Chapter IV

results

Effects of unilateral ureteral obstruction on general circulation and contralateral renal functions in four groups of animals.

After unilateral ureteral obstruction, there were no significant changes in mean arterial pressure (MAP), heart rate (HR) and packed cell volume (PCV). Urine flow rate (V) of the contralateral kidney increased approximately 20% from the control level, while there were slightly change on glomerular filtration rate (GFR), renal plasma flow (RPF), renal blood flow (RBF) and filtration fraction (FF). Renal vascular resistance (RVR) decreased approximately 10%. Plasma concentrations of sodium (P_{Na}) and chloride (P_{Cl}) increased slightly whereas potassium concentrations (P_K) did not change. There was no difference in plasma osmolality (P_{Osm}) before and after the obstruction. Urinary excretion of sodium ($U_{Na}V$), potassium (U_KV) and chloride ($U_{Cl}V$) increased slightly. Slightly increases in fractional excretion of sodium, potassium and chloride were noted. Osmolar clearance (C_{Osm}) increased approximately 76%. Water reabsorption decreased slightly. Pelvic pressure increased by average 52 mm.Hg.

Effects of indomethacin on general circulation :

Group I : Administration of indomethacin after hypertonic solution.

The results in Table I showed that the injection of hypertonic solution did not change mean arterial pressure, heart rate and packed cell volume. Cardiac output, plasma volume and blood volume

Table I Effects of intravenous injection of indomethacin on general circulation of five dogs induced plasma hyperosmolality during unilateral ureteral obstruction.

Parameter	control	unilateral ureteral obstruction	hypertonic solution	indomethacin 15 min	30 min	45 min
MAP(mm.Hg)	116.8 ±26.7	120.9 ±26.0 NS	120.9 ±30.0 NS	129.7 ±21.4 NS	130.6 ±19.8 NS	128.4 ±17.5 NS
HR(beat/min)	147 ±16	144.0 ±22 NS	148.0 ±13 NS	156 ±25 NS	146 ±11 NS	145 ±16 NS
PCV(%)	32.0 ±10.2	32.4 ±8.9 NS	32.4 ±8.5 NS	31.8 ±9.0 NS	31.8 ±9.1 NS	31.8 ±9.1 NS
CO(ml/min/kg.bw)	146.4 ±32.2	-	118.4 ±20.6 NS	103.4 ±34.3 NS	-	134.9 ±90.1 NS
PV(ml/kg.bw)	71.1 ±23.6	-	60.4 ±27.8 NS	43.3 ±11.8 NS	-	60.3 ±37.2 NS
BV(ml/kg.bw)	103.8 ±30.4	-	89.3 ±38.9 NS	64.4 ±18.9 NS	-	91.4 ±63.1 NS
TPR(%)	100	-	128.0 ±22.0 NS	178.0 ±73.0 NS	-	157.0 ±72.0 NS

Abbreviation : MAP, mean arterial blood pressure; HR, heart rate; PCV, packed cell volume; CO, cardiac output; PV, plasma volume; BV, blood volume; TPR, total peripheral resistance. Results are given as mean ± S.D. P-value by paired t-test with respect to the previous control period. NS = not significant.

were not change. Total peripheral resistance (TPR) increased approximately 28% from the control level. After indomethacin injection MAP, HR and PCV did not change. CO, PV and BV decreased slightly at 15 minute and turned to the higher level at 45 minute. TPR increased approximately 78% in 15 min and slightly decreased back to 57% in 45 min respectively.

Group II: Administration of indomethacin after hypotonic solution.

The results in Table II showed that MAP, HR and PCV were not change after intravenous injection of hypotonic solution. CO, PV and BV increased slightly. TPR did n t change. After indomethacin, there were no significant changes in MAP, HR and PCV. CO decreased slightly at 15 min and maintained at the lower level until the end of experiment whereas PV and BV decreased transiently at 15 min then increased and remained at higher level throughout the experimental period.

Group III: Administration of indomethacin after furosemide.

The data in Table III showed the decreases in MAP (14%) was recorded whereas HR did not change but PCV increased (25%) after furosemide intravenous injection. CO, BV and PV decreased approximately 34%, 36% and 29% respectively whereas TPR did not change. Intravenous injection of indomethacin caused no significant changes in MAP, HR, PCV, CO, BV and PV at 15 min. The lower level of these variables were maintained until the end of the experiment.

Group IV: Administration of indomethacin after ADH.

The results were summarized in Table VI. After intramuscular injection of ADH, no changes in MAP, HR and PCV were noted. CO increased significantly from 189.4 ± 17.2 to 248.5 ± 40.1 ml/min/kg.bw ($P<0.05$) whereas

Table II Effects of intravenous injection of indomethacin on general circulation of five dogs induced plasma hypoosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypotonic solution	indomethacin 15 min	30 min	45 min
MAP(mm.Hg)	120.4 ±13.3	129.6 ±8.7 NS	138.0 ±8.8 NS	127.2 ±30.8 NS	128.5 ±35.8 NS	129.4 ±34.5 NS
HR(beat/min)	168 ±13	182 ±20 NS	178 ±22 NS	177 ±31 NS	175 ±33 NS	182 ±33 NS
PCV(%)	36.6 ±7.8	37.2 ±7.8 NS	36.2 ±8.9 NS	35 ±9.0 NS	34 ±8.0 NS	35 ±8.4 NS
CO(ml/min/kg.bw)	144.5 ±13.2	-	178.6 ±46.6 NS	158.6 ±76.6 NS	-	105.0 ±65.9 NS
PV(ml/kg.bw)	69.1 ±19.6	-	73.5 ±16.1 NS	44.1 ±6.6 NS	-	48.2 ±17.0 NS
BV(ml/kg.bw)	107.8 ±23.1	-	115.0 ±17.1 NS	67.9 ±5.4 NS	-	72.8 ±17.6 NS
TPR(%)	100	-	102.1 ±16.1 NS	122.3 ±57.4 NS	-	142.5 ±51.9 NS

Abbreviation: are defined in Table I.

