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# What's new in pacing?

# Hardware

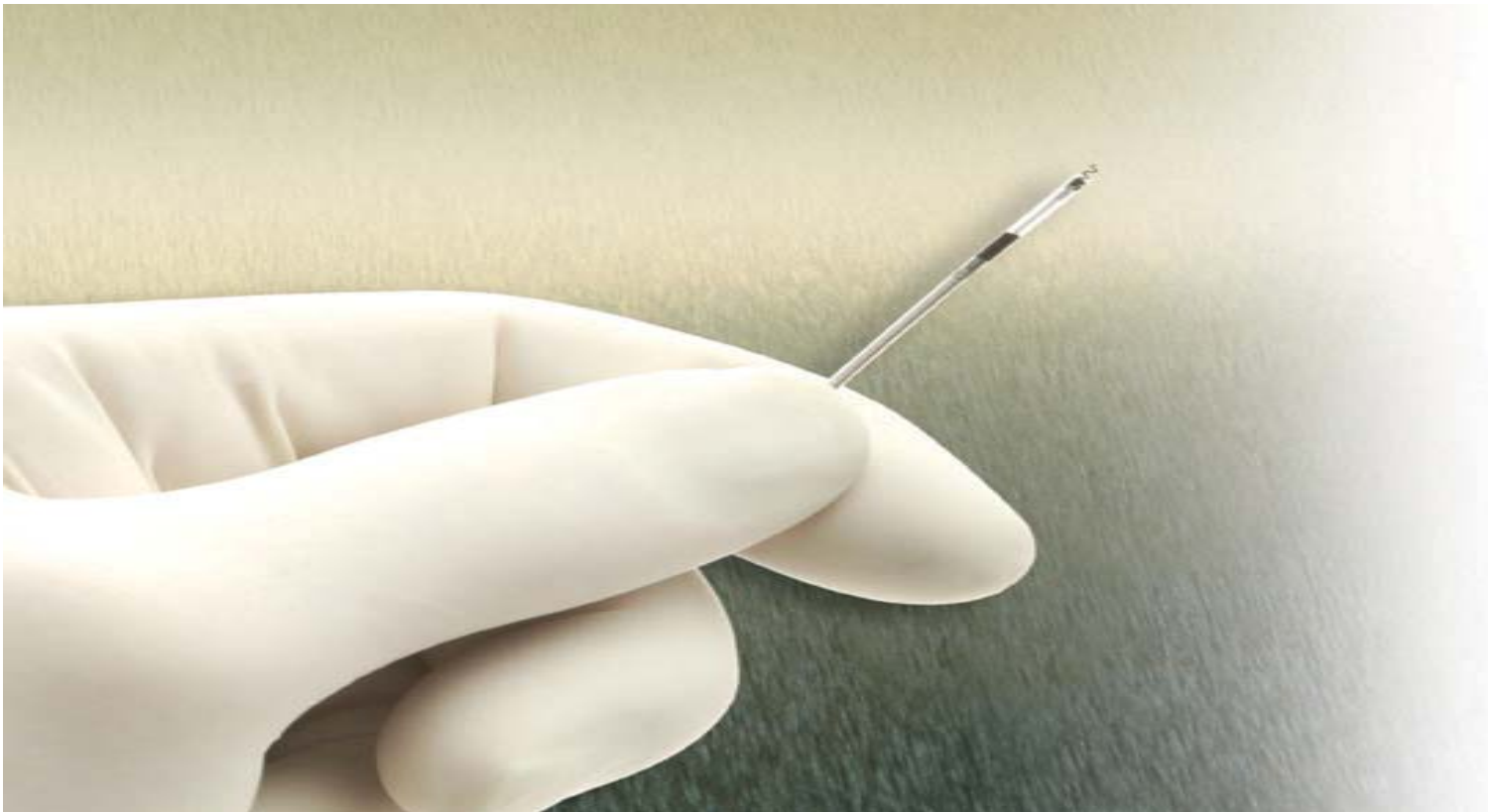
- Remote monitoring is the big thing!
  - Improves patient care
  - Probably more relevant for ICD follow-up
- Improving patient symptoms is a hardware issue
  - RV pacing options
  - LV pacing options
  - Novel pacing sites

# Improving pacing physiology

- Leads
  - Smaller
    - Maybe simpler (Medtronic Select Secure)
  - Positions
    - Sheathed delivery
      - Ultimate flexibility, multiple chambers
    - The Mond stylet
      - What does the evidence suggest?

