EVMS Emergency Medicine Journal Club
Therapy Worksheet

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CITATION: Schmidt, A. S., Lauridsen, et al., Anterior–lateral versus anterior–posterior electrode position for cardioverting atrial fibrillation. *Circulation*, *144*(25), 1995–2003. 2021

A. What is being studied? (Answer below)	**Comments**
1. Study Objective	To compare efficacy of anterior–lateral to anterior–posterior electrode positioning for cardioverting atrial fibrillation
2. Study Design	Multicenter randomized control trail (investigator-initiated open-label, blinded-outcome assessor)
3. Inclusion Criteria	>18, with AF, scheduled for elective cardioversion Additionally, patient required to have sufficient anticoagulation or a TEE documenting absence of intracardiac thrombi.
4. Exclusion Criteria	Arrythmias other than AF, implantable devices (ICD, pacemaker), hemodynamically unstable AF, untreated hyperthyroidism, known/suspected pregnancy, previous participation in trail
5. Interventions Compared	Anterior-posterior (AP) versus anterior-lateral (AL) electrode placement Both groups could receive up to a maximum of 4 shocks at escalating energy from 100J to 150J to 200J to a final 360J.
6. Outcomes Evaluated	**Primary**: Proportion of patient in sinus rhythm 1 minute after first shock **Secondary**: -Proportion of patient in sinus rhythm 1 minute after up to 4 shocks of escalating maximum energy -Efficacy at 2-hours post procedure

	Safety: Number of patients with arrhythmic events during or within 2 hours of cardioversion, peri-procedural pain, skin redness
B. Are the results of the study valid? Answer questions below	
1. Were patients randomized?	Yes. Patients were randomly assigned in a 1:1 ratio. Randomization was stratified according to the study site and with variable block sizes of 4, 6, or 8.
2. Was randomization concealed (Blinded)	Yes. They used an external randomization service to assure proper concealment
3. Were patients analyzed in the groups to which they were randomized?	All patients assigned AP (234) received AP and were analyzed as such. Out of the 234 patients assigned AL, 1 received AP and was excluded and 1 was excluded after randomized due to being previously enrolled. The authors used intention-to-treat analysis.
4. Were patients in the treatment and control groups similar with respect to known prognostic factors?	Overall, yes. The median months since AF diagnosis had a range of 1-60 for the AL group and 1-46 for the AP group. This made the medians 9 and 5 respectively. Additionally, the study had more males, but this was in comparable in groups. Other factors considered were demographics, type of AF, duration AF, medial history (Heart failure, diabetes, history of stroke/TIA, etc) and medications used at baseline. The authors reported that there were no statistically significant differences between groups. (Table 1)
C. Did experimental and control groups retain a similar prognosis after the study started (answer the questions below)?	
1. Were patients aware of group allocation?	This is unclear based on the paper as patients were sedated with Propofol and timing of pad placement was not included. Unlikely patient knowledge of pad placement location would bias outcome
2. Were clinicians aware of group allocation?	Yes. Due to the nature of placing the electrodes they would have to be aware.

3. Were outcome assessors aware of group allocation?	No. Blinded assessment of the outcomes was performed centrally by an investigator through an electronic review of the cardioversion attempts using CODE-STAT 10 data review
4. Was follow-up complete?	No long-term follow-up occurred but the patients were monitored for 2 hours until discharge.
D. What were the results?	
1. How large was the treatment effect? (difference between treatment and control group).	**Primary Outcome NSR @ 1 minute** 54% AL group vs. 33% in the AP group. Absolute risk difference of 22% (95% CI, 13-30) and a NNT (1/ARR) 1/.22 = of 5 (95% CI, 3-8). **NSR After Final Shock** 93% AL group vs. 85% AP group Absolute Risk Difference 7% (95% CI, 2-12) NNT (1/ARR) 1/.07= 14 (95% CI, 8-50). **Subgroup Findings:** **Obese patients:** (BMI >30) had a risk difference of 15% AL vs. AP and risk ratio of 1.2 after the final shock compared to non-obese patients who had a risk difference of 3% and risk ratio of 1.03. **First episode of AF** vs those with >1 episodes of AF. First episode had a risk difference of 15% and risk ratio of 1.2 after the final shock compared to those with >1 episode of AF who had a risk difference of 1% and risk ratio of 1.01. No other sub-group differences or difference based on location. There were no significant safety outcome differences reported.
2. How precise was the estimated treatment effect at a 95% confidence interval?	See above
D. How can I apply the results to patient care	

IV. Were the study patients similar to my patients?	Not really. The study population was non-US and non-ED patients. The patients were on average, in their late 60s, male, with a BMI ~28. Many had a history of hypertension, heart failure or diabetes similar to our patient population. Many had tried cardioversion in the past.
1.Were all clinically important outcomes considered?	Yes. Pad placement for procedural efficacy was their main focus and it is unlikely that long term follow-up is important in this context. Patient and clinician preferences were not measured but is this relevant? Possibly the added burden of rolling the patient. Their sample size may not have been large enough to identify other subgroups who may have more benefit from AP placement.
2. Are the likely treatment benefits worth the potential harms and costs?	Yes. AL pad placement appears to be more efficatious in their patient population with no evidence of additional harms or costs.

Limitations:

- Non-ED study. The population and acuity of the emergency department is different than that of those undergoing planned cardioversions.
- The trail participants were anticoagulated and/or had a TEE prior to the procedure
- The trial was done in Denmark
- Maximal shock energy was not used initially
- BMI was briefly mentioned but not fully explored such as whether they made adjustments for positioning pads of obese patients. This could be relevant as the morbidly obese are over-represented in our ED population.
- The trail was not blinded except for outcome assessors.

Clinical Bottom Line:

In cardioverting patients with non-acute atrial fibrillation, anterior-lateral lead placement appears to be more effective than anterior-posterior lead placement in restoring sinus rhythm with the least amount of energy and shocks.