Table III Effects of intravenous injection of indomethacin on general circulation of five dogs pretreated with furosemide during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	furosemide	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
MAP(mm.Hg)	124.2 ±14.2	122.7 ±18.3 NS	105.6 ±24.4 NS	108.1 ±29.9 NS	106.1 ±33.3 NS	106.2 ±34.2 NS
HR(beat/min)	165 ±9	156 ±20 NS	151 ±30 NS	156 ±35 NS	158 ±34 NS	162 ±38 NS
PCV(%)	29.8 ±7.2	28.6 ±6.5 NS	35.2 ±7.8 NS	33.2 ±7.1 NS	32.2 ±6.1 NS	32 ±5.9 NS
CO(ml/min/kg.bw)	160.6 ±24.4	-	105.3 ±36.3 NS	95.1 ±28.5 NS	-	84.8 ±23.8 NS
PV(ml/kg.bw)	66.4 ±27.2	-	42.7 ±10.2 NS	30.5 ±18.2 NS	-	44.5 ±10.2 NS
BV(ml/kg.bw)	92.4 ±28.9	-	65.4 ±10.4 NS	65.6 ±19.5 NS	-	64.8 ±10.1 NS
TPR(%)	100	-	97.4 ±51.8 NS	156.0 ±52.4 *	-	162.5 ±40.9 *

Abbreviation: are defined in Table I. * $P < 0.05$

PV and BV showed a slight increase. It enhanced stroke volume increased by approximately 40% while TPR decreased by approximately 20%. The animals given indomethacin showed no significant change in MAP, HR and PCV. There were slight decreases in CO, PV and BV at 15 min and maintained at the lower level until the end of experiment. TPR did not change at 15 min then increased and remained at higher level throughout the experimental period.

Effects of indomethacin on renal functions.

Group I: Administration of indomethacin after hypertonic solution.

Renal hemodynamic (Table V)

The results in Table V showed that after hypertonic solution, the rate of urine flow (V) of contralateral kidney increased from 20.6 $\pm$ 11.5 to 36.8$\pm$22.2 µl/min/kg.bw.($P<0.05$). There were no significant changes in glomerular filtration rate (GFR), renal plasma flow (RPF) and renal blood flow (RBF). The filtration fraction (FF) did not change, whereas renal fraction (RF) increased by approximately 62%. Renal vascular resistance (RVR) did not change.

After intravenous injection of indomethacin, urine flow rate decreased significantly 77% at 15 min, 80% at 30 min and 75% at 45 min. A significant decreases in renal blood flow and renal plasma flow to 41% and 40% were seen respectively. There were no significant changes in filtration fraction and renal fraction after indomethacin while renal vascular resistance increased slightly within 45 minutes after indomethacin administration.

Table IV Effects of intravenous injection of indomethacin on general circulation of five dogs pretreated with Anti-diuretic hormone during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	anti-diuretic hormone	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
MAP(mm.Hg)	130.7 ±20.6	131.4 ±17.4 NS	135 ±13.5 NS	137.7 ±17.6 NS	133.5 ±16.3 NS	136.5 ±19.7 NS
HR(beat/min)	181 ±27	177 ±38 NS	178 ±39 NS	196 ±10 NS	200 ±18 NS	201 ±18 NS
PCV(%)	31 ±2.6	31.8 ±4.0 NS	31 ±3.3 NS	31.4 ±3.5 NS	31.2 ±3.8 NS	31.4 ±4.2 NS
CO(ml/min/kg.bw)	189.4 ±17.1	-	248.5 ±40.1 *	248.3 ±65.2 NS	-	201.0 ±58.1 NS
PV(ml/kg.bw)	57.1 ±6.5	-	62.3 ±6.8 NS	59.4 ±14.6 NS	-	55.2 ±11.8 NS
BV(ml/kg.bw)	82.8 ±8.1	-	90.8 ±13.6 NS	87.2 ±23.2 NS	-	81.0 ±18.9 NS
TPR(%)	100	-	80.4 ±7.0 NS	85.9 ±20.8 NS	-	106.5 ±28.0 NS

Abbreviation : are defined in Table I. * $P<0.05$

Table V Effects of intravenous injection of indomethacin on contralateral renal function of five dogs induced plasma hyperosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypertonic solution	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
V(µl/min/kg.bw)	6.7 ±3.1	20.7* ±11.5	36.8* ±22.2	8.2* ±3.8	7.9* ±6.9	9.3* ±8.1
GFR(ml/min/kg.bw)	1.5 ±0.2	1.4NS ±0.1	2.0NS ±0.3	1.1NS ±0.3	0.9NS ±0.2	1.1NS ±0.4
RPF(ml/min/kg.bw)	7.9 ±1.8	12.2NS ±5.2	10.2NS ±2.1	5.6* ±1.9	5.7* ±0.9	5.9* ±1.4
RBF(ml/min/kg.bw)	11.5 ±2.1	17.7NS ±6.6	15.1NS ±2.9	7.9* ±2.6	8.4* ±1.9	9.0* ±2.9
FF(%)	15.4 ±5.2	13.1NS ±5.1	20.4NS ±3.4	24.8NS ±14.1	16.9NS ±6.4	21.0NS ±10.7
RF(%)	8.0 ±1.4	-	13.1* ±2.9	8.9NS ±5.3	-	8.9NS ±5.2
RVR(%)	100	78.9NS ±36.8	83.4NS ±28.5	181.5NS ±75.5	167.3NS ±68.0	174.2NS ±101.9

