



## Chapter I

### Introduction and Aims

The pressure of the urine in the urinary tract above an obstructed ureteral stone tends to increase. This increase in pressure is accompanied by high tension in the pelvic and ureteral wall, causing severe pain, ureteral colic (Kiil, 1957; Holmlund, 1968). Even a moderate reduction in pressure above the stone will result in a significant decrease in tension in the renal pelvic wall (Holmlund, 1968) and, consequently, in pain. Such a reduction of pressure can be achieved by either improved flow of urine through the ureter or reduction of urine production. Improved flow of urine is achieved by removal of the stone but can also follow antiphlogistic therapy, which reduces edema in the ureteral wall around the stone (Holmlund, 1968; Nygard and Bjerneby, 1975). However, investigators who tried to treat ureteral colic with spasmolytic drugs failed (Redecker, 1962; Gilmore, 1964), which shows that no improvement of ureteral flow was achieved with such therapy.

An increase in the renal pelvic pressure above an obstructed ureteral stone has been found to stimulate the synthesis of prostaglandin ( $E_2$ ) in the renal medulla (Gilmore, 1964; Schramm and Carlson, 1975; Abe, 1973). Prostaglandin  $E_2$  has been shown to improve renal blood flow and has a natriuretic effect (Johnston, 1967; Horton, 1969). Considerable evidence has been adduced that the increment of ureteral pressure is diminished in animals pretreated with indomethacin. It

seemed possible that intravenous administration of indomethacin might reduce an already elevated pressure. The administration of indomethacin, a potent inhibitor of the synthesis of prostaglandin, caused a significant reduction of the diuresis within 15 minute (Usberti, 1975; Feigen, 1976). Indomethacin also has a well documented antiphlogistic effect that may improve the ureteral flow around a ureteral stone surrounded by an edematous wall.

In the clinical study, Holmlund et al (1978) used indomethacin to treat the patients with ureteral colic. Relief of pain was obtained in 78 to 84 per cent of the patients. Sjodin et al (1983) recently found that the high level of anti-diuretic hormone in plasma was the important factor for the relief of pain after injection of indomethacin in patients with ureteral colic. The mechanism for this effect is not clear and it has not report on the relation between anti-diuretic hormone and plasma osmolality or hydration status which one will be important factor for enhancing the effect of indomethacin.

Therefore the purpose of the present study was to determine the effect of indomethacin on pelvic pressure after ureteral obstruction whether its effect was influenced by the changes of plasma osmolality. During administration of indomethacin whether any alteration of pelvic pressure was affected by changes of extrarenal or intrarenal factors.