# Sheathed delivery

- Select secure (Medtronic 3830)



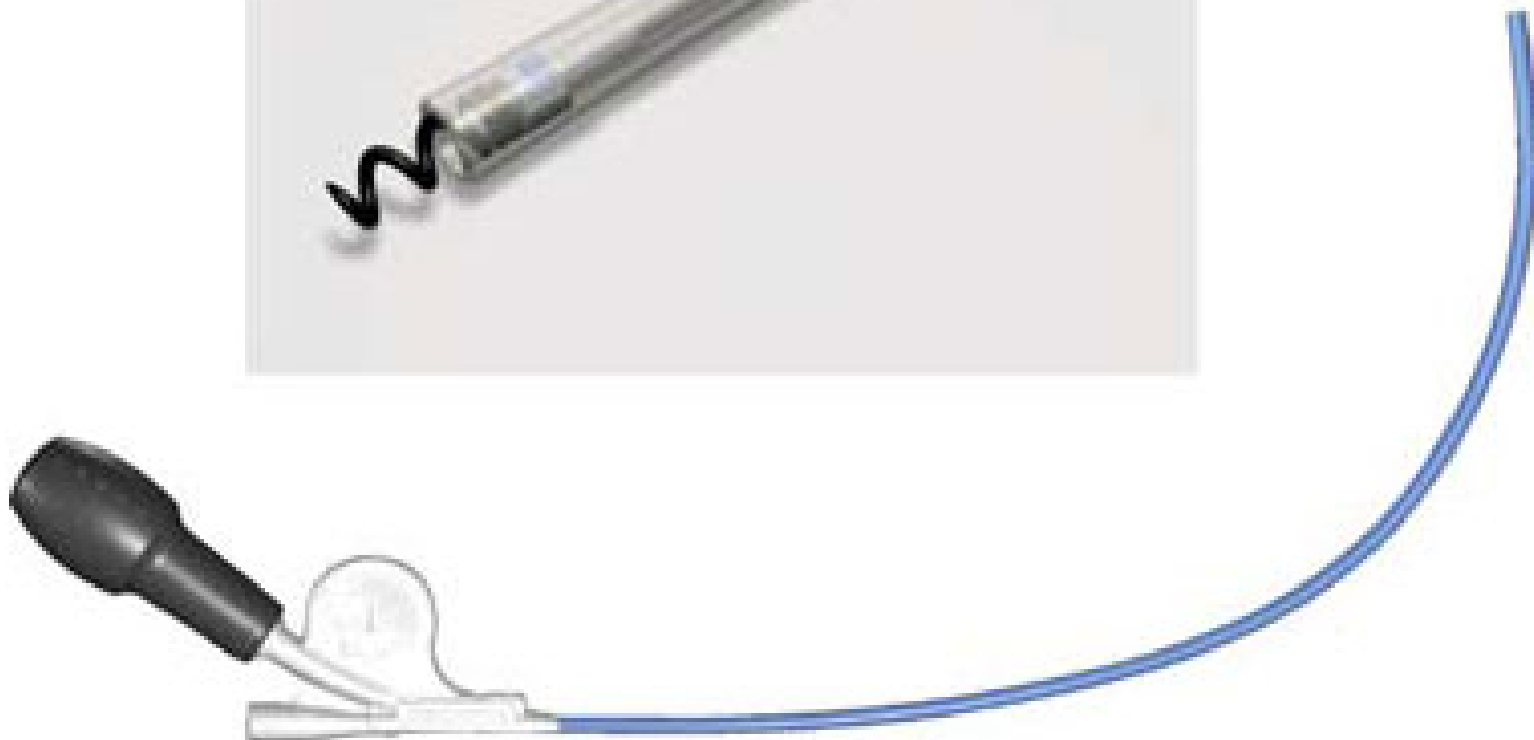
# Select secure system

- 



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# Optim leads

- New insulation

- Ultra lubricious

multilead procedures

cephalic veins

- Minimal stiffness

? Fewer perforations



# Pacing sites

- Evidence of a problem?
  - RVA pacing is detrimental in heart failure
    - DAVID
  - OK in normal LV function (?)
  - Is RVOT pacing better?