Abbreviation: V, urine flow rate; GFR, glomerular filtration rate; RPF, renal plasma flow; RBF, renal blood flow; FF, filtration fraction; RF, renal fraction; RVR, renal vascular resistance. Results are given as mean ± S.D. P-values by paired t-test with respect to the previous control period. * $P<0.05$, NS = not significant.

Electrolyte excretion and pelvic pressure

The data in Table VI and VII showed no significant increases in plasma concentration of sodium and chloride after given hypertonic saline solution. Plasma osmolality (P_{Osm}) increased 15%. Urinary excretion of sodium of contralateral kidney increased approximately 72%, whereas urinary excretion of potassium and chloride did not change. There were no significant increases in fractional excretions of sodium, potassium and chloride. Osmolar clearance (C_{Osm}) and free water clearance (C_{H_2O}) did not change as well as pelvic pressure.

In comparison with hypertonic solution injection period, intravenous injection of indomethacin caused no significant changes in plasma concentration of sodium, potassium and chloride. Plasma osmolality decreased approximately 15% at 15 min then increased and remained to the higher level throughout the experimental period. Urinary excretion as well as fraction excretions of sodium, potassium and chloride were not alter. Osmolar clearance decreased significantly by average 49% and maintained at the lower level throughout the period of experiments whereas free water clearance increased throughout the experiment. Pelvic pressure decreased approximately 42% at 15 min and 48% at 45 min.

Group II : Administration of indomethacin after hypotonic solution: Renal hemodynamics

The results were summarized in Table VIII, after hypotonic solution injection, urine flow rate increased significantly from 12.2 $\pm$4.6 to 18.6$\pm$14.7 µl/min/kg.bw.($P<0.05$). Glomerular filtration rate,

Table VI Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs induced plasma hyperosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypertonic solution	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
P_{Na} (mEq/L.)	138.2 ±3.4	139.4 ±5.8 NS	142.2 ±4.6 NS	136.4 ±9.3 NS	143 ±7.5 NS	140.6 ±6.8 NS
P_{K} (mEq/L.)	3.5 ±0.3	3.4 ±0.2 NS	3.3 ±0.3 NS	3.3 ±0.4 NS	3.6 ±0.4 NS	3.6 ±0.4 NS
P_{Cl} (mEq/L.)	108.0 ±3.3	111.6 ±3.9 NS	111.0 ±6.9 NS	108.2 ±5.5 NS	112.0 ±3.8 NS	111.0 ±2.6 NS
P_{Osm} (mOsm/L.)	272.6 ±6.8	263.4 ±14.5 NS	310.5 ±5.5 NS	260.9 ±17.5 NS	275.3 ±11.0 NS	269.5 ±10.6 NS
U_{Na} (mEq/L.)	145.4 ±73.9	125.2 ±75.8 NS	154.8 ±46.8 NS	170.0 ±44.4 NS	148.6 ±66.9 NS	148.2 ±60.4 NS
U_{K} (mEq/L.)	124.6 ±58.4	86.8 ±39.2 NS	81.6 ±61.8 NS	113.6 ±54.7 NS	56.4 ±15.1 NS	101.0 ±50.9 NS
U_{Cl} (mEq/L.)	180.6 ±13.2	129.4 ±88.3 NS	78.2 ±53.3 NS	73.4 ±47.4 NS	70.2 ±52.0 NS	68.6 ±34.0 NS
U_{Osm} (mOsm/L.)	1306.1 ±132.0	926.7 ±466.7 NS	783.3 ±476.0 NS	1181.5 ±287.8 NS	1060.2 ±290.4 NS	1064.5 ±517.3 NS

Abbreviation : P_{Na}, plasma concentration of sodium; P_{K}, plasma concentration of potassium; P_{Cl}, plasma concentration of chloride; P_{Osm}, plasma osmolality; U_{Na}, urinary concentration of sodium; U_{K}, urinary concentration of potassium; U_{Cl}, urinary concentration of chloride; U_{Osm} urinary osmolality. P-values by paired t-test with respect to the previous control period. NS = not significant.

