

# THE EFFECT OF L-CARNITINE IN CONTRAST-INDUCED NEPHROPATHY IN DIABETIC RATS

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## Objective

The aim of this study will be to evaluate the L-carnitine effect on CIN in diabetic rats.

## Materials and Methods

Adult male Wistar rats weighing 250-290g was used and divided into five groups: Citrate, Diabetes Mellitus (DM), Diabetes + iodinated contrast (DM+IC), L-carnitina (L-Car) and DM + IC + L-Car. Physiological parameters (Body weight, water and food intake, glycemia and kidney weight and body weight ratio); Renal function (Inulin Clearance); hemodynamics (arterial blood pressure; renal blood flow; renal vascular resistance) and oxidative profile (urinary peroxides, urinary TBARS, thiois in renal tissue and urinary nitric oxide) was evaluated.

## Results

Results were expressed as mean  $\pm$  standard deviation. The variance between the groups was analyzed using the One Way ANOVA test, followed by the Newman-Keuls multiple comparisons post-test of the Graph-Pad Prism version-3 for Windows® statistical program. Values of  $p < 0.05$  were considered significant.

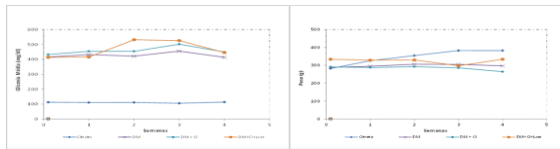


Figure 1. Blood Glucose for four weeks of groups Citrate, DM, DM+IC, DM+IC+LCar. São Paulo 2017.

Figure 2. Body weight for four weeks of groups Citrate, DM, DM+IC, DM+IC+LCar. São Paulo 2017.

Grupos	n	Peso final (g)	Peso rim (g)	Peso rim / Peso animal ( $\times 10^{-3}$ )	Ingesta ração (g)	Ingesta água (ml)
Citrate	7	374 $\pm$ 42	1,31 $\pm$ 0,07	0,35 $\pm$ 0,05	23 $\pm$ 2	30 $\pm$ 6
DM	7	261 $\pm$ 27 <sup>a</sup>	1,54 $\pm$ 0,16 <sup>a</sup>	0,59 $\pm$ 0,06 <sup>a</sup>	34 $\pm$ 4 <sup>a</sup>	123 $\pm$ 31 <sup>a</sup>
DM + IC	7	260 $\pm$ 27 <sup>a</sup>	1,72 $\pm$ 0,14 <sup>ab</sup>	0,64 $\pm$ 0,13 <sup>a</sup>	39 $\pm$ 5 <sup>ab</sup>	149 $\pm$ 25 <sup>a</sup>
DM + IC + LCar	7	307 $\pm$ 19 <sup>abc</sup>	1,58 $\pm$ 0,11 <sup>ac</sup>	0,52 $\pm$ 0,04 <sup>ac</sup>	32 $\pm$ 4 <sup>ac</sup>	121 $\pm$ 15 <sup>a</sup>

Values are expressed as mean  $\pm$  standard error of mean.

<sup>a</sup> $p < 0,05$  vs Citrate  
<sup>b</sup> $p < 0,05$  vs DM  
<sup>c</sup> $p < 0,05$  vs DM + IC

Table 2 – Renal function of groups Citrate, DM, DM+IC, DM+IC+LCar. São Paulo 2017

Grupos	n	Fluxo urinário (ml/min)	Clearance creatinina 100g (ml/min)	Clearance de Inulina 100g (ml/min)
Citrate	7	0,013 $\pm$ 0,003	0,87 $\pm$ 0,15	0,89 $\pm$ 0,23
DM	7	0,059 $\pm$ 0,009 <sup>a</sup>	0,45 $\pm$ 0,07 <sup>a</sup>	0,52 $\pm$ 0,12 <sup>a</sup>
DM + IC	7	0,071 $\pm$ 0,009 <sup>ab</sup>	0,30 $\pm$ 0,07 <sup>ab</sup>	0,16 $\pm$ 0,04 <sup>ab</sup>
DM + IC + LCar	7	0,064 $\pm$ 0,010 <sup>a</sup>	0,56 $\pm$ 0,16 <sup>ac</sup>	0,51 $\pm$ 0,21 <sup>ac</sup>

Values are expressed as mean  $\pm$  standard error of mean.

<sup>a</sup> $p < 0,05$  vs Citrate  
<sup>b</sup> $p < 0,05$  vs DM  
<sup>c</sup> $p < 0,05$  vs DM + IC

Table 3 – Renal hemodynamics of groups Citrate, DM, DM+IC, DM+IC+LCar. São Paulo 2017

Grupos	n	Frequência cardíaca (bpm)	Pressão arterial média (mmHg)	Fluxo sanguíneo renal (ml/min)	Resistência vascular renal (mmHg/ml/min)
Citrate	7	421 $\pm$ 42	99 $\pm$ 5	7,3 $\pm$ 1,6	15,1 $\pm$ 3,3
DM	7	438 $\pm$ 38	99 $\pm$ 3	4,3 $\pm$ 1,6 <sup>a</sup>	25,2 $\pm$ 7,8 <sup>a</sup>
DM + IC	7	371 $\pm$ 43 <sup>ab</sup>	102 $\pm$ 16	2,6 $\pm$ 0,6 <sup>ab</sup>	37,8 $\pm$ 11,2 <sup>ab</sup>
DM + IC + LCar	7	580 $\pm$ 21 <sup>abc</sup>	109 $\pm$ 4	6,2 $\pm$ 0,7 <sup>bc</sup>	18,3 $\pm$ 2,9 <sup>c</sup>

Values are expressed as mean  $\pm$  standard error of mean.

<sup>a</sup> $p < 0,05$  vs Citrate  
<sup>b</sup> $p < 0,05$  vs DM  
<sup>c</sup> $p < 0,05$  vs DM + IC

Table 4 – Oxidative stress of groups Citrate, DM, DM+IC, DM+IC+LCar. São Paulo 2017

Grupos	n	Peróxidos urinários (nmol/g creatinina U)	TBARS (nmol/g creatinina U)	Tióis (nmol/g de proteína)	NO (nmol/g creatinina U)
Citrate	7	2,0 $\pm$ 0,9	0,25 $\pm$ 0,15	33,8 $\pm$ 6,1	37,68 $\pm$ 10,10
DM	7	13,5 $\pm$ 5,7 <sup>a</sup>	12,91 $\pm$ 3,02 <sup>a</sup>	17,2 $\pm$ 2,9 <sup>a</sup>	70,86 $\pm$ 14,13
DM + IC	7	21,3 $\pm$ 9,8 <sup>ab</sup>	22,55 $\pm$ 5,20 <sup>ab</sup>	10,6 $\pm$ 2,1 <sup>ab</sup>	142,87 $\pm$ 33,27 <sup>ab</sup>
DM + IC + LCar	7	4,5 $\pm$ 2,4 <sup>bc</sup>	0,64 $\pm$ 0,12 <sup>bc</sup>	36,0 $\pm$ 13,9 <sup>bc</sup>	130,21 $\pm$ 38,42 <sup>bc</sup>

Values are expressed as mean  $\pm$  standard error of mean.

<sup>a</sup> $p < 0,05$  vs Citrate  
<sup>b</sup> $p < 0,05$  vs DM  
<sup>c</sup> $p < 0,05$  vs DM + IC

## Conclusions

The results of this study reinforced that DM is an important risk factor for contrast-induced nephropathy. The preconditioning with L Carnitine in diabetic animals with CINs showed its renoprotective effect, confirming the hypothesis of this study.

## References

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