

## Electrocardiographic Assessment of Trimetazidine Antiischemic Properties

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Within the first minutes following ligation of a coronary artery in animals (dog, rabbit, rat), the unipolar epicardial electrograms, registered in the ischemic region, show alterations of the T wave and elevation of the ST segment. We developed in our laboratory [1] a computer system, called SATAPEC, to simultaneously enter and process up to 256 recordings of cardiac electric potentials. SATAPEC also allows the drawing of a graphic, color representation of the injured areas; the potential representation gives information on the lesion size and the activation representation shows the delay in activation spreading. In these experiments, 240 electrodes are used and fastened on a net, which is set around the heart.

Twenty-four rabbits, New Zealand males and females, were divided in two groups, control and treated. The treated animals were given orally, twice a day, 2.5 mg of TMZ, and the last dose was given 2 hours before ligation. Under pentobarbital (30 mg/kg) anesthesia, after opening the chest, the IVA was ligated at its beginning and the 240 ECG registered with the net put around the heart, 1

minute before and every minute after the ligation for 8 minutes. The baseline and position of the net with respect to the location of the ligation were checked. Automatic measure of the ST elevation (120 ms after the beginning of QRS) allowed the drawing of the evolution curve of their mean. The variance analysis was made on the values greater than 1 mV.

The results are shown in Table 1. The ST elevation mean evolution with time showed a significant difference between the two groups ( $p = 0.017$ ), allowing a complementary analysis, which demonstrated a significant effect of TMZ treatment 4, 6, and 8 minutes after coronary ligation, the mean ST elevation being lowered by treatment.

An original automatic computerized system for simultaneously entering and processing 240 ST elevation from electrodes surrounding the ischemic heart allows the testing of antiischemic products and gives a map of ischemic areas. Pretreatment with TMZ (2.5 mg/kg, twice a day) induced a significant protection against ischemia in rabbit hearts subjected to IVA ligation.

### References

1. D'Alché P, Charon M, Morel M. On line computation of the epicardial potential or activation map. *Adv Cardiol* 1981; 28:26-29.

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Table 1. Mean ST elevation expressed in mV

	N	before	2 min	4 min	6 min	8 min	Group × time interaction
Control	12	0.00 ± 0.00	2.86 ± 0.24	3.71 ± 0.36	4.09 ± 0.50	4.21 ± 0.43	$p = 0.017$
Treated	12	0.00 ± 0.00	2.53 ± 0.16	2.59 ± 0.18	3.01 ± 0.18	3.19 ± 0.30	
		$p = 1$	$p = 0.41$ NS	$p = 0.007$ S	$p = 0.009$ S	$p = 0.014$ S	Group effect

# ELECTROCARDIOGRAPHICAL ASSESSMENT OF THE ANTI-ISCHAEMIC PROPERTIES OF TRIMETAZIDINE\*

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## INTRODUCTION

During myocardial ischaemia, ECG alterations develop, and ST depression is regarded as a good witness of ischaemic injury. Similarly, in the animal, within the first minutes following ligation of a coronary artery, unipolar epicardial ECG leads over the ischaemic area record T wave alterations and ST segment elevation.

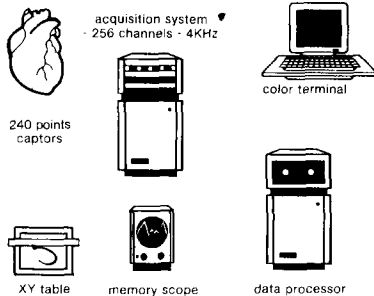
## AIM OF THE STUDY

To assess the cardioprotective effect of trimetazidine on the basis of an cardiographical study.

## METHODS

- 2 groups of 12 rabbits: control
- trimetazidine: 2.5 mg.day<sup>-1</sup>, b.i.d., 8 days
- recordings before and 1,2,3,4,5,6,7,8 min after LAD ligation
- 240 ECG recorded simultaneously with SATAPEC\*
- automatic measure of ST elevation (120 ms after the beginning of QRS)

### SATAPEC



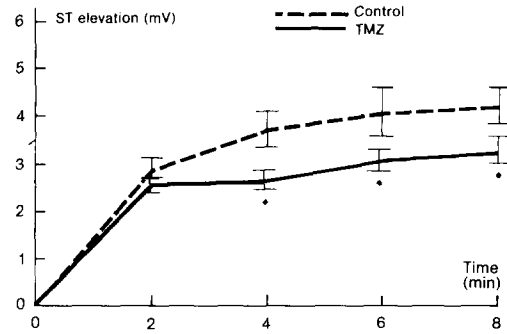
\* SATAPEC: 256-channel simultaneous acquisition system - automatic processing of cardiac electric potentials.

## RESULTS

### 1. ST SEGMENT ELEVATION: SEVERITY OF THE ISCHAEMIC DAMAGE

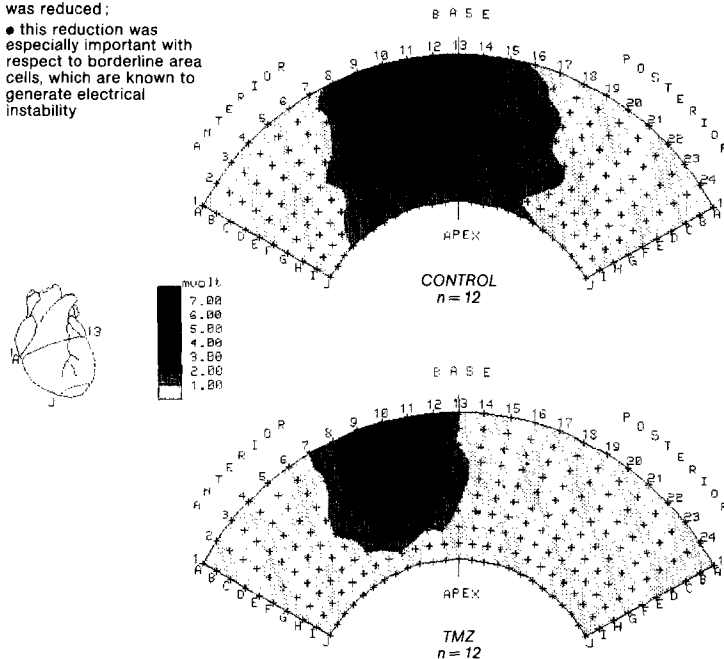
Pretreatment with trimetazidine (TMZ) reduces mean ST elevation following coronary artery ligation.

Analysis of variance: \* p < 0.05.



### 2. ISCHAEMIC AREAS AFTER 8 MIN LAD LIGATION: ELECTROCARDIOGRAPHIC MAPPING

- After pretreatment with trimetazidine:
- the total ischaemic area was reduced;
  - this reduction was especially important with respect to borderline area cells, which are known to generate electrical instability



## CONCLUSION

In acute myocardial ischaemia, trimetazidine treatment reduced:

- ST elevation and therefore severity of the ischaemic damage;
- the borderline area, thus allowing functional recovery.

References: (1) D'ALCHE P., CHARON M., MOREL M. On-line computation of the epicardial potential or activation map. Adv Cardiol 1981; 28: 26-29

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