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Real life EP lab without fluoroscopy

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Background: Arrhythmias' invasive treatment requires X-rays to introduce and guide catheters to target ablation foci. X-rays have no therapeutic role in patients (pts) and there is no clear safe exposure dose either for pts or for EP physicians.
Purpose: Single center experience with a daily life fluoroscopy free EP lab to guide introduction, navigation, mapping and ablation catheters in the four chambers of the heart.
Methods: A near zero EP program was started in 2009, using 3-D mapping technology, beginning with flutter ablations FLU, AVNRT, AVRT, and finally complex AT and VT ablations; fluoroscopy elimination was achieved early in the experience, even pregnant patients were safely offered EP procedures when needed. Duration was measured since pts arrival to departure from EP lab. Acute success needed arrhythmia or substrate elimination with no complication. EPS were pts with palpitations in whom no arrhythmia was found. Follow up was completed in 81% of this cohort (1–61 months).
Results: 607 pts were treated (including 1 Afib ablation -ICE used for transseptal puncture-) with three available systems (NaVx, Carto and Rythmia). Navigation with extreme views was highly useful; daily exposure helps to integrate 3-D anatomy faster for EP fellows. Fluoroscopy was needed mostly for vascular and transeptal access. There were 10 acute complications (1.6%): 5 AV blocks with need of a pacemaker, and 4 pericardial effusions; no acute complications was associated to the lack of fluoroscopy in any patient. Fluoroscopy was not used at all in 93.9% of cases (99% in AVNRT and 95.7% of flutter ablation)

Type (n)	Duration, range (min)	Zero fluoro (%)	Acute success rate (%)	Long term success rate (%)
Total	25–540	93.9	88	77.7
Flutter (184)	35–210	95.7	88.6	81.2
AVNRT (206)	45–205	99	94.7	91.1
AVRT (66)	45–540	87.9	84.8	85.7
AT (37)	45–395	82.4	67.6	72.4
VT (19 LV, 43 RV)	75–322	83.8	67.6	75.0
EPS (27)	25–210	96.1	N/A	N/A

Conclusion: It is possible to accomplish standard and complex EP cases, to deploy catheters, to navigate, map and ablate arrhythmia substrates in all type of patients, in a time-efficient way without the use of fluoroscopy in most of cases. In pregnant patients no other approach is safe when arrhythmias need invasive treatment, but experience to work without X-ray exposure needs to be acquired in a daily basis.

NOVEL ASPECTS OF ANTI BRADYCARDIA PACING

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Ventricular pacing percentage and atrial fibrillation risk in dual chamber cardiac implantable devices

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Background: High ventricular pacing percentage (VP%) has been associated with worse prognosis in patients with pacemakers (PM) or cardioverted defibrillators (ICD) who did not require ventricular pacing.
Aim: To estimate how many PM/ICD patients in real-world clinical practice are associated to a high (>40%) VP% and evaluate the hypotheses that high VP% is deleterious in patients who don't need ventricular pacing but may be protective in patients with conduction diseases (any degree AV block).
Methods: PM/ICD patients were followed for at least 6 months in 31 Italian cardiological centers. The first 3 months were used as a screening period to calculate the "baseline VP%". Main endpoint was atrial fibrillation (AF) longer than 6 hours, which was considered as an epiphenomenon of non-optimal physiological pacing. Through a Cox model, AF risk was associated with VP% and other patient baseline characteristics.
Results: We followed 1258 patients (305 female, 70±12 years), 560 with PM and 698 with ICD. AV block was present in 304 (54.3%) PM patients, 108 III degree, 112 II degree and 84 I degree and in 126 (18.1%) ICD patients, 28 III degree, 24 II degree and 74 I degree.
In a median follow-up of 30 months, a VP% higher than 40% was measured in 182 (32.5%) PM patients and in 73 (10.5%) ICD patients. Among patients who were in sinus rhythm after the screening period, AF longer than 6 hours occurred in the following 12 months observation period in 136/510 (26.7%) PM patients and

87/660 (13.2%) ICD patients. A VP%>40% was associated with a reduced risk of AF in PM with AV block (HR=0.51, p=0.008), while a VP%>10% was associated with an enhanced risk of AF in ICD patients without AV block (HR=2.03, p=0.050).
Conclusion: Many PM/ICD patients receive high VP%. In ICD patients with normal conduction, RV pacing is associated with higher risk of AF, which may represent the epiphenomenon of pacing-induced ventricular dyssynchrony. Conversely, in PM patients with AV block, ventricular pacing seems to be protective, being associated with lower risk of AF. Biventricular pacing or algorithms devoted to adapt AV delay may provide physiological pacing in AV block patients.

