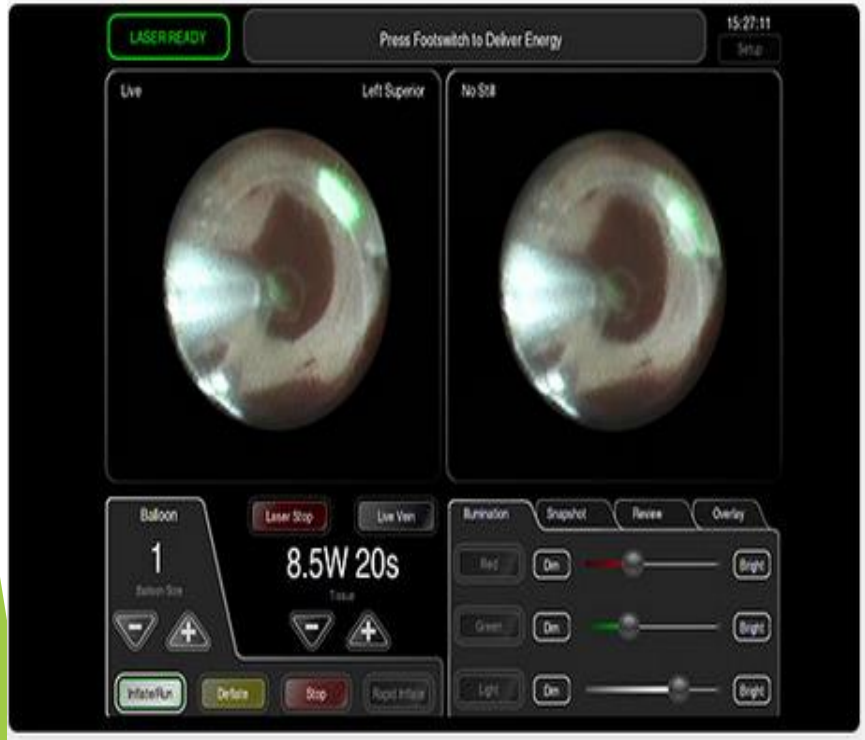
EP NEWS

By S.P Tabatabaee M.D

HEARTLIGHT OVERVIEW

Electrophysiologists treating atrial fibrillation know how important procedural control is to patient outcomes. That's why HeartLight's direct anatomic visualization, titratable laser energy, and universal balloon design make it a new standard for PVI procedures.



DIRECT VISUALIZATION

SEE IT. BELIEVE IT.

With a direct, "catheter-eye's" view of the anatomy, HeartLight's reusable 2Fr endoscope provides unmatched real-time assurance that ablations are on target.

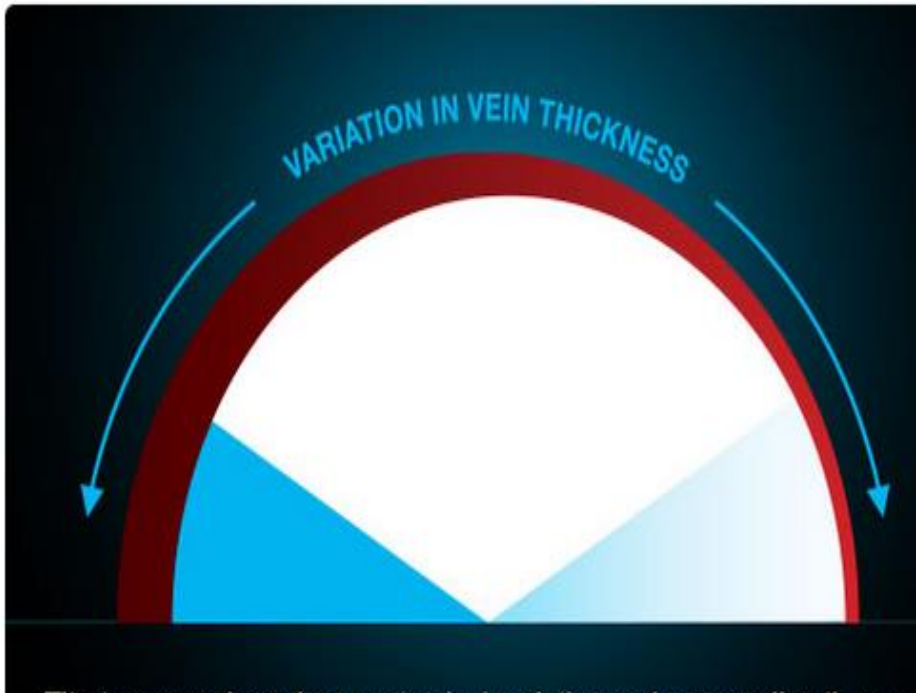
- Enables precise laser energy delivery
- Eliminates total reliance on maps and other surrogate visualization methods
- Full-color perspective enhances depth perception

