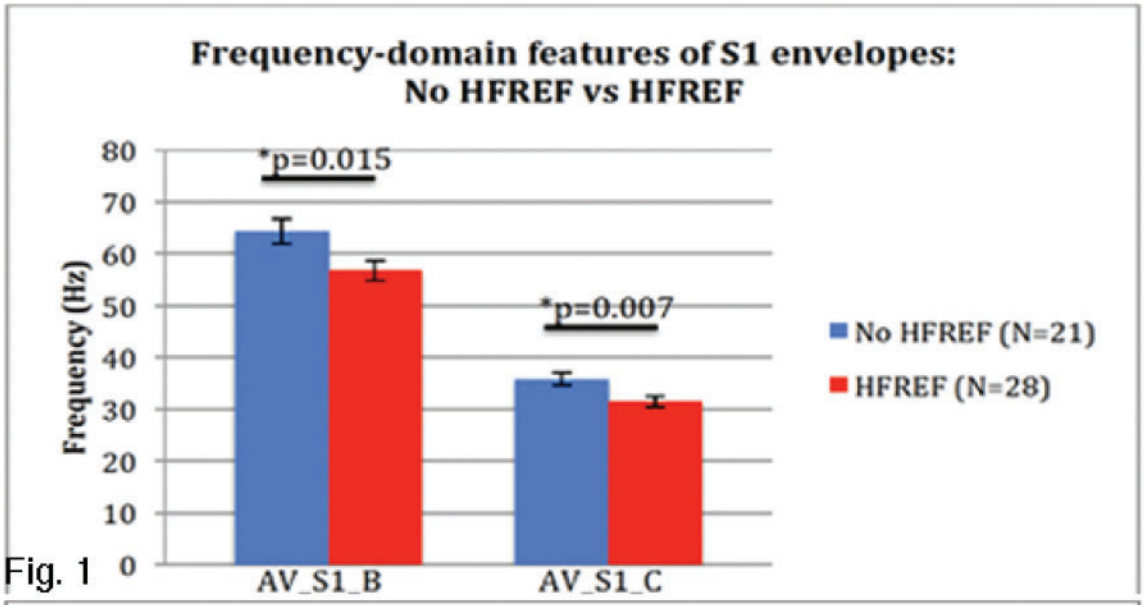

Fig. 1

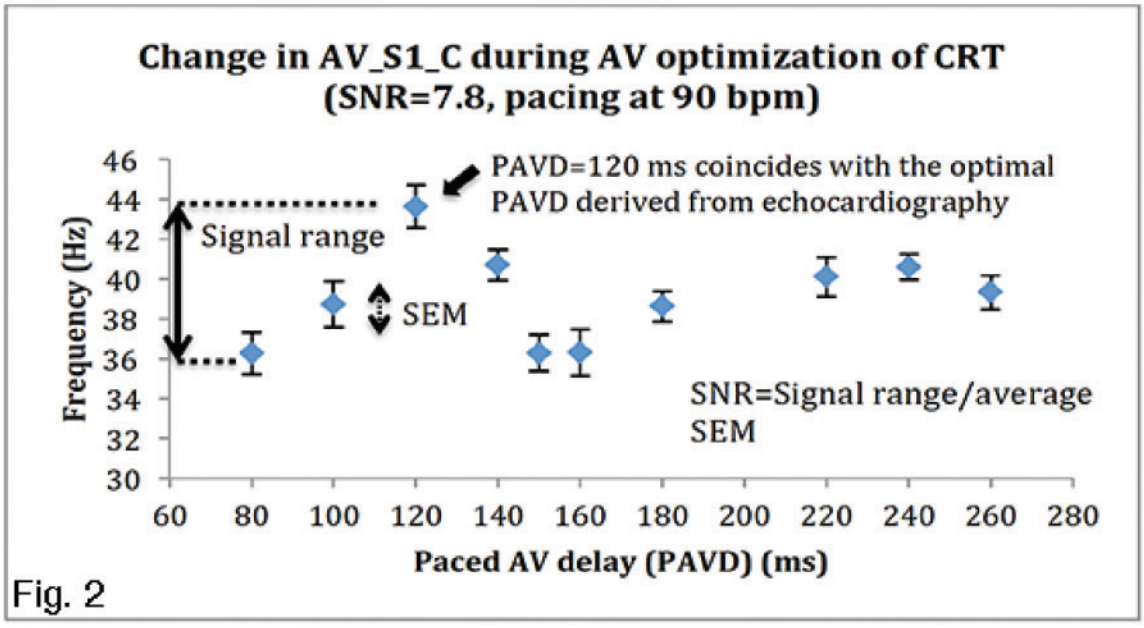

Fig. 2

Abstract P1754 Figure.