Table VII Effects of intrvenous injection of indomethacin on contralateral renal hemodynamics of five dogs induced plasma hyperosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypertonic solution	indomethacin 15 min	30 min	45 min
$U_{Na}V$(μEq/min/kg.bw)	1.1 ±0.8	2.9^{NS} ±2.1	5.2* ±3.1	1.4^{NS} ±0.8	1.4^{NS} ±1.5	1.6^{NS} ±1.8
$U_{K}V$(μEq/min/kg.bw)	0.6 ±0.1	1.3^{NS} ±0.3	1.7^{NS} ±0.1	0.8^{NS} ±0.5	0.5^{NS} ±0.6	0.7^{NS} ±0.6
$U_{Cl}V$(μEq/min/kg.bw)	1.2 ±0.8	2.8^{NS} ±1.8	2.8^{NS} ±1.9	0.6^{NS} ±0.6	0.7^{NS} ±0.8	0.8^{NS} ±1.1
FE of Na (%)	0.7^{NS} ±0.5	1.5^{NS} ±1.0	1.7^{NS} ±0.9	0.9^{NS} ±0.4	1.0^{NS} ±0.9	0.8^{NS} ±0.6
FE of K (%)	17.3 ±2.7	29.3* ±7.5	26.8^{NS} ±1.8	23.4^{NS} ±12.0	15.1^{NS} ±14.9	17.1^{NS} ±7.9
FE of Cl (%)	1.1 ±0.8	1.9^{NS} ±1.2	1.2^{NS} ±0.8	0.5^{NS} ±0.4	0.6^{NS} ±0.7	0.5^{NS} ±0.5
$U_{Osm}V$(μOsm/min/kg.bw)	7.6 ±0.6	14.1^{NS} ±3.8	18.7^{NS} ±4.4	8.9^{NS} ±3.1	7.3^{NS} ±5.3	8.0^{NS} ±5.6
C_{Osm}(μl/min/kg.bw)	28.0 ±2.5	54.5* ±16.7	68.2^{NS} ±16.4	34.3* ±11.5	27.2* ±20.5	30.6* ±22.3
C_{H_2O}(μl/min/kg.bw)	-21.1 ±2.5	-33.9^{NS} ±11.1	-31.4^{NS} ±19.2	-26.1^{NS} ±7.8	-19.3^{NS} ±14.1	-21.4^{NS} ±16.0
Pelvic pressure(mm.Hg)	-	46.3 ±9.6	39.1^{NS} ±14.1	22.6* ±7.6	22.7* ±7.9	20.6* ±6.1

Abbreviation: $U_{Na}V$, urinary excretion of sodium; $U_{K}V$, urinary excretion of potassium; $U_{Cl}V$, urinary excretion of chloride; FE of Na, fractional excretion of sodium; FE of K, fractional excretion of potassium; Fe of Cl, fractional excretion of chloride; $U_{Osm}V$, urinary osmolar excretion; C_{Osm}, osmolar clearance; C_{H_2O}, free water clearance. *P<0.05,NS=not significant.

Table VIII Effects of intravenous injection of indomethacin on contralateral renal function of five dogs induced plasma hypoosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypotonic solution	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
V(µl/min/kg.bw)	11.2 ±5.7	12.2 ±4.6 NS	18.5 ±14.7 *	7.6 ±3.3 *	10.1 ±5.0 *	10.3 ±4.6 *
GFR(ml/min/kg.bw)	1.8 ±0.1	1.8 ±0.2 NS	2.2 ±0.6 NS	0.9 ±0.3 NS	1.2 ±0.6 NS	1.1 ±0.5 NS
RPF(ml/min/kg.bw)	10.4 ±1.1	11.9 ±1.0 NS	10.3 ±1.1 NS	9.7 ±1.7 NS	9.3 ±0.8 NS	9.4 ±2.4 NS
RBF(ml/min/kg.bw)	16.0 ±1.8	18.3 ±1.6 NS	16.6 ±3.0 NS	15.2 ±3.3 NS	14.5 ±2.6 NS	14.8 ±4.1 NS
FF(%)	33.3 ±4.0	30.1 ±12.4 NS	31.1 ±10.5 NS	30.2 ±9.6 NS	32.6 ±12.8 NS	29.6 ±10.5 NS
RF(%)	11.2 ±1.9	-	10.2 ±3.7 NS	12.7 ±6.7 NS	-	13.5 ±5.1 NS
RVR(%)	100	97.5 ±17.0 NS	117.4 ±33.9 NS	110.0 ±9.5 NS	115.9 ±27.2 NS	120.1 ±32.9 NS

Abbreviation : are defined in Table V.

renal plasma flow and renal blood flow did not change. There were no significant change in filtration fraction and renal fraction. Renal vascular resistance increased slightly 17% of the control level.

After indomethacin administration, urine flow rate decreased slightly within 45 minutes. There were no significant change in glomerular filtration rate, renal plasma flow and renal blood flow. Filtration fraction and renal fraction did not change. Renal vascular resistance increased by average 20% of the control level at the end of the experiment.

Electrolyte excretion and pelvic pressure

The data in Table IX and X showed that the plasma concentration of sodium, potassium and chloride did not change after hypotonic solution injection. Plasma osmolality decreased slightly (9%). Urinary excretions of sodium, potassium and chloride increased slightly, whereas fractional excretion of sodium, potassium and chloride did not change. Osmolar clearance increased slightly whereas free water clearance decreased slightly. During hypotonic solution injection, pelvic pressure showed no significant change.

Intravenous injection of indomethacin caused no significant change in plasma concentration of sodium, potassium and chloride as compareed with the period before indomethacin injection. Plasma osmolality did not change. Urinary excretion as well as fractional excretions of sodium, potassium and chloride decreased slightly. After administration of indomethacin, osmolar clearance decreased slightly at 15 min and remained to the higher level at 45 min, whereas free water clearance