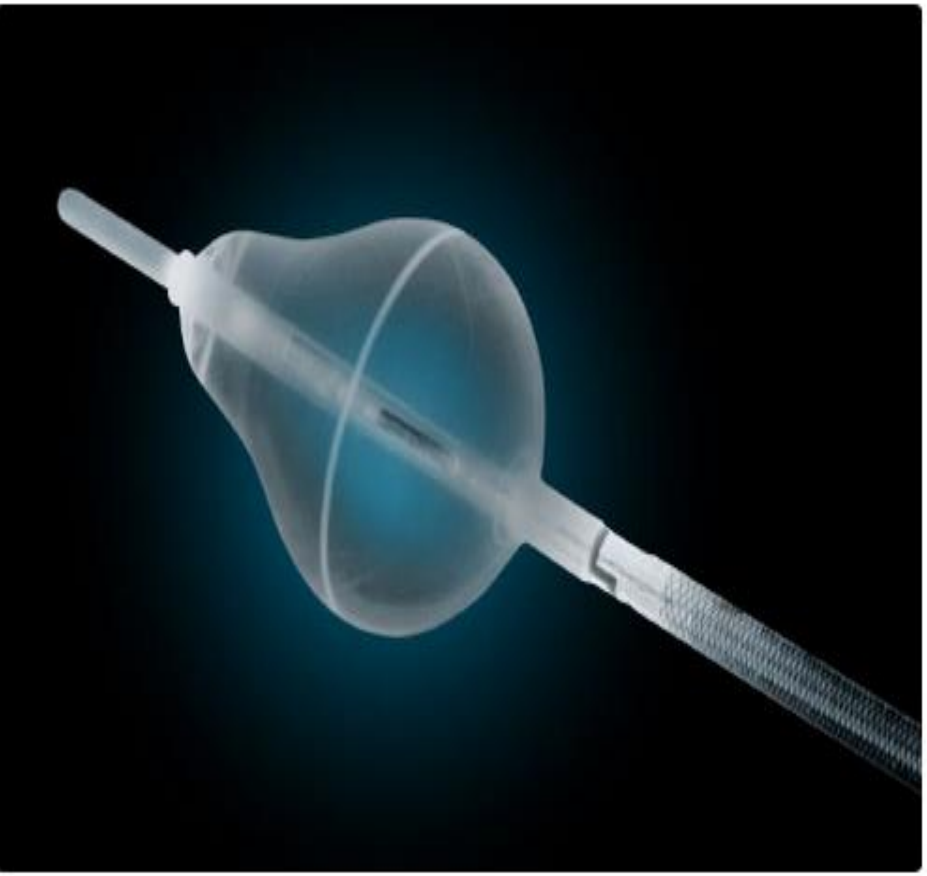
TITRATABLE LASER ENERGY

MAXIMIZE CONTROL.

HeartLight delivers focused laser energy, enabling precise lesions optimized for variations in anatomy.

- Titratable energy delivery enables isolation of veins using levels from 5.5w to 12w
- Allows full rotational and axial energy positioning capabilities —without moving the balloon
- Applies energy in a series of continuous 30° arcs, and can be freely directed to any area, creating precisely-tailored lesion sets





UNIVERSAL BALLOON DESIGN

ANY VEIN. ANY TIME.

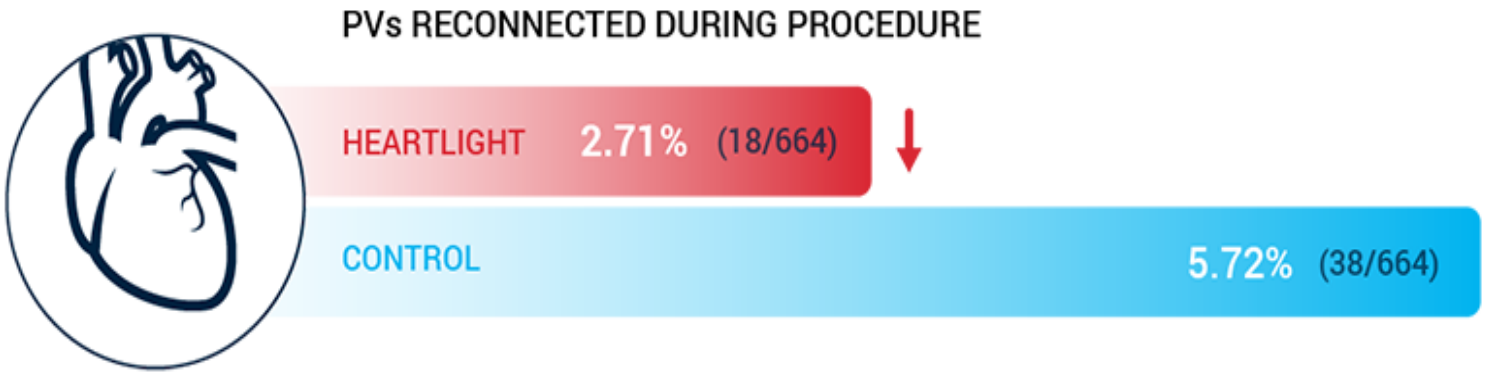
The tapered, low-pressure compliant HeartLight balloon expands to fit a wide range of patient anatomies and optimizes vein contact.

- Progressively inflatable until optimal vein occlusion is achieved
- Enables a wide range of pulmonary veins to be isolated
- Allows for treatment of anatomic variations such as common trunks, early branching and small middle veins

ESTABLISHING A NEW STANDARD FOR PVI.

Data demonstrate a safe, efficient procedure that results in durable positive clinical outcomes.

- 4,000 patients treated
- More than 80 peer-reviewed publications
- First balloon-based ablation technology to complete a successful FDA randomized pivotal trial in comparison to a gold standard RF technique
- Demonstrated a statistically significant lower incidence of PV reconnection during the procedure in comparison to RF[1]



- Exploratory analysis showed that physicians performing 15 or more HeartLight procedures achieved outcomes that compare to RF

AN INSIDE LOOK AT HEARTLIGHT TECHNOLOGY.

The HeartLight Endoscopic Ablation System consists of a balloon catheter, endoscope, deflectable sheath, and integrated consol
they form a unique system offering direct visualization, titratable energy delivery, and universal balloon design.

