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Poster Walk: Ablation, Pacing and Defibrillation I

P01–P08

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P01

Unexpectedly high rate of lead failure of the microport (formerly Sorin/Livanova) Beflex and Vega pacemaker electrodes: a single centre experience

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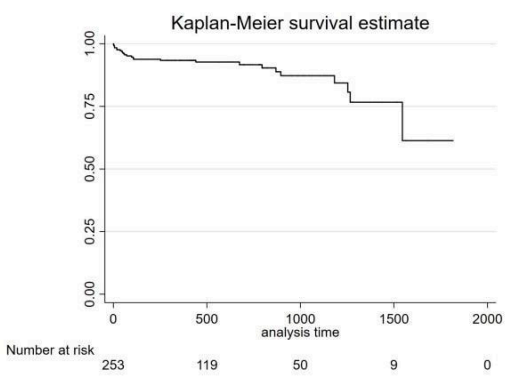
Introduction: Pacing leads remain the weak link of current pacemaker systems. Various differences in design and material exist among companies. Lead performance is mainly assessed via post-marketing studies of the manufacturing companies. Reliable independent reports are rare. We aimed to study the early and long-term performance of the Microport (formerly Sorin/Livanova) Beflex and Vega leads at our centre, for which a lead survival >99% at 3 years has been reported by the company.

Method: In this single centre, retrospective study we analysed the performance of all right ventricular Microport pacemaker leads implanted at our centre between January 2014 and January 2018. Only first pacemaker implants were considered. Lead failure was defined as any lead issue requiring reintervention during follow-up (dislocation, perforation, electrical abnormalities such as lead noise or excessively high thresholds).

Results: A total of 271 Microport right ventricular pacing leads were implanted (233 Beflex and 38 Vega leads). Mean patient age was 76 years (66% men). Dual chamber pacemakers were implanted in 162 patients (60%) and single chamber in 109 (40%). Mean threshold at implant was 0.6V @ 0.5ms (range 0.3-1.2V), mean R wave 13.2 mV (range 1.5-30mV) and mean impedance 816 Ohm (range 469-1639 Ohm). Patients without available follow-up information were excluded (N=18, 6.6%). The remaining 253 patients (93.3%) were analysed.

Mean follow-up was 1.6 years (range 1 day-5 years). We observed a total of 25 lead failures (10%). Lead dislocation occurred in 2 cases (0.8%), lead perforation in 5 cases (2%), electrical abnormalities in 6 cases (2.4%) and excessively high threshold in 12 cases (4.8%; mean voltage 4V, range 2-7.5V; mean pulse width 0.75ms, range 0.35-1ms). Yearly incidence of lead failure per 100 leads was 6.1% (95%-CI [4.09-8.98]; Figure showing Kaplan-Meier graph).

Figure: P01-1.



Conclusion: We found an unexpectedly high rate of lead failure of the Microport Beflex and Vega pacing leads at our centre. The two main reasons for premature lead failure were excessively high thresholds as well as electrical abnormalities during follow-up. Comparison of lead performance with other centres and against other leads are needed to further assess the magnitude of the problem.

P02

Late pacemaker implantation after transcutaneous aortic valve implantation

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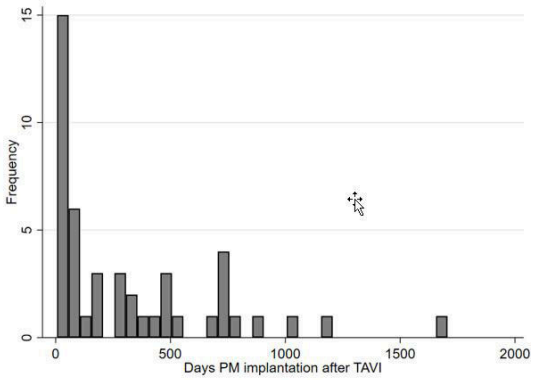
Introduction: Transcutaneous aortic valve implantation (TAVI) often impairs AV conduction. Management of these patients is challenging, particularly in case of new left bundle branch block (LBBB). The ideal management strategy is still debated.

