

1.	INTRODUCTION	1
1.1.	Cardiovascular changes with distension of the urinary bladder	1
1.1.1.	Changes in the arterial pressure	1
1.1.2.	Changes in venous pressure	4
1.1.3.	Changes in cardiac output	5
1.1.4.	Changes in heart frequency	5
1.2.	Respiratory changes during the bladder distension	7
1.3.	Possible mechanisms responsible for the cardiovascular and respiratory changes during bladder distension	8
1.3.1.	Neural mechanisms	8
1.3.1.1.	Afferent pathways	8
1.3.2.	Efferent mechanisms	9
1.3.2.1.	Neurogenic mechanisms	9
1.3.2.2.	Humoral mechanisms	10
1.4.	Summary	11
2.	MATERIAL AND METHODS	11
2.1.	Experimental animals	11
2.2.	Anaesthesia	11
2.3.	Operation	12
2.3.1.	Venous, arterial and tracheal cannulations	12
2.3.2.	Exposure and preparation of the bladder, the ureter and the urethra	13

2.3.3.	Preparation of the bladder nerves	13
2.3.4.	Isolation of the sino-aortic nerves	14
2.3.5.	Isolation of the renal nerves and adrenalectomy	14
2.3.6.	Isolation of the phrenic nerve	15
2.4.	Artificial respiration	15
2.5.	Distension of the urinary bladder	16
2.5.1.	Distension of the bladder with saline solution	16
2.5.2.	Pneumatic distension of the urinary bladder	16
2.6.	Electrical stimulation	17
2.6.1.	Electrodes	17
2.6.2.	Stimulating apparatus	17
2.6.3.	Stimulus parameters	17
2.7.	Recording and measurement of parameters	18
2.7.1.	Recording and measurement of parameters in dogs	18
2.7.2.	Recording and measurement of the parameters in cats	18
2.8.	Preparation and infusion of the drugs	20
2.9.	Statistical analysis	21
3.	RESULTS	22
3.1.	Experimental groups	22
3.2.	Effects of short term distension of the urinary bladder	22
3.2.1.	Effects of pneumatic distension of the urinary bladder in dogs	22
3.2.1.1.	Changes in the arterial pressure	23

3.2.1.2.	Changes in the heart frequency	23
3.2.1.3.	Changes in the respiratory frequency	26
3.2.2.	Effects of distension of the bladder by saline	26
3.2.3.	Effects of saline distension of the urinary bladder in cats	29
3.2.3.1.	Arterial pressure	29
3.2.3.2.	Heart frequency	35
3.2.3.3.	Respiratory parameters	35
3.2.4.	Effects of electrical stimulation of the afferents from the urinary bladder	39
3.2.4.1.	Arterial pressure	39
3.2.4.2.	Heart frequency	43
3.2.4.3.	Respiratory parameters	45
3.3.	Factors influencing the cardiovascular and the respiratory responses with the urinary bladder distension	49
3.3.1.	Role of the intraabdominal pressure	49
3.3.2.	Role of the ureters	55
3.3.2.1.	Arterial pressure	55
3.3.2.2.	Respiratory parameters	57
3.3.3.	Role of the sino-aortic nerves	57
3.3.3.1.	Cardiovascular and respiratory changes during the distension of the bladder after sino-aortic denervation	57
3.3.3.1.1.	Arterial pressure	59
3.3.3.1.2.	Heart frequency	63
3.3.3.1.3.	Respiratory parameters	63
3.3.3.2.	Electrical stimulation of the pelvic and the hypogastric nerves after sino-aortic denervation	65
3.3.3.2.1.	Arterial pressure responses	65

3.3.3.2.2.	Heart frequency	69
3.3.3.2.3.	Respiratory parameters	70
3.4.	Mechanisms contributing to the cardiovascular and respiratory changes during the urinary bladder distension in cats	74
3.4.1.	Role of the Kidney	74
3.4.1.1.	Effects of the electrical stimulation of the pelvic and the hypogastric nerves after bilateral renal denervation	74
3.4.1.1.1.	Arterial pressure	75
3.4.1.1.2.	Heart frequency	77
3.4.1.1.3.	Respiratory parameters	79
3.4.1.2.	Changes in the efferent renal nerve activity during the electrical stimulation of the afferents from the bladder	80
3.4.1.3.	Cardiovascular and respiratory changes during the bladder distension after renal denervation and clamping of the renal vessels	83
3.4.1.3.1.	Arterial pressure	83
3.4.1.3.2.	Respiratory parameters	87
3.4.1.4.	Cardiovascular and respiratory changes during the bladder distension after administration of angiotensin II antagonist	88
3.4.1.4.1.	Cardiovascular changes	89
3.4.1.4.2.	Respiratory changes	96
3.4.1.5.	Effects of electrical stimulation of the afferents from the bladder after administration of angiotensin II antagonist	97
3.4.1.5.1.	Cardiovascular changes	97
3.4.1.5.2.	Respiratory changes	101
3.4.2.	Effect of electrical stimulation of the bladder afferents after adrenalectomy	102
3.5.	Effect of prolonged distension of the urinary bladder on cardiovascular and respiratory parameters	103

3.5.1.	Cardiovascular changes	104
3.5.2.	Ventilatory changes during the prolonged distension of the bladder	107
4.	DISCUSSION	109
4.1.	Criticism of the methods	109
4.1.1.	Methods of distension of the urinary bladder	109
4.1.1.1.	Pneumatic distension of the urinary bladder	109
4.1.1.2.	Distension of the urinary bladder with saline solution	112
4.1.2.	Renal denervation	112
4.1.3.	Specificity of the angiotensin antagonists	113
4.2.	Discussion of the results	113
4.2.1.	Changes in the cardiovascular system with distension of the urinary bladder	114
4.2.1.1.	Arterial pressure changes	114
4.2.1.2.	Arterial pressure changes with electrical stimulation of the pelvic and the hypogastric nerves with reference to the afferent pathway	116
4.2.2.	Neural and mechanical factors influencing the arterial pressure response during the distension of the urinary bladder	118
4.2.2.1.	Role of the sino-aortic nerves	118
4.2.2.2.	Role of the ureters	119
4.2.2.3.	Influence of intraabdominal pressure	120
4.2.3.	Adaptation of the arterial pressure increase during the distension of the bladder and the possible mechanisms involved	121
4.2.4.	Are humoral factors involved in the increase of the arterial pressure?	122
4.2.4.1.	Role of the kidney	122

4.2.5.	Changes in the heart frequency during the distension of the bladder	125
4.2.6.	Ventilatory changes during the disten- sion of the bladder	128
5.	SUMMARY	131
6.	BIBLIOGRAPHY	136