BALLOON CATHETER

ENDOSCOPE

DEFLECTABLE SHEATH

HEARTLIGHT CONSOLE

An inflatable balloon is located at the distal end of the disposable, 12F, multi-lumen catheter. Separate lumens provide access for the lesion generator, illumination fibers, balloon inflation/deflation circuit, and endoscope. Made of a highly compliant material, the balloon's shape is

Extra vascular ICD (EV-ICD) and Medtronic:

- Medtronic is developing the EV-ICD to avoid trans-venous leads like Boston S-ICD
- The EV-ICD system is being developed with leads that are placed outside the heart and veins and under the rib cage
- It is done with existing sub-Q systems
- putting the lead underneath the sternum and using specialized introducer tool

S-ICD vs. EV-ICD:

- Under the rib cage
- S-ICD :large, cumbersome, limited longevity
- EV-ICD : similar in size to traditional ICD , similar lifespan, little higher maximum energy

40 j vs. 35j

The main advantage:

- Deliver anti-tachycadia pacing(ATP)
- Brady pacing
- Defibrillation and post shock pacing in a painless way this ability is driven by where the lead goes

The Sub-sternal Pacing Acute Clinical Evaluation(SPACE) study

- Included 26 patients at eight center U.S. AND Canada centers
- Pacing from extra vascular lead is possible and effective in all case

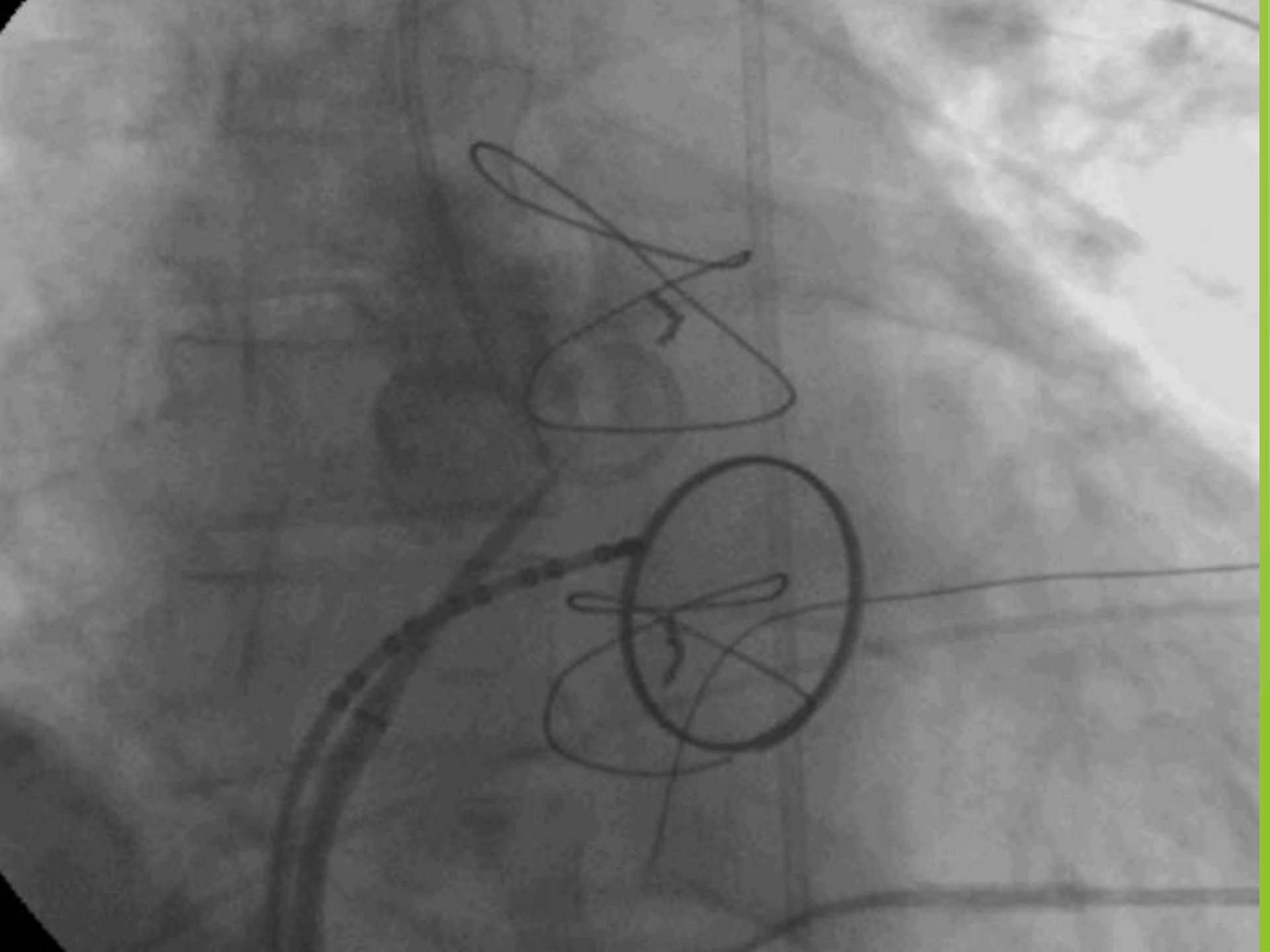
Inadvertent sheath placement in the aorta during septostomy

Europace(2017) 19 (3):447-457


حضر مرگ

Aims

- Trans septal puncture (TPS) are routinely performed in cardiac interventions requiring access to the left heart .
- Pericardial effusion/tamponade are well recognized
- Few data on accidental puncture of aorta and management



Methods and result:

- Assess frequency and outcome of inadvertent aortic puncture during TSP in patients undergoing ablation procedure between January 2005 and December 2014
- During the 10-year period ,two inadvertent aortic puncture occurred among 2936 consecutive patients and one in Mustard

What's new?

