NATURAL HISTORY OF ERECTILE DYSFUNCTION IN THE SPONTANEOUSLY HYPTERTENSIVE RAT: A LONGITUDINAL IN VIVO STUDY

ABSTRACT

OBJECTIVES

To study the erectile responses from SHR and their normotensive counterparts, WKY in vivo

- at 6 weeks of age: pre-hypertensive state
- at 12 weeks of age
- at 24 weeks of age: well-established hypertension

in order to evaluate the progressive development of ED in a well-established model of genetic hypertension.

METHODS

In vivo evaluation of erectile function

- Spontaneously Hypertensive rats (SHR) and Wistar-Kyoto (WKY) rats
  - 6-weeks old (n=12)
  - 12-weeks old (n=12)
  - 24-weeks old (n=12)

- Evaluation of erectile function by simultaneous monitoring of the arterial pressure and intracavernosal pressure (ICP) following electrical stimulation of the cavernous nerve in vivo (0-10 Hz) under ketamine (90 mg/kg) and xylazine (10 mg/kg) anaesthesia.

Results are expressed as the increase in ICP elicited by electrical stimulation of cavernous nerve, normalized by the mean arterial pressure (MAP) of the animal.

BACKGROUND

- Epidemiology of ED: The Key Role of Hypertension
  - The prevalence of ED in men with hypertension is significantly higher than in the general population (15% vs 9.6%)
    - Pollack et al., J Urol Vol 133:644 (1985)
  - ED is a symptom occurring in 8-10% of untreated hypertensive patients
    - Lewis et al., 1st International Consultation on Erectile Dysfunction, WHO (2000)

- In vivo Erectile Dysfunction in 12-weeks old SHR

Results of electrical stimulation on ICP:

- SHR vs WKY

RESULTS

Evolution of mean arterial pressure in anaesthetized WKY and SHR with time

REPRESENTATIVE TRACINGS OF ORIGINAL RECORDING OF INTRACavernOSAL PRESSURE WHEN STIMULATING THE CAVERNOSUM NERVE (6 V, 10 Hz, 1 ms, 45 s) IN SHR AND AGE-MATCHED WKY RATS

Effect of cavernous nerve stimulation at increasing stimulation frequencies on the ICP rise of anaesthetized rats

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CONCLUSION

- Despite the fact that the magnitude of an erectile response is directly driven by the magnitude of the arterial blood pressure, erectile responses elicited by cavernous nerve stimulation are already impaired in the pre-hypertensive SHR.
- The onset of ED is detectable prior to the onset of hypertension in the SHR, without further deterioration with time.
- If confirmed in humans, this finding could be of utmost interest since it could confer the valuable property for ED to be an early warning sign/sentinel for hypertension as it has been postulated for cardiovascular conditions in general.