We studied patients, discharged without a pacemaker (PM) after TAVI with the purpose to describe incidence, indications and predictors of late pacemaker implantation.

Figure: P02-1.



Methods: Consecutive patients undergoing TAVI at our institution between January 2012 and December 2017 were enrolled. In those discharged without a PM, the primary endpoint was PM implantation during follow-up.

Results: Of 1499 patients undergoing TAVI, 131 (8.7%) had a PM implanted before TAVI and 271 (18%) received a PM during the index admission. A total of 120 patients (8%) had no ECG at discharge, were lost during follow-up or died before discharge after TAVI, leaving 1059 patients for analysis. Median age was 82 years and 47% of patients were male. At discharge from TAVI, 761 patients (72%) had no LBBB, 111 patients had pre-existing LBBB (10%) and 187 patients had new LBBB (18%). During follow-up, a PM was implanted a median of 171 days (interquartile range 21-514; see Figure P02-1) after TAVI in 46 patients (4%). The rates of PM implantation were 4%, 4.5% and 6% in patients discharged with no LBBB, pre-existing LBBB and new LBBB, respectively (p=0.5). Reasons for late PM implantation were sick-sinus-syndrome in 20% of patients, advanced AV block in 77% and cardiac resynchronization therapy in 3%. One patient underwent a valve in valve TAVI procedure with complete AV block 2 years after the first TAVI procedure. The predominant symptom leading to PM implantation late after TAVI was syncope and occurred in 55% of patients.

Conclusions: A PM is implanted late after TAVI in 4% of patients a median of 6 months after TAVI. The main reason for late PM implantation is complete AV block and syncope is the most frequent clinical presentation. Incidence of late PM implantation is not different among groups discharged with or without LBBB after TAVI.

P03

Chronic use of flecainide and propafenone for rhythm control of atrial fibrillation and flutter in the real-world

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Introduction: Class IC antiarrhythmic drugs (AAD) such as flecainide and propafenone are a therapeutic option (Class IA recommendation) to maintain sinus rhythm (SR) in patients with atrial fibrillation (AF) and atrial flutter (AFL) with no structural heart disease. The aim of this study was to investigate and compare long-term efficacy and safety of flecainide and propafenone in the real-world setting of a tertiary care center.

Method: Individuals with a history of AF or AFL and chronic treatment with a class IC AAD for the maintenance of SR were retrospectively included in our study population. Baseline patient characteristics, antiarrhythmic comedication, duration of therapy, therapy response and incidence of adverse effects were investigated.

Results: A total of 1281 patients were treated with class IC AAD for any arrhythmia. 772 were treated with either propafenone of flecainide specifically for AF or AFL. A long-term treatment with flecainide was given in 310 patients, and with propafenone in 89 patients, respectively. Mean age was 57 ± 11 years,280 (70%) patients were male, 241 (83%) patients suffered from paroxysmal AF. The mean daily flecainide and propafenone dose was 181 ± 56mg and 397 ± 107mg over a median of 207 days (IQR 62-744). Negative chronotropic and dromotropic medication was simultaneously used by 310 (77%) patients.Overall, improved therapeutic response was observed in 197 cases (49%). 147 patients (37%) discontinued therapy most commonly due to adverse drug effects. Adverse drug effects were reported in 60 (41%). Other frequent reasons for therapy discontinuation were decision to proceed with ablation (40 patients, 27%) and change to a different antiarrhythmic drug (28 patients, 19%).

Conclusion: A desired symptomatic response to flecainide and propafenone therapy was observed in approximately half of the patients with AF or AFL during long-term therapy. However, this therapy was associated with a relatively high rate of adverse drug effects, often resulting in therapy discontinuation suggesting the need for close follow-ups of patients treated with class IC AAD for AF and AFL.

P04

Clinical predictors for left atrial fibrosis in patients referred for catheter ablation of atrial fibrillation

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Background: Atrial fibrillation (AF) is characterized by various clinical presentations and pathophysiological substrates. Paroxysmal AF is mainly due to triggered activity in the pulmonary veins. Persistent AF could be related to more complex arrhythmic mechanisms. Presence of left atrial (LA) fibrosis identified by late gadolinium enhancement cardiac magnetic resonance (LGE-CMR) can be related to more complex arrhythmogenic substrate. Aim of the study was to identify predictors of presence and severity of LA fibrosis detected by LGE-CMR in patients with AF referred for catheter ablation (CA).