- Aortic puncture is rare , but life-threatening complication of TSP
- Only one series describing its incidence and three case report management by device
- Fortunately non of our patient required surgery or device

Case :

- A 62-year old man with dilated CMP who presented for ablation of VT with recurrent ICD shock
- INR on the morning 1.96
- VT was easily inducible and well tolerable
- A 5F sheath was placed in the right femoral artery for hemodynamic monitoring

- Agillis large curve ,St,Jude Medical,MN,USA,inner diameter 8.5 F was placed in right femoral vein
- TSP by BRK XS,St. Jude Medical,Minnesota,USA)
- Under biplane fluoroscopy at 15’ RAO and 60’ LAO

- TSP was inadvertently leading to placing sheath in aorta

From: **Incidence and management of inadvertent puncture and sheath placement in the aorta during attempted transseptal puncture**

Europace. 2016;19(3):447-457. doi:10.1093/europace/euw037

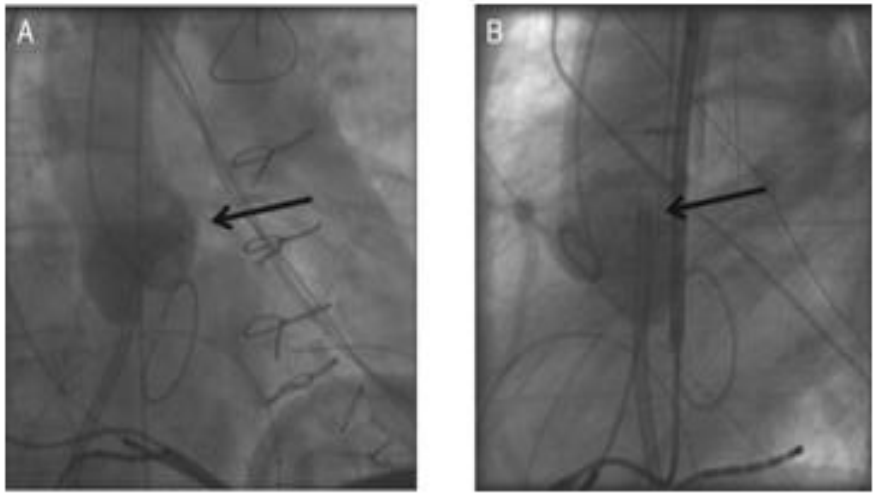
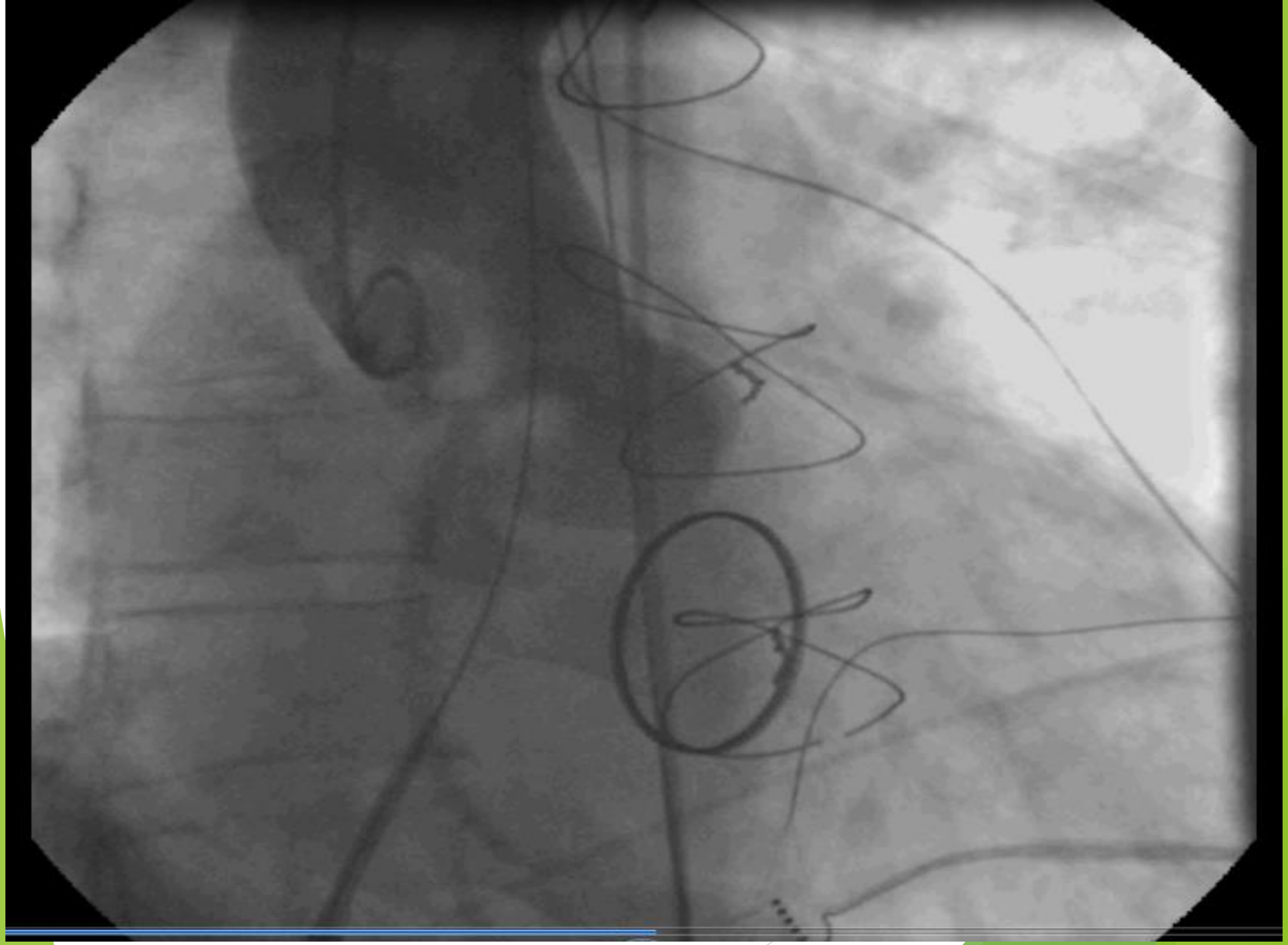


