

Assessment of the haemodynamic profile of Glyceryl Trinitrate And Salbutamol by pulse contour analysis and finometry in healthy male volunteers

G Cooper, M Taylor, R Mahajan, R Abdel-Hakim, VG Wilson *University of Nottingham, Nottingham, UK*

Introduction: Gordan and colleagues (2009) recently reported that sublingual glyceryl trinitrate (GTN) and inhaled salbutamol in healthy volunteers caused peak changes in reflective index, as determined by pulse contour analysis, at differing time points. At the highest dose test the peak response to salbutamol was approximately 60% of that produced by GTN and took three times as long (10 min) to attain the peak response. No information was provided regarding the relative effect of the drugs on stiffness index and, apart from evidence of an increase in heart rate with salbutamol, changes in other haemodynamic variables was minimal. In the present study we have combined the use of finger plethysmography and finometry to monitor several cardiovascular parameters simultaneously and closely monitor the effect of these two drugs.

Methods: 34 healthy, non-smoking male volunteers (mean age 20.7 ± 0.2 years) were sequentially administered $400 \mu\text{g}$ sublingual glyceryl trinitrate and $400 \mu\text{g}$ inhaled salbutamol via a spacer device on a morning visit following an overnight fast. Measurements were obtained using Finometry and finger plethysmography. Results are presented as mean percentage change (\pm SEM) and significant differences based upon an unpaired Student's t-test.

Results and Data Analysis: The basal stiffness index values for GTN (6.93 ± 0.13 m/s, $n=34$) and salbutamol (6.86 ± 0.14 m/s, $n=34$) were similar and the peak changes in the parameter were observed at 5 min and 10-12 min post-administration, respectively. Basal reflective index values for GTN (65.0 ± 2.2 %, $n=34$) and salbutamol (67.1 ± 2.3 %, $n=34$) were also similar, as were heart rate, systolic blood pressure and diastolic blood pressure (not shown). Table 1 shows that the peak reduction in stiffness index and reflective index by salbutamol was approximately 25% of that to GTN. Responses to both agents were back to baseline within 40 min. At the time of the peak response both agents caused a similar increase in heart rate, but statistically differing effects on systolic and diastolic blood pressure. In particular, GTN caused a small increase in blood pressure at 5 min, while salbutamol reduced this parameter (Table 1).

	Stiffness Index	Reflective Index	Heart Rate	Systolic BP	Diastolic BP
GTN	-16.83 ± 1.35	-30.73 ± 3.23	6.96 ± 1.22	4.25 ± 1.14	5.77 ± 0.91
Salbutamol	-3.96 ± 1.33	-7.60 ± 2.39	7.86 ± 1.41	-0.22 ± 1.31	-8.28 ± 3.17
p value	$p < 0.001$	$p < 0.001$	$p=0.63$	$p < 0.02$	$p < 0.001$

Table 1. Mean percentage change (\pm SEM) at peak response times for selected cardiovascular parameters following administration of glyceryl trinitrate ($400 \mu\text{g}$) and salbutamol ($400 \mu\text{g}$) in

healthy male volunteers (n=31-34). P values were calculated using an unpaired Student's t-test.

Discussion: The time course profile of responses to sublingual GTN and inhaled salbutamol in healthy, young, male volunteers were similar for both stiffness index and reflective index, consistent with the earlier observations (Gordan *et al.*, 2009). While the relative magnitude of the peak effect of salbutamol compared to GTN was similar for both parameters (approx. 25%), this was markedly smaller than that reported earlier. Also, continuous recording of cardiovascular variables with the finometer revealed interesting differences in haemodynamic profile to the agents at the time of peak response.

References

Gordan SE, Cartwright N, Griifiths M (2009). *Br. J. Clin. Pharmacol.* **68**, 630-633.