Methods: Consecutive patients were included. Clinical data, electrocardiographic (ECG) (P-wave duration, PR interval), laboratory (CRP, BNP, CK) and echocardiographic parameters (left ventricular ejection fraction, LA volume and dimension in parasternal long axis (PLAX) were collected. LGE-MRI was performed using a fat-saturated 3D inversion recovery, ultrafast gradient echo sequence in a

1.5 Tesla scanner. LA fibrosis was categorized semi-quantitatively as grade 1 (no fibrosis), grade 2 (limited diffuse or patchy LGE) and grade 3 (severe). Multivariable logistic regression was used to identify predictors of any fibrosis (combination of grade 2 and 3) or of severe fibrosis only.

Results: Of the 106 patients enrolled, 77 (73%) had paroxysmal AF. Grade 1, 2 and grade 3 fibrosis was observed in 61 (57%), 38 (36%), and seven (7%) patients respectively. Paroxysmal AF was more frequent in patients with grade 1 (51, 84%) and grade 2 (25, 66%) than in those with grade 3 (1, 14%; p< 0.001). Patients with severe fibrosis showed a longer PR interval and a significant difference in PLAX compared to patients with grade 1 or 2 (212±29 ms, 169±21 ms and 179±33 ms, p=0.002; 49±5 mm, 39±6 mm and 41± 7 mm, p=0.008 respectively). Multivariate analysis identified persistent AF (OR 3.496 (95%CI 1.367-8.941), p=0.009) and PR interval (OR 1.017 (95% CI 1.001-1.034), p=0.039) as independent predictors for any fibrosis. For severe fibrosis, BNP (OR 1.009 (95%CI 1.002-1.016), p=0.014) and PR interval (1.037 (95% CI 1.009-1.065), p=0.009) were identified as independent predictors.

Conclusions: In a population of patients undergoing CA for AF, diffuse LA fibrosis identified by LGE-CMR has been shown to correlate with PR interval. Whereas fibrosis is determined in addition by the type of AF, severe fibrosis is determined in addition to PR interval by the BNP value.

P05

Evolution and triggers of appropriate ICD shocks in patients with arrhythmogenic cardiomyopathy during long-term follow-up

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Introduction: Arrhythmogenic cardiomyopathy (ACM) is a life-threatening disease exposing patients at risk for arrhythmias and heart failure. Implantable cardiac defibrillators (ICD) can prevent sudden cardiac death in ACM, but the evolution and triggers of arrhythmic events are not well described.

Purpose: To describe the incidence, evolution and triggers of appropriate ICD shocks in patients with ACM to identify targets for future treatment optimization.

Methods: We retrospectively analysed a cohort of ACM patients with ICDs for the occurrence of appropriate shocks. We used every available device interrogation for data collection.

Results: 56 appropriate ICD shocks occurred in 22 of 40 patients (55%) during a mean follow up of 10 ±6.4 years. Mean time to first shock was 2.8 years (range 0-15). 68% of appropriate shocks occurred within 4 years after ICD implantation, and the amount of appropriate shocks adjusted for the number of patients at follow up declined consistently over time (Figure P05-1). 96% of shocks occurred during daytime and the majority during summer (36%) vs. winter (20%). We identified a high rate (87.5%) of potentially reversible triggers in 47 of 56 episodes (sports activity 37.5%, hypokalaemia 35.7% and infection 14.3%).

Figure: P05-1: Number of patients, appropriate ICD shocks and arrhythmic-burden-quotient (shocks/patient).