Figure Legend:
Aortography in 30° right anterior projection (A) and 60° left anterior oblique view (B) of the patient described in case 1. The steerable 11.5F sheath (inner diameter 8.5F) is placed in the aortic root (arrow).

What did they do?

- Hemodynamic monitoring showed stable blood pressure
- 1000IU of PPSB (prothrombin complex concentrate) were applied to antagonize vitamin-k-antagonist
- Echocardiography excluded a pericardial effusion
- A guidewire was placed via sheath in aortic arch

- Sheath was withdrawn to IVC
- Serial echo was done and aortograghy showed no leakage
- After 30 minute wire was withdrawn to RA



- In both 11.5F sheath accidentally placed in ascending aorta just above aortic valve
- In the presence of surgical stand by , sheath was pulled back with a wire left in aorta
- Under hemodynamic monitoring and echocardiography after 30 min wire was pulled back
- Non of them required closing device and open surgery

Sudden cardiac death in a patient with lamin A/C mutation in the absence of dilated cardiomyopathy or conduction disease

Philipp Ehlermann · Stephanie Lehrke · Theano Papavassiliu · Benjamin Meder · Martin Borggrefe · Hugo A. Katus · Rainer Schimpf

- Dilated cardiomyopathy (DCM) is a frequent form among the cardiomyopathies and displays a very heterogeneous etiology.
- It is a familial disease in about one-third of DCM cases
- More than 20 DCM candidate genes were already identified

Table 1 – Diseases caused by mutations in *LMNA*

Diseases of striated muscle

Autosomal dominant Emery–Dreifuss muscular dystrophy (#181350)

Autosomal recessive Emery–Dreifuss muscular dystrophy (#604929)

Autosomal dominant cardiomyopathy dilated 1A (#115200)

Autosomal dominant limb girdle muscular dystrophy type 1B (#159001)

Peripheral neuropathy

Autosomal recessive Charcot–Marie–Tooth disorder type 2B1 (#605588)

Lipodystrophy syndromes

Autosomal dominant Dunnigan-type familial partial lipodystrophy (#151660)

Autosomal dominant lipoatrophy with diabetes, hepatic steatosis, hypertrophic cardiomyopathy and leukomelanodermic papules (#608056)

Autosomal recessive mandibuloacral dysplasia (#248370)*

Accelerated aging disorders

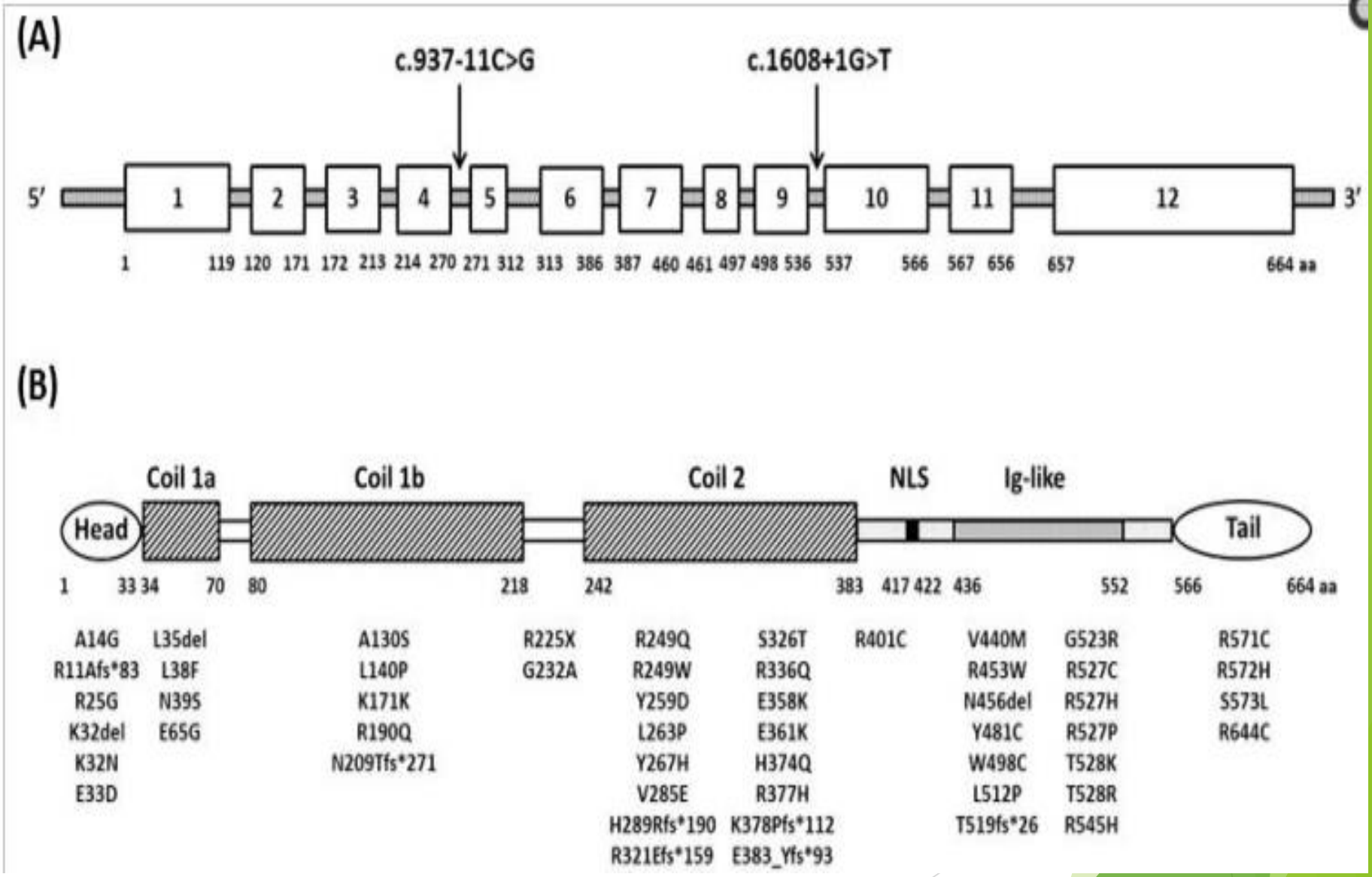
Autosomal dominant atypical Werner Syndrome (#277700 for Werner syndrome)

