

The effects of Sevoflurane on the cardiac action potential in pigs

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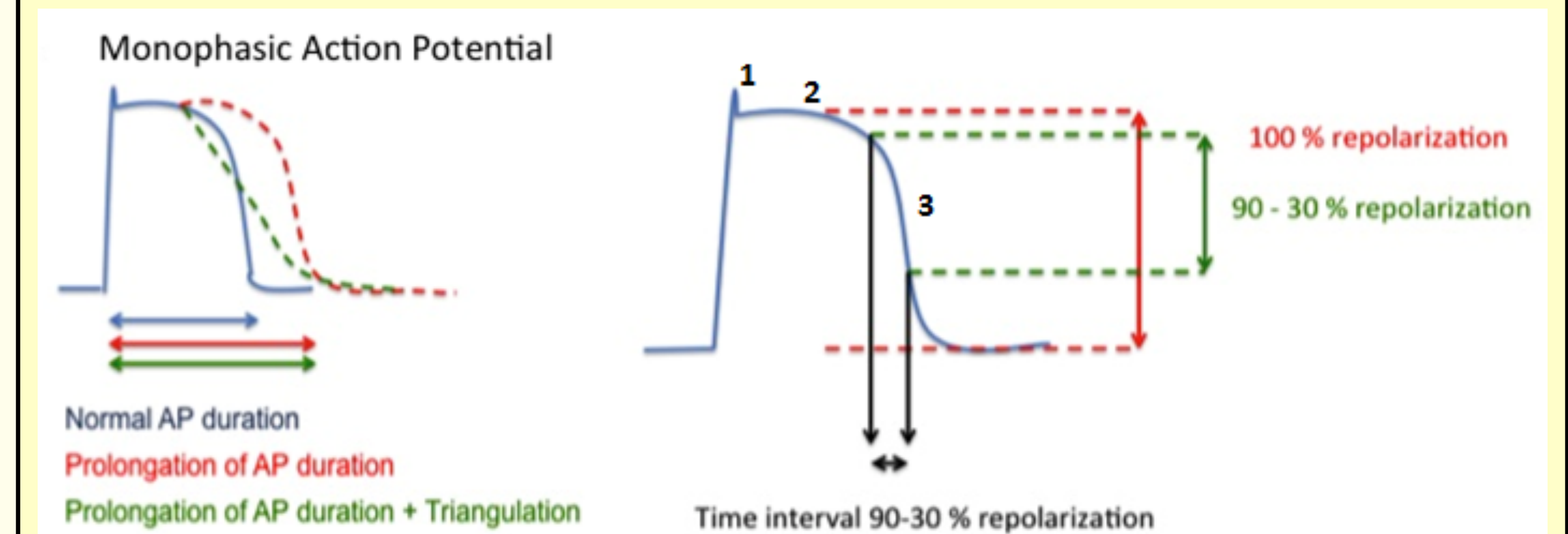
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Introduction

Some reports have associated sevoflurane anaesthesia with the development of torsades de pointes (TdP). The traditionally used surrogate marker for drug induced TdP is a prolonged QT interval on the electrocardiogram. Actually, QT prolongation is antiarrhythmic, provided it is not contaminated by particular abnormalities in the characteristics of ventricular repolarization. Triangulation is one of these proarrhythmic abnormalities.

Triangulation

- ❑ slows phase 3 repolarization of the monophasic action potential (MAP)
- ❑ renders action potential (AP) more triangular
- ❑ increases the vulnerable period of the heart



The present study investigated the effect of sevoflurane on the action potential duration (APD) and its effect on triangulation.