Methods: Medical records of all patients undergoing LLE between January 2012 and August 2015 were screened with regard to sufficient information on systemic infection or lead endocarditis and patients were determined thereafter. We treated 101 patients using high frequency 80 Hz laser sheaths and lead implant duration of ≥24 months. Indications for lead extraction were; systemic infection and lead endocarditis 29.7%, local infection 49.5%, lead dysfunction 15.8%, upgrades 3.0% and tricuspid insufficiency 2.0%. 239 leads were scheduled for LLE: 175 pacing and 64 ICD leads; mean time from initial lead implantation 96.5 ± 65.5 months (range 24-408). The patient lead distribution with regard to systemic infection or lead endocarditis: Systemic infection and lead endocarditis (Group A): 30 patients, 78 leads; local infection and other extraction indications (Group B): 71 patients, 161 leads.
Results: Complete procedural success was significantly higher in group A than in group B (100% vs. 94.4%; p=0.0331). The laser treatment time and fluoroscopy time were numerically lower in group A. Mean time from initial lead implantation (103.4 vs. 89.6 months; p= 0.1320) and ratio of ICD leads (28.2% vs. 26.1%; p=0.7566) did not differ significantly between the two groups. Minor and major complications were low in both groups and did not reveal any significant difference (Group A: one minor complication; pocket hematoma, group B: two major complications; pericardial effusion and emergent sternotomy due to SVC perforation). No extraction related mortality was observed.
Conclusions: The presence of systemic infection or lead endocarditis in LLE procedures allows for higher complete procedural success. When compared with LLE of non-infected leads, the infected leads require less laser and fluoroscopy times. Due to the rarity of minor and major complications, no statistical significance was found between the two groups.

P1754

Externally recorded cardiac acoustics to optimise cardiac resynchronisation therapy

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Background: Mechanical characteristics of the left ventricle (LV) may be encoded in cardiac acoustic signatures within low frequency ranges.
Purpose: We aimed to characterise i) acoustic features in the frequency domain in subjects with normal LV function (Group 1) and patients with heart failure with reduced ejection fraction (HFREF) indicated for cardiac resynchronisation therapy (CRT, Group 2) and ii) their relationship with aortic velocity time integral (VTI) with respect to signal to noise ratio (SNR) during atrio-ventricular (AV) optimisation of CRT.
Method: 15-seconds segments of heart sounds obtained from electronic (e-) stethoscope recordings of subjects in Group 1 (N=21), Group 2 (N=28), and 4 subjects undergoing AV optimization of CRT were subjected to a novel signal processing method to detect S1 and S2 sounds envelopes and extract frequency-domain acoustic features from the detected envelopes. During AV optimization of CRT (pacing at 90bpm), aortic VTI and EA duration were measured with Doppler on echocardiography from a range of paced AV delays (PAVD). The optimal PAVD was found at the highest aortic VTI with the best EA duration and pattern for LV filling. The SNR of the acoustic features were calculated by dividing the range of signals across all the tested PAVD by the average size of the standard error of mean (SEM) (the noise) at each PAVD.
Results: 1) Two frequency-domain features extracted from the S1 envelopes (AV_S1_B and AV_S1_C) were higher in Group 1 compared to Group 2 (fig. 1). No difference was found in the same features extracted from the S2 envelopes (AV_S2_B and AV_S2_C) between the 2 groups. 2) During AV optimization of CRT, AV_S1_C correlated with aortic VTI in subjects with high SNR (e.g. SNR=7.8: N=10, r=0.67, p=0.03, 2-tailed) but not in those with low SNR (e.g. SNR=3.9: N=7, r=-0.322, p=0.48). 3) In the subject with the highest SNR (7.8), the PAVD at the highest value of AV_S1_C coincides with the optimal PAVD derived from echocardiography (fig. 2).
Conclusion: e-Cardiac acoustics offer a potential novel method to diagnose HFREF and optimize AVD in CRT. Future studies to confirm the current findings and improve the SNR of this method are needed for clinical utility.

P1756

Primary surgical closure or negative pressure wound therapy: optimal strategy for pocket management after infected device extraction

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Background: Cardiac implanted electronic device (CIED) use has increased significantly over last 2 decades associated with an increased rate of infection. CIED extraction is a class I recommendation for device infection. However, there are no published guidelines suggesting the best approach regarding management of the device pocket after extraction.
Purpose: To compare the outcomes between primary surgical closure versus use of negative pressure wound therapy (NPWT) management of device pocket in case of infection.
Methods: A comprehensive lead extraction registry and the associated medical records at Piedmont Heart Institute were retrospectively reviewed to identify all patients, who underwent CIED extraction procedure for device infection between August 2014 & January 2017. The decisions concerning wound management and rationale (if any) were left to the discretion of the managing physician & recorded. The primary endpoints were need for secondary wound revision or recurrent site infection.
Results: Thirty-two patients underwent device removal for infection during the study period. Primary closure was performed in 14 patients and 18 patients were treated with NPWT (i.e. wound-vac). Ten patients in the primary closure group had a surgical drain placed that was removed after 48 hours. Antibiotic duration and drug choice type were guided by the presence or absence of systemic infection. Individual physician preference was the main factor in deciding use of primary closure vs NPWT and it remained consistent among individual physicians among different patient and wound types. All patients had complete wound healing at 2-month follow-up. There were no cases of surgical pocket problems necessitating revision or recurrent infection in either group.
Conclusions: Primary surgical closure and NPWT are equally efficacious methods to allow wound healing after removal of an infected CIED. Based on prior published wound management literature, NPWT is significantly more expensive then primary closure. Use of primary closure may help reduce health care cost while providing high quality wound management post extraction.