Table IX Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs induced plasma hypoosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypotonic solution	indomethacin 15 min	30 min	45 min
P_{Na} (mEq/L.)	140.8 ±4.2	143.4 ±6.4 NS	139.2 ±4.4 NS	139.8 ±4.8 NS	139.0 ±4.7 NS	138.2 ±4.1 NS
P_{K} (mEq/L.)	3.0 ±0.3	3.0 ±0.4 NS	2.9 ±0.4 NS	3.1 ±0.4 NS	3.0 ±0.4 NS	3.1 ±0.4 NS
P_{Cl} (mEq/L.)	114.0 ±2.7	114.4 ±5.5 NS	111.8 ±1.7 NS	11.4 ±3.0 NS	113.2 ±1.6 NS	109.2 ±4.7 NS
P_{Osm} (mOsm/L.)	294.4 ±3.0	290.6 ±5.7 NS	271.0 ±5.4 NS	267.0 ±4.1 NS	269.6 ±9.1 NS	268.6 ±1.5 NS
U_{Na} (mEq/L.)	148.0 ±68.1	126.6 ±68.3 NS	125.4 ±56.5 NS	138.0 ±57.0 NS	113.4 ±53.6 *	111.6 ±48.9 *
U_{K} (mEq/L.)	78.8 ±41.4	80.8 ±19.9 NS	67.6 ±25.7 NS	90.6 ±26.7 NS	99.8 ±51.7 *	63.2 ±26.0 NS
U_{Cl} (mEq/L.)	154.6 ±91.3	139.2 ±11.6 NS	126.4 ±82.4 NS	129.2 ±11.5 NS	100.0 ±11.5 NS	66.6 ±63.5 *
U_{Osm} (mOsm/L.)	1218.9 ±115.3	1065.8 ±118.2 NS	839.6 ±127.3 NS	1079.6 ±136.2 NS	1164.2 ±195.7 NS	1089.8 ±92.6 NS

Abbreviation : are defined in Table VI. *P 0.05.

Table X Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs induced plasma hypoosmolality during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	hypotonic solution	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
$U_{Na}V$(μEq/min/kg.bw)	1.5 ±1.0	1.3 ±1.0 NS	2.8 ±3.4 NS	1.0 ±0.5 NS	1.1 ±0.6 NS	1.2 ±0.7 NS
$U_{K}V$(μEq/min/kg.bw)	0.6 ±0.2	0.7 ±0.2 NS	0.9 ±0.2 NS	0.6 ±0.2 NS	0.8 ±0.3 NS	0.7 ±0.4 NS
$U_{Cl}V$(μEq/min/kg.bw)	1.5 ±1.4	1.4 ±1.7 NS	3.0 ±4.3 NS	0.9 ±0.8 NS	0.9 ±1.0 NS	0.7 ±0.7 NS
FE of Na (%)	1.2 ±0.8	1.2 ±0.9 NS	1.6 ±1.5 NS	0.9 ±0.6 NS	0.7 ±0.4 NS	0.8 ±0.5 NS
FE of K (%)	25.6 ±4.2	31.4 ±10.5 NS	30.4 ±10.4 NS	24.6 ±10.7 NS	25.0 ±12.2 NS	21.7 ±13.6 NS
FE of Cl (%)	1.5 ±1.1	1.8 ±1.9 NS	2.0 ±2.4 NS	0.9 ±0.8 NS	0.6 ±0.6 NS	0.6 ±0.7 NS
$U_{Osm}V$(μOsm/min/kg.bw)	10.2 ±3.0	9.6 ±3.6 NS	13.3 ±9.0 NS	7.7 ±3.2 *	10.8 ±4.6 NS	10.9 ±4.6 NS
C_{Osm}(μl/min/kg.bw)	26.7 ±8.8	27.9 ±6.1 NS	38.7 ±17.6 NS	24.4 ±10.3 NS	32.6 ±14.0 NS	36.7 ±15.5 NS
C_{H_2O}(μl/min/kg.bw)	-15.3 ±8.7	-17.3 ±5.9 NS	-20.1 ±8.3 NS	-16.8 ±7.9 NS	-22.5 ±11.2 NS	-26.4 ±12.6 NS
Pelvic pressure(mm.Hg)	-	57.6 ±10.5	62.9 ±14.1 NS	48.1 ±16.0 *	47.4 ±17.1 *	47.7 ±17.8 *

Abbreviation: are defined in Table VII. *P 0.05.

increased at 15 min then decreased and remained at the lower level throughout the experimental period. Pelvic pressure decreased 22%, 24% and 24% at 15 min, 30 min and 45 min respectively.

Group III: Administration of indomethacin after furosemide:

Renal hemodynamics

The data in Table XI showed that after furosemide administration, urine flow rate increased significantly from 21.4±15.7 to 175.5±89.9 µl/min/kg.bw.($P<0.05$). No significant change in glomerular filtration rate, renal plasma flow and renal blood flow were noted. Filtration fraction did not change whereas renal fraction increased significantly from 9.2±2.2 to 19.4±8.3% ($P<0.05$). Renal vascular resistance decreased 27% of the control level.

Indomethacin injection decreased urine flow rate significantly from 175.5±89.9 to 96.6±65.3 µl/min/kg.bw.($P<0.05$) at 15 min and increased to the higher level at 45 min. Glomerular filtration rate, renal plasma flow and renal blood flow did not change. Filtration fraction increased significantly from 25.9±10.7 to 52.8±9.9% ($P<0.05$) and decreased to the lower level at 45 min. Renal fraction did not change significantly. Renal vascular resistance decreased 17% of the control level at 45 min.