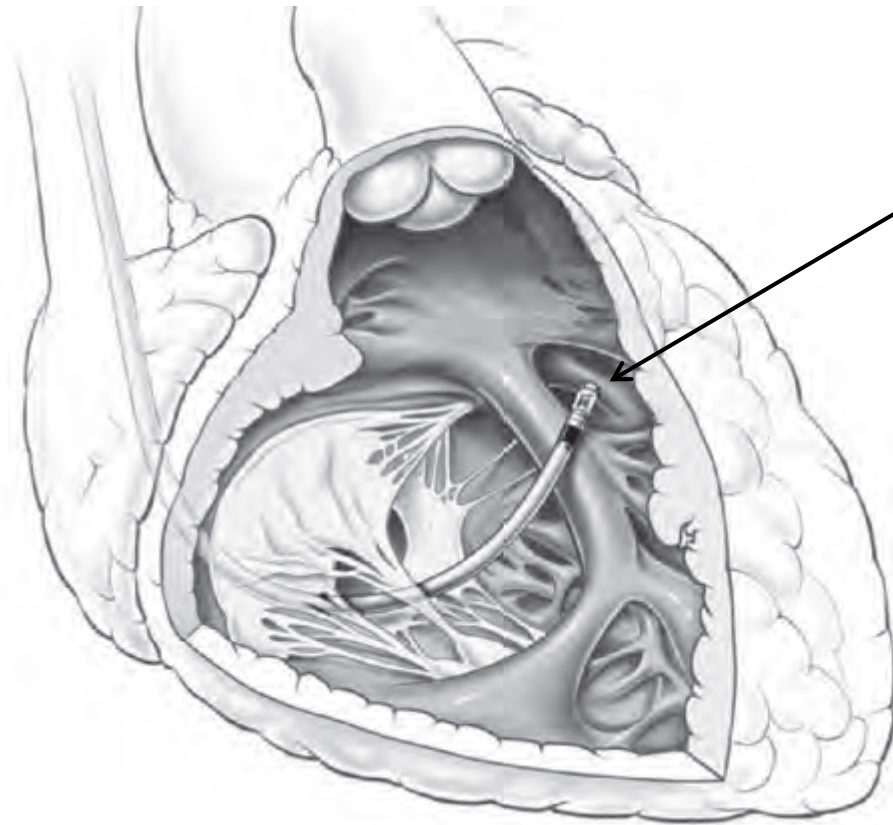
# Why the RVA?

- Ease, stability, reliability
- BUT
  - Late activation of lateral LV (LBBB-like activation)
    - Divergent muscle strain
    - Increased myocardial work
    - Ultimately may lead to LV dilatation, worsen heart failure and promote AF

# Is the RVOT better?

- Narrower QRS (ie less LV delay)
- Conflicting haemodynamic studies
  - If LV function normal
    - Probably doesn't matter
  - If LV impaired
    - LV pacing better than any RV site

# Techniques



Septoparietal  
trabeculations

Posterior position on  
fluoroscopy

The “Mond stylet” (SJM)

# Is long-term pacing possible?

- Medi C, Mond HG
  - 100 patients, RVOT septum, data on 92
  - 1 year follow-up
    - No pacing or sensing failures

Long-term performance appears to be satisfactory

# Is LV function preserved in HF?

- ROVA study
  - CHF (LV<40%), chronic AF
  - Dual site RV pacing (RVA and RVOT)
  - Primary outcome QoL
    - No difference in 6MW, QoL with either site or dual site

But, only 103 patients

- more, larger scale trials required  
(but can't be done)

# And in normal LV function?

- Korean study (2009)
  - Only 30 patients
  - Echo study, no functional endpoints
  - RVA pacing as effective as RVOT
    - Perhaps *less* dyssynchrony
- Hong Kong (2002)
  - 24 patients, Normal LV function, CHB
  - RVOT or RVA (12 each group, ie doctors not blinded)
  - After 18 months
    - LVEF better in RVOT paced group
    - Fewer myocardial perfusion defects

# Jury's out! (and may never return)

- Nonetheless
  - Not difficult
  - Not costly
  - Not associated with excess of lead complications
- The Mond Stylet
  - SJM
  - Not much of an investment in development
  - Most of us make our own!

# ...And CRT?

- Expanding indications
  - Narrow QRS
    - RethinQ
    - No benefit of CRT in narrow QRS
  - Identifying mechanical dyssynchrony
    - PROSPECT
    - Mechanical dyssynchrony poor at predicting response to CRT
  - MADIT CRT
    - Does CRT improve survival and/or HF events in:-
      - IHD – NYHA class 1/2, LVEF  $\leq 30\%$ , QRS  $\geq 130$ ms
      - NonIHD – NYHA class 2, LVEF  $\leq 30\%$ , QRS  $\geq 130$ ms
      - All patients in SR, Compared with ICD alone

# MADIT CRT

- 34% reduction in primary endpoint
  - Due to 41% reduction in hospital admissions
  - No difference in survival in CRT group

“It seems likely that this preventive CRT-D therapy will have widespread application and utilisation.”

- Approx 1m people with HF in UK (Heart of England Study)
- 35% with QRS>120 (Clark AL et al, Eur J Heart Failure – UK community study)

# In conclusion

- Longevity is paramount
- Flexibility may be increasingly important
- We'll likely be doing more LV pacing
- Heart failure is almost entirely untapped
  - But the cost will be great