P1757

Laser lead extraction in patients with venous stenosis or occlusion

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Introduction: The approach to treat patients in need of system upgrade or revision suffering from venous occlusion or stenosis is a challenging procedure and ongoing issue. Because venous occlusion may be asymptomatic for a long time contralateral implantation of a new device is performed most commonly when it comes to system upgrade.
Purpose: The aim of this study is to show the possibility of laser lead extraction (LLE) for venous re-canalization and ipsilateral re-implantation.
Methods: A retrospective study was conducted on consecutive patients in need of system/ device upgrade between January 2012 and August 2016. All patients underwent pre-procedure venography and patients with venous occlusion or severe stenosis were included. Clinical characteristics, device information and intra-procedural data of these 39 patients were analyzed. Indications for LLE, procedural success and complications are classified in accordance with the Heart Rhythm Society Consensus Report on Transvenous Lead Extraction.
Results: 27 patients were male (74.8%) with a mean age of 75±14 years. We treated 56 leads with a mean lead age of 108.6±64.2 months, a mean fluoroscopy time of 16.1±11.8 minutes, a mean laser-treatment time of 80.9±39.7 seconds and 6218.2±7347.3 laser impulses delivered. Complete procedural success and venous re-canalization followed by ipsilateral re-implantation was achieved in all cases (100%).
Conclusion: LLE is a save and attractive solution to manage device upgrade or lead revision in patients with venous occlusion or relevant stenosis avoiding contralateral implantation to prevent from further complications.

P1758

Mechanical power sheath recanalization mediated lead implantation in patients with venous occlusion: technique and results

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Background: Chronic venous occlusion hampers lead revisions and upgrades in patients with pacemaker and ICD systems. This can make cardiothoracic surgery or contra-lateral implantation of leads with tunneling necessary. A technique using venous recanalization may be a preferred alternative.
Purpose: to assess the efficacy and safety of this new technique.
Methods: From 2009-2016 all consecutive patients planned for lead re-implantation or upgrade with known chronic venous occlusion were studied. All patients underwent extraction of an existing malfunctional or functional ICD- or pacemaker lead with the Cook Evolution mechanical powersheath. By using the lumen of the sheath, endovascular access to the heart was obtained for new leads.
Results: Forty-one patients were included with a total of 105 leads (2.56 ±1.1 leads per patient).The indication for this procedure was replacement of malfunctional leads (n=35, 85.4%) or sacrificing a functional lead in case of an upgrade (n=6, 14.6%). In total 75 leads were extracted (ICD leads n=39; 37.1%, RV leads n=12; 16%, RA leads n=19; 25.3%, LV leads n=5; 6.6%) and 30 leads stayed in situ. Mean age of lead at time of extraction was 8,6 years (median 8.6, IR 5.05, minimum 1.1, maximum 25.8). Because of damage to bystander leads during extraction we had to extract 2 additional leads (1x RA lead, 1x LV lead). Clinical success (<4cm lead residue in situ) was achieved in 41 patients (100%) and complete success (the removal of all lead material) in 39 patients (95.1%). There were 2 minor complications (2 pocket hematomas, managed conservatively) and 1 major complication (tamponade, needing thoracotomy). Mean procedure time was 3.0 hours (median 2.0, minimum 1:28, maximum 5:35) with a mean fluoroscopy time of 14.9 min (SD: 12.5 min).
Conclusions: The technique of recanalization with the Evolution sheath is feasible with an acceptable safety profile and has a high efficacy in creating new venous access in patients with chronic venous occlusion needing cardiac lead intervention.

P1759

Success and complication rates of lead-extraction with the first versus the second generation evolution mechanical sheath

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Background: The Evolution sheath (USA) is a power sheath frequently used for chronic lead extraction. In 2013 a novel type (bidirectional) of Evolution sheath (the RL type) was introduced.
Purpose: We evaluated differences in success and complication rates of the two types.
Methods: From 2009-2015 all lead extractions requiring the use of an Evolution sheath were prospectively examined. According to the current guidelines, complete procedural success was defined as the removal of all targeted lead material. Clinical