Electrolyte excretion and pelvic pressure

The results in Table XII and XIII showed that after furosemide, plasma concentration of sodium, potassium and chloride did not change. No significant change in plasma osmolality was noted. Urinary excretion of sodium increased significantly from 3.7±3.2 to 20.8±10.9 µEq/min/kg.bw

Table XI Effects of intravenous injection of indomethacin on contralateral renal function of five dogs pretreated with furosemide during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	furosemide	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
V(µl/min/kg.bw)	7.5 ±2.5	21.4* ±15.7	175.5* ±89.9	96.5* ±65.2	105.8NS ±77.4	106.2NS ±70.3
GFR(ml/min/kg.bw)	1.3 ±0.3	1.3NS ±0.3	1.7NS ±0.7	1.3NS ±0.1	1.3NS ±0.1	1.3NS ±0.2
RPF(ml/min/kg.bw)	10.0 ±1.9	10.7NS ±2.2	11.6NS ±3.3	10.1NS ±1.2	11.0NS ±2.5	10.4NS ±2.0
RBF(ml/min/kg.bw)	14.4 ±3.1	15.2NS ±3.5	17.8NS ±3.9	15.3NS ±2.3	16.3NS ±3.5	15.3NS ±2.4
FF(%)	31.9 ±16.5	24.4NS ±9.3	25.9NS ±10.7	52.8NS ±9.9	26.2NS ±8.0	25.4NS ±8.9
RF(%)	9.2 ±2.2	-	19.3* ±8.2	18.1NS ±8.0	-	19.2NS ±5.1
RVR(%)	100	87.6NS ±16.5	73.4NS ±30.1	83.0NS ±28.7	79.4NS ±34.4	83.3NS ±34.9

Abbreviation: are defined in Table V. *P<0.05.

($P<0.05$) and fractional excretion of sodium increased slightly. Urinary excretion of potassium increased slightly while fractional excretion of potassium increased from 22.1 ± 6.5 to $37.6\pm6.4\%$ ($P<0.05$). Urinary excretion and FE of chloride increased significantly from 3.5 ± 3.6 to 23.2 ± 2.4 uEq/min/kg.bw.($P<0.05$), and from 2.6 ± 2.7 to $11.5\pm6.3\%$($P<0.05$) respectively. Osmolar and free water clearance increased significantly from 48.3 ± 24.4 to 182.1 ± 10.1 µl/min/kg.bw.($P<0.05$) and from -26.8 ± 9.5 to -6.5 ± 8.0 µl/min/kg.bw.($P<0.05$) respectively. Pelvic pressure decreased approximately 21%.

After indomethacin, plasma concentrations of sodium, potassium and chloride did not change as well as plasma osmolality. Urinary excretions and fractional excretions of sodium, potassium and chloride were not change. Osmolar clearance decreased slightly whereas free water clearance increased slightly. Pelvic pressure decreased approximately 22%, 17% and 12% at 15 min, 30 min and 45 min respectively.

Group IV: Administration of indomethacin after ADH :

Renal hemodynamics

The data in Table XIV showed that after ADH injection, urine flow rate decreased slightly. Glomerular filtration rate, renal plasma flow and renal blood flow did not change. Filtration fraction and renal fraction were not alter. Renal vascular resistance increased 12% of the control level.

Intravenous injection of indomethacin after ADH caused no significant changes in urine flow rate, glomerular filtration rate, renal plasma flow and renal blood flow. Filtration fraction increased

Table XII Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs pretreated with furosemide during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	furosemide	indomethacin 15 min	30 min	45 min
P_{Na} (mEq/L.)	139.2 ±3.7	140.2 ±3.3 NS	139.4 ±1.6 NS	138.6 ±2.4 NS	137.8 ±2.8 NS	139.8 ±0.4 NS
P_K (mEq/L.)	4.0 ±1.1	3.3 ±0.5 NS	3.2 ±0.5 NS	3.1 ±0.6 NS	3.1 ±0.6 NS	3.2 ±0.4 NS
P_{Cl} (mEq/L.)	108.6 ±5.2 NS	111.8 ±4.5 NS	111.8 ±2.7 NS	110.6 ±5.3 NS	112 ±7.5 NS	113.2 ±5.0 NS
P_{Osm} (mOsm/L.)	283.9 ±2.8	278.1 ±6.1 NS	289.6 ±4.0 NS	283.3 ±5.5 NS	281.9 ±8.0 NS	283.4 ±9.3 NS
U_{Na} (mEq/L.)	154 ±37.8	157 ±41.1 NS	115.8 ±11.6 *	110.6 ±17.3 NS	111 ±15.6 NS	112 ±15.0 NS
U_K (mEq/L.)	70.8 ±29.8	57 ±25.7 NS	17.2 ±11.4 *	20.8 ±7.8 NS	19.8 ±8.2 NS	20.2 ±8.5 NS
U_{Cl} (mEq/L.)	114.8 ±72.2	118.8 ±68.8 NS	134 ±16.5 NS	124.8 ±11.2 NS	122 ±19.3 NS	120.4 ±18.3 NS
U_{Osm} (mOsm/L.)	1059.6 ±360.0	868 ±252.5 NS	401.4 ±150.1 *	352.9 ±53.1 NS	338 ±35.0 NS	333.3 ±28.3 NS