Autosomal dominant Hutchinson–Gilford progeria syndrome (#176670)

Autosomal dominant restrictive dermopathy lethal (#275210)

On-line Mendelian Inheritance in Man (OMIM; http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM) entry numbers are given in parentheses.

* Mandibuloacral dysplasia also has features of accelerated aging.


(A)
c.937-11C>G
c.1608+1G>T
5′
1
2
3
4
5
6
7
8
9
10
11
12
3′
1
119 120 171 172 213 214 270 271 312 313 386 387 460 461 497 498 536 537 566 567 656 657
664 aa
(B)
Coil 1a
Coil 1b
Coil 2
NLS
Ig-like
Head
Tail
1 33 34 70 80 218 242 383 417 422 436 552 566 664 aa
A14G
R11Afs*83
R25G
K32del
K32N
E33D
L35del
L38F
N39S
E65G
A130S
L140P
K171K
R190Q
N209Tfs*271
R225X
G232A
R249Q
R249W
Y259D
L263P
Y267H
V285E
H289Rfs*190
R321Efs*159
S326T
R336Q
E358K
E361K
H374Q
R377H
K378Pfs*112
E383_Yfs*93
R401C
V440M
R453W
N456del
Y481C
W498C
L512P
T519fs*26
G523R
R527C
R527H
R527P
T528K
T528R
R545H
R571C
R572H
S573L
R644C

- LMNA is among the most common genes affected in familial DCM and is coding for lamin A/C, which is a ubiquitous component of the nuclear skeleton and involved in the regulation of gene expression.

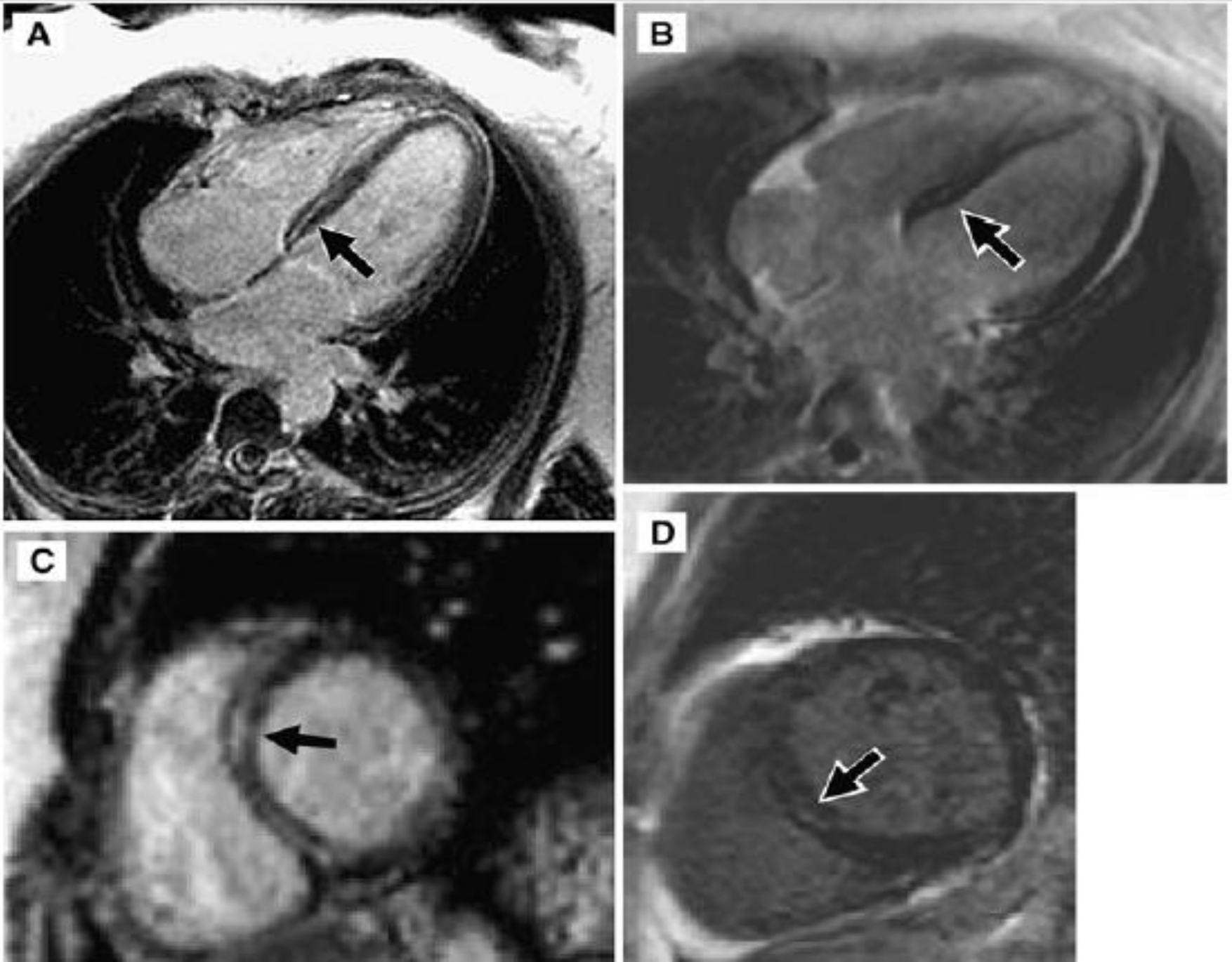
- there are many other non-cardiac diseases like Emery-Dreifuss muscular dystrophy (EDMD2; OMIM 181350), Limb-girdle muscular dystrophy type 1B (LGMD1B; OMIM 159001), Dunnigantype familial partial lipodystrophy (OMIM 151660), Charcot-Marie-Tooth disease (CMT2B1; OMIM 605588),Hutchinson-Gilford progeria syndrome (HGPS; OMIM176670) andrestrictive dermopathy (OMIM 275210),which can result from defects in this gene and are summarized under the term laminopathies

