temporary oral anticoagulation after MitraClip – a strategy to lower the incidence of post-procedural stroke? Acta Cardiol. 2020;75(1):61–67.
[9] Zencirkiran Agus H, Kahraman S. Prognostic nutritional index predicts one-year outcome in heart failure with preserved ejection fraction. Acta Cardiologica. 2020;75(5):450–455.
[10] Singh A, Karnik R, Shah AN, et al. Myocardial strain characteristics at different interventricular pacing timings: implications for device programming and long-term clinical outcomes in patients with cardiac resynchronisation therapy. Acta Cardiol. 2021;76(1):46–10.