Abbreviation: are defined in Table VI. *P<0.05

Table XIII Effects of intravenous injection of indomethacin on contralateral renal hemodynamics five dogs pretreated with furosemide during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	furosemide	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
$U_{Na}V$(μEq/min/kg.bw)	1.2 ±0.6	3.7^{NS} ±3.1	20.8* ±10.9	11.3^{NS} ±8.1	12.2^{NS} ±9.0	12.3^{NS} ±8.2
$U_{K}V$(μEq/min/kg.bw)	0.4 ±0.1	0.8^{NS} ±0.2	2.1^{NS} ±0.9	1.5^{NS} ±0.6	1.5^{NS} ±0.8	1.6^{NS} ±0.7
$U_{Cl}V$(μEq/min/kg.bw)	0.9 ±0.9	3.4^{NS} ±3.6	23.1* ±2.3	12.1^{NS} ±0.8	13.0^{NS} ±0.9	13.1^{NS} ±0.8
FE of Na (%)	0.7 ±0.4	2.2^{NS} ±1.9	8.4^{NS} ±4.8	5.6^{NS} ±3.4	6.3^{NS} ±4.4	6.3^{NS} ±3.8
FE of K (%)	19.2 ±1.9	22.0^{NS} ±6.4	37.5* ±6.3	37.9^{NS} ±7.0	38.9^{NS} ±8.6	38.3^{NS} ±5.4
FE of Cl (%)	0.8 ±0.8	2.6^{NS} ±2.7	11.5* ±6.2	7.5^{NS} ±4.3	8.3^{NS} ±5.3	8.2^{NS} ±4.7
$U_{Osm}V$(μOsm/min/kg.bw)	7.7 ±3.1	15.3^{NS} ±7.8	58.8* ±2.9	32.4^{NS} ±9.8	33.9^{NS} ±2.8	35.2^{NS} ±2.6
C_{Osm}(μl/min/kg.bw)	24.0 ±9.7	48.2^{NS} ±24.3	182.0* ±10.1	98.6^{NS} ±16.8	106.5^{NS} ±12.2	108.7^{NS} ±19.8
C_{H_2O}(μl/min/kg.bw)	-16.5 ±8.5	-26.8^{NS} ±9.5	-6.5* ±8.0	-2.0^{NS} ±0.7	-0.6^{NS} ±0.7	-2.4^{NS} ±0.9
Pelvic pressure(mm.Hg)	-	51.5 ±0.9	40.4^{NS} ±4.9	31.5* ±8.0	33.7^{NS} ±5.7	35.0^{NS} ±7.1

Abbreviation: are defined in Table VII. *P<0.05

slightly within 30 min then decreased and remained at the lower level throughout the experiment. Renal fraction did not change. Renal vascular resistance increased to 27% of the control level at 45 min.

Electrolyte excretion and pelvic pressure

The results in Table XV and XVI indicated that after ADH administration there were no significant change in plasma concentrations of sodium, potassium and chloride. Plasma osmolality did not change. Urinary excretion and fractional excretion of sodium, potassium and chloride showed no significant changes. Osmolar clearance and free water clearance did not change. Pelvic pressure increased slightly.

Intravenous injection of indomethacin caused no significant changes in plasma concentrations of sodium, potassium, chloride and osmolality. Urinary excretion and fractional excretions of sodium, potassium and chloride did not change. Osmolar clearance decreased slightly and maintained at the lower level within 45 min. The free water clearance increased slightly and maintained at the same level within 45 min. Pelvic pressure decreased slightly to 8%, 13% and 10% at 15 min, 30 min and 45 min respectively.

Comparing the effect of indomethacin on general hemodynamics and renal function in each of four groups of animals.

After indomethacin administration, there were no changes in mean arterial blood pressure and packed cell volume in all of four groups (Fig 1 and 3). In ADH group, a slight increase in heart rate was recorded after indomethacin (Fig 2). Cardiac output, plasma volume and blood volume did not change (Fig 4-5). Total peripheral resistance in group I

Table XIV Effects of intravenous injection of indomethacin on contralateral renal function of five dogs pretreated with ADH during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	ADH	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
V(µl/min/kg.bw)	14.7 ±10.7	19.8 ±9.6 NS	17.1 ±9.1 NS	13.8 ±5.8 NS	18.3 ±10.4 NS	16.4 ±7.0 NS
GFR(ml/min/kg.bw)	1.8 ±0.1	1.6 ±0.3 NS	0.8 ±0.2 NS	1.0 ±0.4 NS	1.1 ±0.9 NS	1.1 ±0.3 NS
RPF(ml/min/kg.bw)	10.3 ±1.8	11.4 ±1.7 NS	10.5 ±1.9 NS	10.8 ±2.6 NS	11.9 ±2.2 NS	10.9 ±2.6 NS
RBF(ml/min/kg.bw)	15.9 ±2.5	16.9 ±3.4 NS	15.2 ±2.5 NS	15.7 ±3.6 NS	17.2 ±3.4 NS	15.8 ±3.2 NS
FF (%)	30.6 ±10.7	27.9 ±10.7 NS	25.7 ±13.9 NS	27.9 ±10.9 NS	37.4 ±17.5 *	20.4 ±10.7 NS
RF (%)	9.5 ±1.5	-	6.3 ±1.6 NS	6.8 ±2.3 NS	-	8.5 ±2.6 NS
RVR (%)	100	98.3 ±39.7 NS	112.4 ±30.5 NS	129.1 ±39.9 NS	132.3 ±55.2 NS	127.2 ±47.0 NS

Abbreviation: are defined in Table V. *P 0.05

Table XV Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs pretreated with ADH during unilateral ureteral obstruction.