Case:

- A 32-year-old woman presented at the outpatient department after a sudden loss of consciousness for seconds, while she was driving a car on a motorway
- No diseases in the medical history.
- She reported about a premature death of her father at the age of 42 years

- no abnormal clinical findings and the ECG was interpreted as normal.
- Echocardiography revealed regular findings, with the exception, that in the apex of the right ventricle a small sacculation was suspected

- Cardiac MRI was performed and ARVC was excluded.
- Left ventricular ejection fraction was 58%. However, in the basal and mid-ventricular septum a discrete intramural late contrast enhancement was seen


A
B
C
D

- Angiography of the right and left ventricle was normal. The coronary arteries were without any signs of atherosclerosis.
- Myocardial biopsy of the left ventricle revealed no pathological findings.
- No abnormal findings during head-up tilt testing

- During electrophysiological examination an AV-nodal reentry tachycardia with a heart rate of 176 min-1

- successful slow pathway ablation was performed. Programmed right ventricular stimulation was negative. It was decided to implant an event recorder (RevealTM

- One year later, the event recorder was explanted after no significant arrhythmias were recorded
- Two years after explanation and 3 years after the initial event, the patient suffered from sudden cardiac death at the age of 35 years.

- A few days after the death of patient III-2, her 38-year-old sister (patient III-1) presented for cardio logical examination
- Two years ago, she was evaluated after repeated syncope without prodromi, which resulted in drop attacks with skin-abrasions.

- A cardiac MRI at this time revealed no abnormal findings; a Brugada syndrome was excluded by ajmaline testing. Now, echocardiography suspected a localized mid-septal hypokinesia, which was not confirmed by the repeated cardiac MRI`

- An electrophysiological study including programmed ventricular stimulation showed no significant arrhythmias, but a slightly reduced atrio-ventricular conductance with a borderline AV interval (200 ms) and a low Wenckebach point

- Because of the family history, old medical records of the father of these two sisters (patient II-2) were acquired from archives of several hospitals

- Two years later the patient was resuscitated after ventricular fibrillation, but unfortunately left the patient in apallic syndrome. He died 9 months later

- In regard to the striking family history and clinical findings, a genetic screening for LMNA mutations by direct sequencing was initiated in patient III-1. Thereby the heterozygote frame-shift mutation c.908-909delCT within the lamin A/C gene (LMNA) was identified