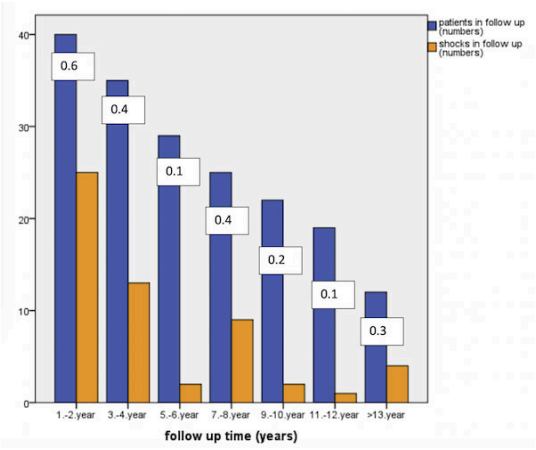

Figure: P05-2: Baseline characteristics.

Mean age at diagnosis	41.2
Male	70%
Definite ACM (diagnostic criteria 2010)	87.5%
Secondary Prevention	75%
LVEF<50% (Echocardiography)	27.5%
Betablocker	83%
Amiodarone	35%
ACE-Inhibitor/Aldosterone-Antagonist	40%
Sustained ventricular tachycardia pre-ICD	80%
Sudden cardiac arrest pre-ICD	7.5%

Conclusions: The risk of appropriate ICD shocks in ACM persists over years after ICD implantation. However, although ACM is a progressive disease, appropriate ICD shocks decline over time, which may reflect optimization of treatment and ICD programming. Arrhythmic episodes occur more often in summer, during daytime, and reversible triggers are frequent. Whether sports restriction, potassium substitution and early treatment of infections might reduce arrhythmic burden, deserves further investigation.

P06

Persistent atrial fibrillation terminated within the left atrium without recurrence at follow-up demonstrates a gradual intracardiac organization during stepwise ablation

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Introduction. We previously reported that patients (pts) with recurrence (Rec) after stepwise catheter ablation (step-CA) of persistent atrial fibrillation (pAF) exhibit high bi-atrial intracardiac dominant frequencies (DF) values before ablation, indicative of a severe bi-atrial electro-

anatomical remodeling. Herein, we hypothesized that a gradual decrease in DF values during step-CA is associated with pAF termination and maintenance of sinus rhythm (SR) on the long term.

Method. In 40 consecutive pts (61±8 yo, sustained AF duration 19±11 months), pulmonary vein isolation (PVI) and left atrium (LA) ablation were performed until pAF termination or cardioversion. 10-sec intracardiac electrograms (EGMs) epochs were recorded before ablation (BL), during PVI and during complex fractionated atrial electrograms (CFAEs) and linear ablation (post_PVI) in the right atrial (RAA) and left atrial (LAA) appendages and in the coronary sinus (CS). DF was defined as the highest peak within the [3-15] Hz EGM spectrum. Rec was defined as any atrial arrhythmia lasting > 30 sec during follow-up (FU).

Results. pAF was terminated within the LA in 70% (28/40, LT) of the pts, while 30% (12/40, NLT) were not. After a mean FU of 34±14 months, all NLT pts had a Rec, while LT pts presented a Rec in 71% (20/28, LT_rec) and remained in SR in 29% (8/28, LT_norec). Figure 1 shows: 1) a gradient in DF values measured in the LAA (panel A), RAA (panel B) and CS (panel C) with the highest values in NLT pts (red), intermediate values in LT_rec pts (yellow) and lowest DF values in LT_norec pts (green); 2) all three groups displayed a gradual intracardiac organization during LA ablation as shown by decreasing DF values ($p< 0.05$, BL vs post_PVI), but the LT_norec pts (green) exhibited the highest relative changes in DF from BL ($p< 0.05$, LT_norec vs NLT, Δ range: -5.31 to -9.69%).

Conclusion. Low DF values before ablation and gradual intracardiac organization until pAF termination are associated with maintenance of SR on the long term.

Disclosures: All authors have no disclosures or conflicts of interest

Figure: P06-1. Effect of ablation on DF.