Methods

Research animal experiment, pilot study:
Effects of sevoflurane 4% on APD in 5 pigs

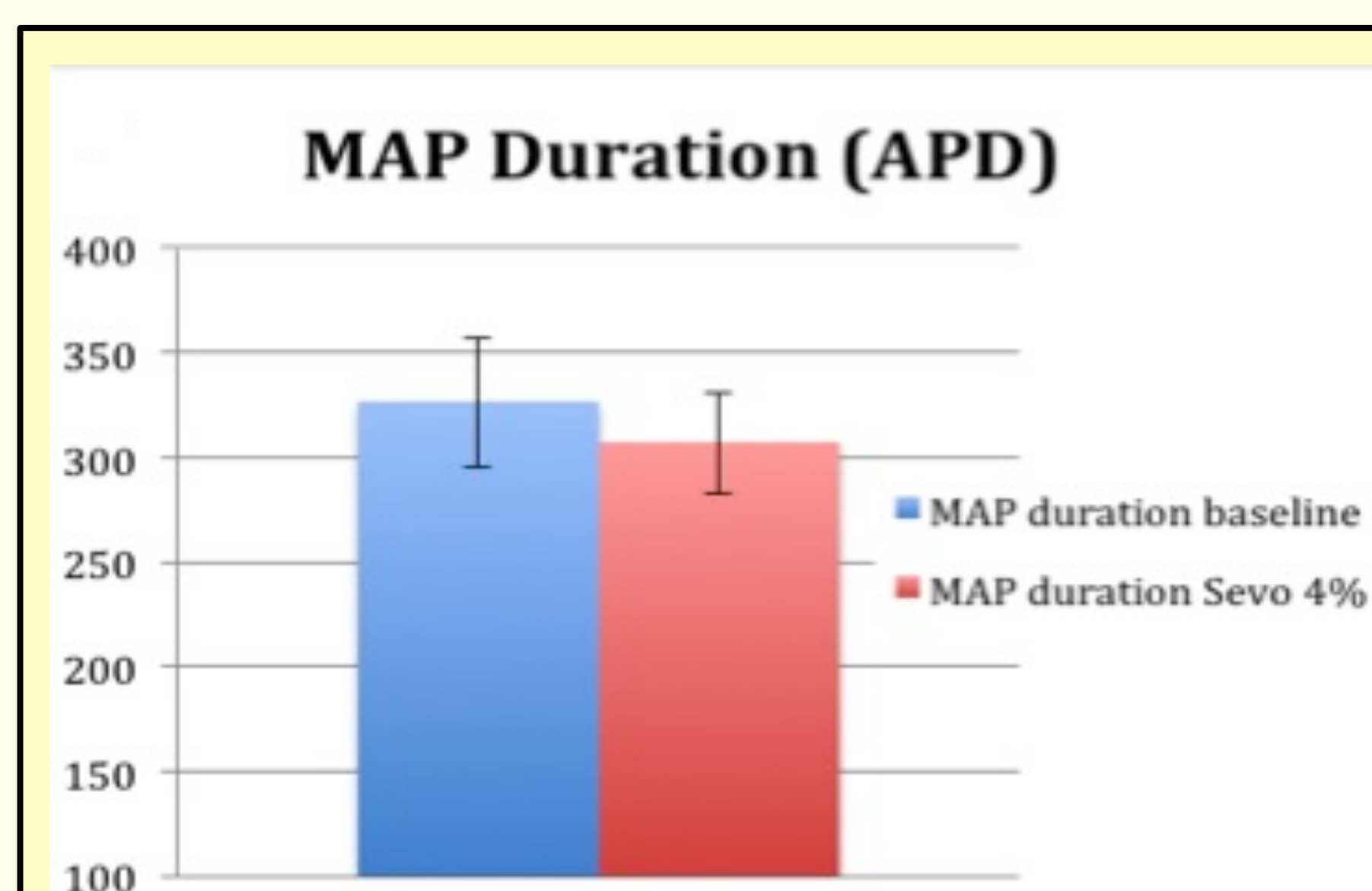
- ❑ Pacing at a fixed heart rate
- ❑ Percutaneously introduced MAP catheter – MAP analysis with EP tracer
- ❑ MAP analysis in baseline + during administration of sevoflurane 4%

Measurements:

- ❑ APD = time interval from the start until the end of the AP
- ❑ APD 30/90 = time interval between 30% and 90% of repolarization
= determines triangulation