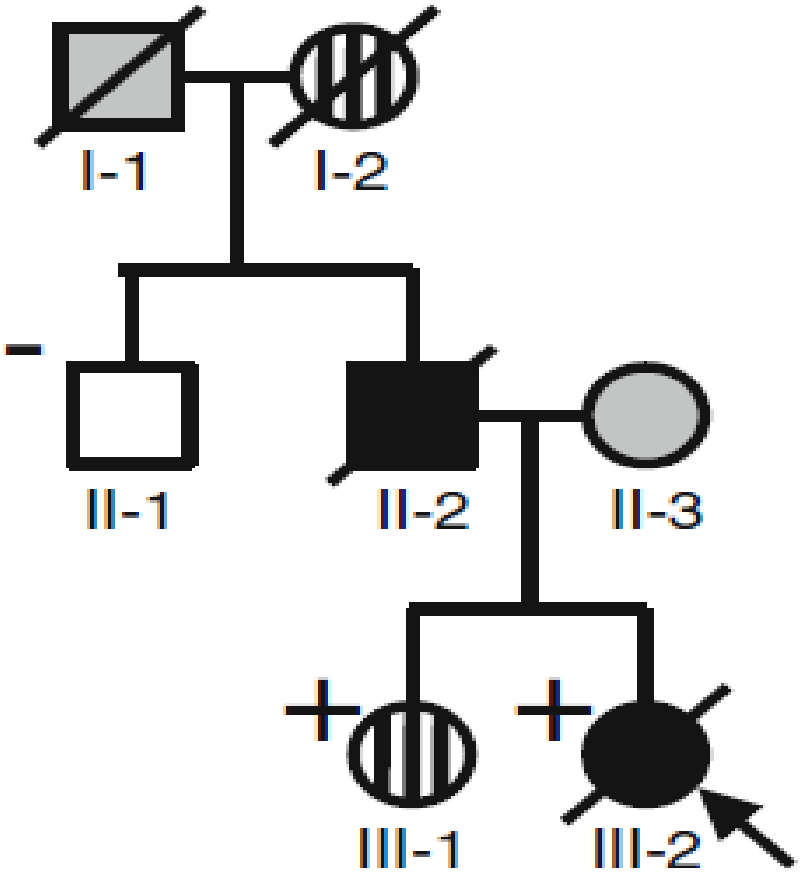


Fig. 1 Pedigrees of the family: *open* and *black symbols* represent unaffected and affected individuals, respectively. *Dashed symbols* indicate individuals with presumed or borderline disease phenotype. *Grey symbols* denote individuals with unknown clinical status. (+) and (−) symbols indicate presence and absence of the mutation, respectively. *Slanted bars* denote deceased individuals. Patient I-2 is denoted as suspected phenotype, as sudden unexplained death occurred at the age of 53 years

- It has been documented that MRI can identify early stages of cardiomyopathy in muscular dystrophies
- There is some evidence that the presence of LGE can predict an adverse prognosis in non-ischemic cardiomyopathy

- This report highlights the role of a thorough and repetitive evaluation of family history in patients with recurrent syncope and familial sudden cardiac death

- Cardiac MRI is a promising technique for early detection of structural abnormalities and cardiac disease manifestation in carriers of LMNA mutations.

- screening for LMNA mutations is essential to identify patients with mild or even absent clinical manifestation of the disease.

- Genetic and family counseling is recommended for all patients and families with cardiomyopathy. (Level A) Genetic counseling is the process of communicating

- Primary prophylactic ICD implantation in mutation carriers should be considered.

Anti coagulant resumption after ICH aids patients

- Even when patients on oral anticoagulant (OAT)have ICH resumption of oral anticoagulant ,produce the best midterm outcome

- Based on meta-analysis of data from 1000 patients in three observational study

- Resumption of OAT is a mjor dilemma when managing patients who developed an ICH
- Result showed : patient s who resumed OAT following ICH had their subsequent 1-year mortality cut by more than 70% and stroke risk halved
- The suggestive finding from the analysis ‘’strongly support” the need for prospective trial to better assess the benefit and risk

- Data collected from a total 1027 patients enrolled in any of three obsevational studies
- German –wide Multicenter Analysis of Oral Anticoagulant Associated Intracranial Hemorrhage(RETRACE) study
- The MGH longitudinal ICH study
- Ethnic/Racial Variations of intracerebral Hemorrhage(ERICH) study.

- Overall 26% of the patients resumed OAT following their ICH
- The rate ranged from a low of 20% in one study to a high of 42% in another
- The vast majority received vitamin K antagonist very few received DOAC
- mortality was 71% to 74% lower among patients who resumed or stayed off OAT during the year following ICH
- Recurrent all-cause stroke was 49% to 55% lower with resumed OAT

- Lumbar location of ICH or non lumbar position of ICH had no influence on responsiveness to OAT
- ICH on lumbar location had a trend toward more recurrent ICH on OAT
- The only factor that linked with whether or not patients resumed OAT was the severity of their ICH
- The more sever bleeding the less likely were patients to resume

Risk Factors Found for Early Death After VT Ablation

- Among patient with structural heart disease ,5% rate of early mortality
- Early mortality :death after 31 days post ablation
- 3% dying before hospital discharge

The factors of early mortality

- Low LVEF:22% versus 34%(OR 1.12 per % decreased ,95% CI 1.05-120)
- Chronic kidney disease :55% versus 28%(OR 2.73, 95% CI 1.10-6.80)
- Presentation with VT storm :66% versus 34%(OR 3.61, 95% CI 1.37-9.48)
- Presence of unmappable VTs: 73% versus 55% (OR 5.69, 95% CI 1.37-23.69)

- Many of these variables are known as predictors of survival in heart failure patients(e.g., the Seattle Heart Failure model)
- Identification of such features may prompt early hemodynamic support
- Half (48%) of patient who died early ,had early recurrent VT
- indeed , recurrent VT was tied to higher odds of subsequent death

- Aggressively treating VT and heart failure in patient with early post-ablation recurrence " may translate into a mortality benefit"
- After recurrence of VT, death was known to be VT related in only 40%
- VT in this setting may be an indication of worsening heart failure rather than changing underlying substrate
- heart failure management, hemodynamic support ,mechanical assist device to stabilize patient before ablation

Recommended approach

- Pre-procedure imaging with CT scanning : to identify LV and LA thrombus
- TSP approach versus retrograde approach in patient with higher risk of embolic event such as ICMP
- percutaneous hemodynamic support in patient with high post-ablation mortality risk
- Lactate monitoring during procedure

Source :

- Journal of the American college of Cardiology

:Santangeli P, et al “Early mortality after catheter ablation of ventricular tachycardia in patient with structural heart disease “J Am Coll Cardiol 2017;DOI:10.1016/j.jack.2017.02.044