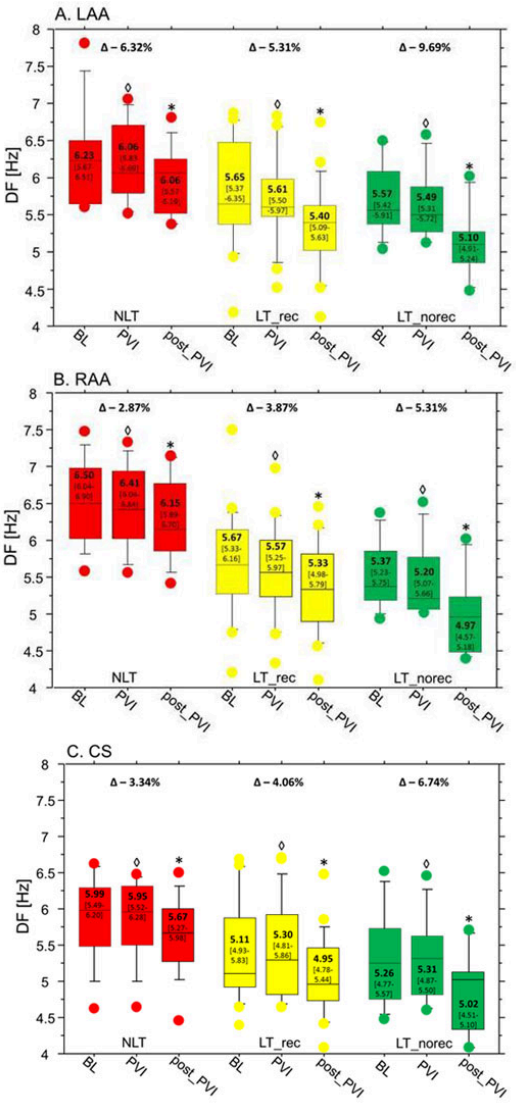

Figure 1. *p<0.05 post_PVI vs BL ; °p<0.05 PVI vs post_PVI

P07

Frequency and outcome of pacemaker and ICD procedures in patients with complete d-TGA and atrial switch at a Swiss tertiary care center

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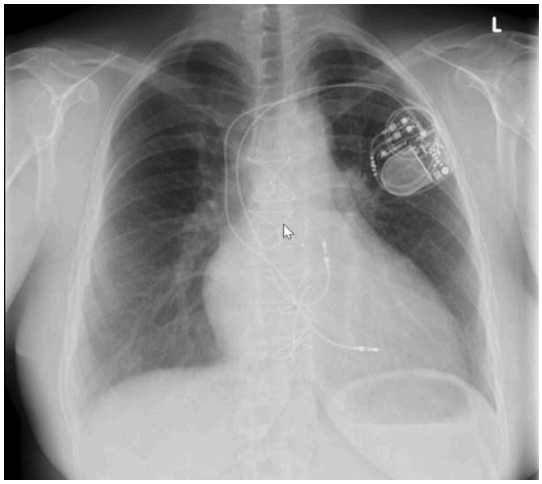
Introduction: Patients with complete transposition of the great arteries (d-TGA) and atrial switch face a high lifetime risk of arrhythmias. Interventions in these patients are challenging because of their particular anatomy. Reports on the frequency and outcome of pacemaker and ICD procedures in this patient population are scarce and missing for Switzerland.

Method: We retrospectively analyzed all device procedures performed in the above-mentioned population at a Swiss tertiary care center.

Results: Among 73 d-TGA patients (71% male; N=37 Senning; N=36 Mustard) followed at our center, a pacemaker was implanted in 10 patients (14%) and an ICD in 3 (4%). Median age at pacemaker and ICD implantation was 19 years (range 6-39 years) and 37 years (range 29-47 years), respectively. Pacemaker indication was sick-sinus-syndrome in all patients. Implanted devices were VVI in 5 (50%), AAI in 3 (30%) and DDD in 2 (20%). Initial implant site was endovenous in 7 patients (70%) and epicardial in 3 (30%). All atrial leads were implanted in the anatomically left atrium and all ventricular leads in the anatomically left ventricle (Figure P07-1). During a median follow-up after first pacemaker implant of 17 years (range 3-32 years), 14 re-interventions were performed in 7 patients (70%). Half of these re-interventions were simple generator exchanges, whereas the other half also had to deal with lead failures. In one patient pacemaker therapy was abandoned after 8 years without sequelae. In two patients an epicardial pacemaker system was exchanged for an endovenous system and in one patient an endovenous atrial lead was exchanged for an epicardial lead after of a stroke in the presence of a baffle leak. No up- or downgrades were performed. All ICDs were implanted for sec-

Figure: P07-1. Example of an endovenous dual-chamber pacemaker implanted in a d-TGA patient after atrial switch.



ondary prevention after sudden cardiac arrest. In two patients, endovenous single-chamber ICDs were implanted and an epicardial CRT-D was implanted in the third. After a follow-up of 0, 3 and 3 years after ICD implant in the 3 patients, one patient had recurrent appropriate ICD interventions and one patient died because of terminal heart failure.