Statistical differences were analysed using a student's t-test

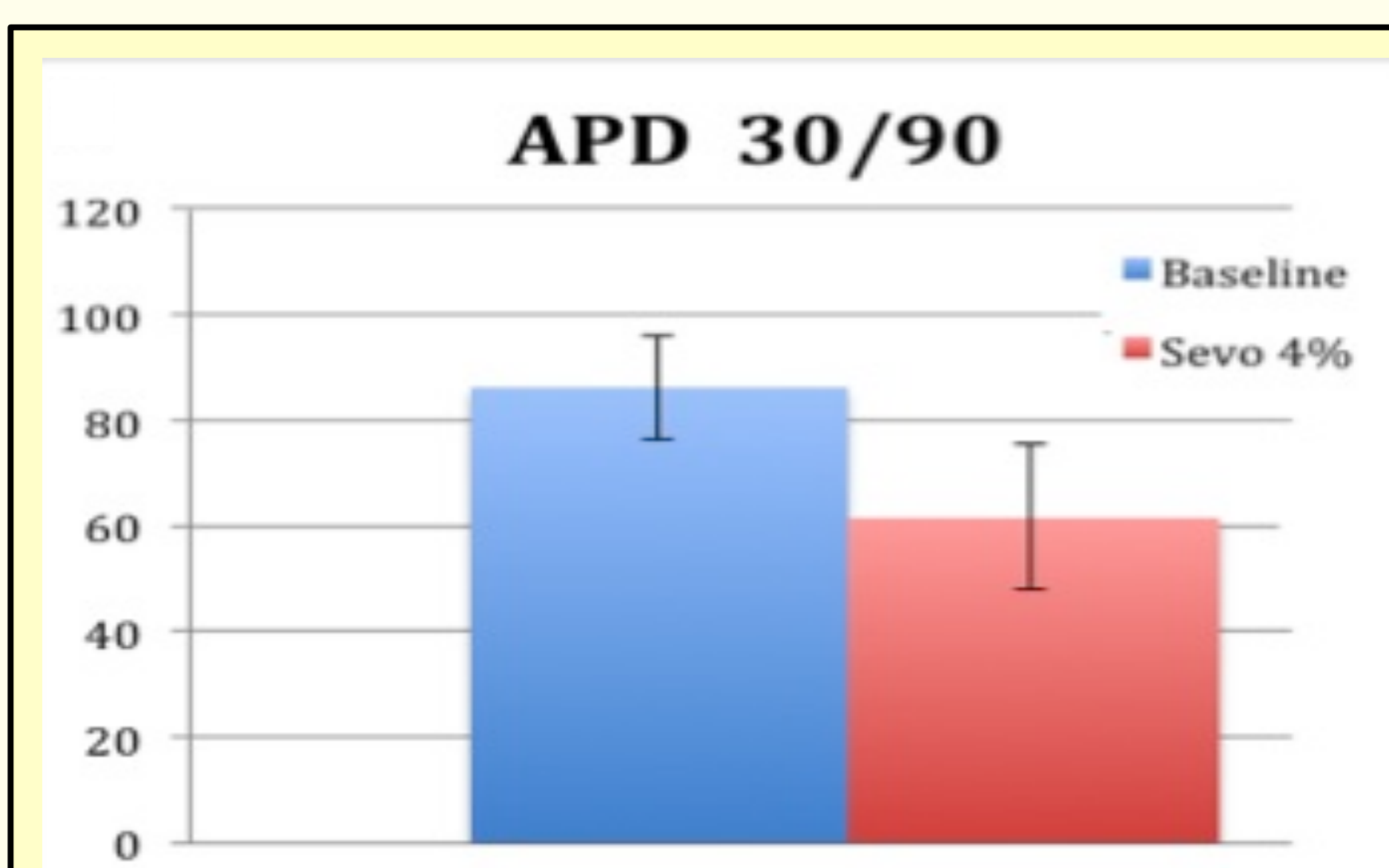
Results



Sevoflurane 4% did not alter APD

326 ± 30 msec
307 ± 24 msec

p = 0.06



Sevoflurane 4% decreased APD 30/90

86 ± 10 msec
62 ± 14 msec

p < 0.001

Conclusion

Triangulation is reduced when using 4% of sevoflurane. In this experiment, triangulation is not the causative mechanism by which sevoflurane in higher concentrations induces TDP.