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Right ventricular septal pacing with narrow QRS less than 125ms is beneficial for preventing pacing induced cardiomyopathy

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Background: When ventricular pacing more than 40% is expected for patients with complete AV block, current guideline demonstrates that bi-ventricular pacing is recommended for preventing pacing-induced cardiomyopathy. However, it is not clear that right ventricular (RV) septal pacing is more beneficial than RV apical pacing.
Objective: Narrow QRS after pacing is more important factor than pacing site. We hypothesize that RV septal pacing with narrow QRS is beneficial for preventing pacing-induced cardiomyopathy.
Methods: Total 117 consecutive patients with complete AV block and pacemaker implantation were studied from 2014 to 2016. RV septal pacing was performed in 66 patients and RV apical pacing was performed in 51 patients. Pacing induced cardiomyopathy was defined as reduced left ventricular ejection fraction (LVEF) after pacing compared to baseline LVEF before pacing. We evaluated LVEF, aggravation of tricuspid regurgitation (TR), ventricular diastolic dimension (LVDD), and left ventricular systolic dimension (LVSD).
Results: QRS width after septal pacing is less than QRS width after apical pacing (122±28ms vs. 137±33ms, p=0.007). During the mean 20.9±17.7 months, there is no significant differences of change of LVEF between septal pacing and apical pacing (-5.57% vs. -3.94%, p=0.292). Aggravation of TR is not different (12.1% vs. 23.5%, p=0.138). The change of LVDD is not different (-1.8mm vs. -0.7mm, p=0.614). The change of LVSD is not different (1.2mm vs. 1.5mm, p=0.158). However, patients with narrow QRS less than 125ms after RV septal pacing have experienced less reduced LVEF than those with wide QRS more than 125ms after pacing (-2.56% vs. -6.35%, p=0.040). Aggravation of TR is not different (15.2% vs. 18.3%, p=0.803) after pacing. The change of LVDD (-1.9mm vs. -0.4mm, p=0.348) and LVSD (1.8mm vs. 0.6mm, p=0.827) is not different.
Conclusion: This study showed that RV septal pacing with narrow QRS less than 125ms is beneficial for preventing pacing-induced cardiomyopathy.

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Type 2 diabetes increases the need for pacemaker and implantable cardioverter defibrillator treatment - A Swedish registry report

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Background: Patients with Type 2 Diabetes mellitus (T2DM) have an increased risk for cardiovascular disease including tachy- and bradyarrhythmia. The prevalence of the latter conditions is less well explored in a contemporary patient population including the need of treatment with pacemakers (PM) and implantable cardioverter defibrillators (ICD).
Purpose: To explore 1) whether patients with T2DM have an increased risk for PM/ICD implantation compared with an age- and sex-matched control population without DM; 2) to investigate characteristics associated with increased risk of receiving a PM/ICD.
Methods: Total 416 014 patients with T2DM from the Swedish national wide diabetes registry and 2 080 070 controls were included. Patients with T2DM in the NDR were compared with five individuals (controls) from the general population matched for age, sex and geographical area. The follow up time was 7 years. Cox regression was performed to estimate the risk of PM-treatment and to examine risk factors.
Results: The prevalence of PM-treatment was higher in patients with T2DM than among controls (1.54% vs 0.98%; p<0.0001). The corresponding prevalence of ICD-implants was 0.26% vs 0.12% (p= <0.0001). T2DM was associated with an increased risk for the need of PM-treatment (Hazard ratio (HR) 1.69, 95% CI 1.60–1.69; p<0.0001) which remained (HR 1.56, 95% CI 1.51–1.60; p<0.0001) after adjustments for several cofounders (age, sex, educational level, marital status, country of birth and coronary heart disease). The unadjusted risk for ICD implantation was also increased (HR 2.28, 95% CI 2.12–2.45; p<0.0001) and remained following adjustment (HR 1.60, 95% CI 1.49–1.73; p<0.0001). Risk factors for receiving a PM were increasing age, diabetes duration, and blood