Conclusion: Patients with complete d-TGA and atrial switch have a high incidence of sick-sinus-syndrome necessitating pacemaker implantation. Half of device re-interventions in these patients deal with lead failures. After the first three decades of life, ICD implantation for secondary prevention of sudden cardiac arrest may also become more frequent.

P08

Prognostic value of a prolonged corrected QT interval in patients with aortic stenosis undergoing valve replacement

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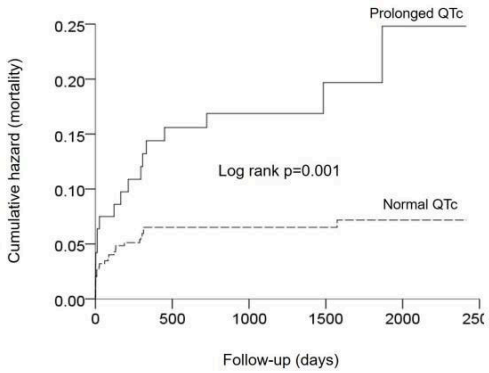
Background: A recent study in a small population of patients with low flow-low gradient aortic stenosis (AS) had found a relationship between a prolonged corrected QT interval (QTc) and increased mortality. The aim of the present study was to assess the prognostic value of QTc in an unselected larger population of patients with severe AS undergoing aortic valve replacement (AVR).

Methods: The QT interval was measured in a 12-lead ECG in 485 patients (age 74±10 years, 57% males) with severe AS [indexed aortic valve area (iAVA) 0.41±0.13 cm^2/m^2,

Figure: P08-1.



left ventricular ejection fraction (LVEF) 58±12%] the day before pre-AVR right heart catheterization. QTc was calculated according to the Bazett formula. Prolonged QTc was defined as QTc >450 ms in men and QTc >470 ms in women. The outcome parameter was all-cause mortality.

Results: A prolonged QTc was found in 100 patients (77 men, 23 women, QTc 483±23 ms). Patients with prolonged QTc were more likely to use oral anticoagulants, diuretics, inhibitors of the renin angiotensin aldosterone system, and digoxin, and to have left bundle branch block, and had more severe mitral regurgitation (data not shown). While iAVA was similar in patients with prolonged and normal QTc (0.41±0.12 vs. 0.40±0.13 cm^2/m^2; p=0.77), patients with prolonged QTc had lower LVEF (50±14 vs. 60±11%) and cardiac index (2.2±0.6 vs. 2.5±0.6 $l/min/m^2$), and had higher mean pulmonary artery pressure (30±12 vs. 24±9 mmHg), mean pulmonary artery wedge pressure (20±8 vs. 15±7 mmHg), and pulmonary vascular resistance (2.5±1.6 vs. 2.0±1.2 Wood units; p< 0.001 for all) than those with normal QTc. After a median follow-up of 3.7 (interquartile range, 2.6-5.2) years after surgical (n=349) or transcatheter (n=136) AVR patients with prolonged QTc had higher mortality than those with normal QTc (log rank p=0.001; Figure P08-1). In multivariate Cox regression including available non-invasive parameters prolonged QTc was an independent predictor of death [hazard ratio 2.34 (95% confidence interval 1.26-4.36); p=007] along with presence of chronic obstructive pulmonary disease and more severe mitral regurgitation.

Conclusions: In patients with severe AS assessed prior to AVR prolonged QTc is a marker of a more advanced disease stage with an adverse hemodynamic profile and increased long-term mortality. Thus, the ECG as a simple and easily available tool provides important prognostic information which is independent of other clinical information and non-invasive imaging.