parameter	control	unilatera ureteral obstruction	ADH	indomethacin 15 min	30 min	45 min
P_{Na} (mEq/L.)	142.8 ±4.8	141.2 ±3.6 ^{NS}	144 ±4.2 ^{NS}	143.2 ±4.1 ^{NS}	142.2 ±5.2 ^{NS}	143 ±3.4 ^{NS}
P_{K} (mEq/L.)	3.0 ±1.0	3.6 ±0.2 ^{NS}	3.7 ±0.2 ^{NS}	3.7 ±0.3 ^{NS}	3.8 ±0.3 ^{NS}	3.7 ±0.1 ^{NS}
P_{Cl} (mEq/L.)	109.6 ±4.8	111 ±3.5 ^{NS}	112.4 ±3.9 ^{NS}	112.8 ±3.8 ^{NS}	113.4 ±3.2 ^{NS}	110.4 ±5.2 ^{NS}
P_{Osm} (mOsm/L.)	299.6 ±9.6	295.6 ±8.6 ^{NS}	294.4 ±8.4 ^{NS}	292.2 ±8.8 ^{NS}	287.2 ±6.1 ^{NS}	289.8 ±9.0 ^{NS}
U_{Na} (mEq/L.)	153.2 ±7.1	149 ±9.2 ^{NS}	149.4 ±9.5 ^{NS}	153.4 ±3.6 ^{NS}	148.2 ±7.9 ^{NS}	141.2 ±16.6 ^{NS}
U_{K} (mEq/L.)	63.2 ±16.9	50 ±10.8 ^{NS}	51.4 ±11.6 ^{NS}	71.2 ±22.3 *	77.2 ±39.8 ^{NS}	76.2 ±29.8 ^{NS}
U_{Cl} (mEq/L.)	179.4 ±71.6	183.4 ±61.9 ^{NS}	177.2 ±51.5 ^{NS}	176.8 ±55.9 ^{NS}	160.8 ±51.4 ^{NS}	148.6 ±47.7 ^{NS}
U_{Osm} (mOsm/L.)	1019.2 ±330.5	870.8 ±194.8 ^{NS}	821 ±171.1 ^{NS}	993.8 ±207.4 ^{NS}	971.4 ±294.5 ^{NS}	993.4 ±267.3 ^{NS}

Abbreviation: are defined in Table VI. $^{*}P < 0.05$

Table XVI Effects of intravenous injection of indomethacin on contralateral renal hemodynamics of five dogs pretreated with ADH during unilateral ureteral obstruction.

parameter	control	unilateral ureteral obstruction	ADH	indomethacin 15 min	indomethacin 30 min	indomethacin 45 min
$U_{Na}V$(μEq/min/kg.bw)	2.7 ±1.9	3.6 ±1.7 NS	3.0 ±1.4 NS	2.6 ±1.1 NS	3.3 ±1.8 NS	2.8 ±1.0 NS
$U_{K}V$(μEq/min/kg.bw)	0.6 ±0.3	0.9 ±0.5 NS	0.8 ±0.4 NS	1.0 ±0.6 NS	1.2 ±0.6 NS	1.1 ±0.4 NS
$U_{Cl}V$(μEq/min/kg.bw)	2.7 ±2.3	3.9 ±2.6 NS	3.1 ±2.0 NS	2.5 ±1.5 NS	2.8 ±1.4 NS	2.4 ±1.1 NS
FE of Na (%)	1.5 ±1.1	2.6 ±1.4 NS	2.5 ±1.5 NS	1.6 ±0.6 NS	1.6 ±0.4 NS	1.7 ±0.6 NS
FE of K (%)	15.1 ±7.9	26.6 ±11.9 NS	26.9 ±15.9 NS	24.3 ±9.7 NS	24.7 ±13.1 NS	27.3 ±8.2 NS
FE of Cl (%)	2.0 ±1.7	3.4 ±2.1 NS	3.2 ±2.2 NS	2.0 ±0.7 NS	1.8 ±0.8 NS	1.9 ±0.8 NS
$U_{Osm}V$(μOsm/min/kg.bw)	12.7 ±5.1	16.5 ±7.5 NS	23.2 ±5.3 NS	14.2 ±7.3 NS	15.9 ±7.0 NS	15.3 ±5.5 NS
C_{Osm}(μl/min/kg.bw)	38.8 ±15.7	52.0 ±23.5 NS	53.9 ±16.8 NS	44.0 ±23.1 NS	50.5 ±22.4 NS	47.7 ±17.3 NS
C_{H_2O}(μl/min/kg.bw)	-24.1 ±9.3	-32.2 ±17.9 NS	-35.8 ±10.8 NS	-30.2 ±18.1 NS	-32.1 ±15.2 NS	-31.3 ±13.8 NS
Pelvic pressure(mm.Hg)	-	55.8 ±13.8	60.2 ±14.0 NS	55.3 ±17.4 NS	52.5 ±15.3 NS	54.9 ±16.2 NS

Abbreviation : are defined in Table VII.

and III were greater than the other two groups (Fig 6). Indomethacin administration in animals induced plasma hyperosmolality caused a marked increase in the rate of urine flow of contralateral kidney than the other groups (Fig 7). There were no significant changes in glomerular filtration rate, renal plasma flow and renal blood flow in all of four groups (Fig 8-9). Filtration fraction did not change in all of four groups whereas renal fraction was slightly reduce in plasma hyperosmolality group (Fig 10). After indomethacin, renal vascular resistance increased markedly in plasma hyperosmolality group as compared with the other groups (Fig 11). Plasma concentrations of sodium, potassium and chloride were constant throughout the experimental period in all groups. Slight decreases in plasma osmolality were found similarly in all groups (Fig 12-15). Urinary excretion and fractional excretion of sodium decreased markedly in plasma hyperosmolality group as compared with the other groups. Urinary excretion and fractional excretion of potassium in furosemide group showed a lower level.

A decrease in urinary excretion and fractional excretion of chloride of plasma hypoosmolality group were recorded (Fig 16-18). Pelvic pressure reduced in plasma hyperosmolality group 42% whereas the others decreased slightly.

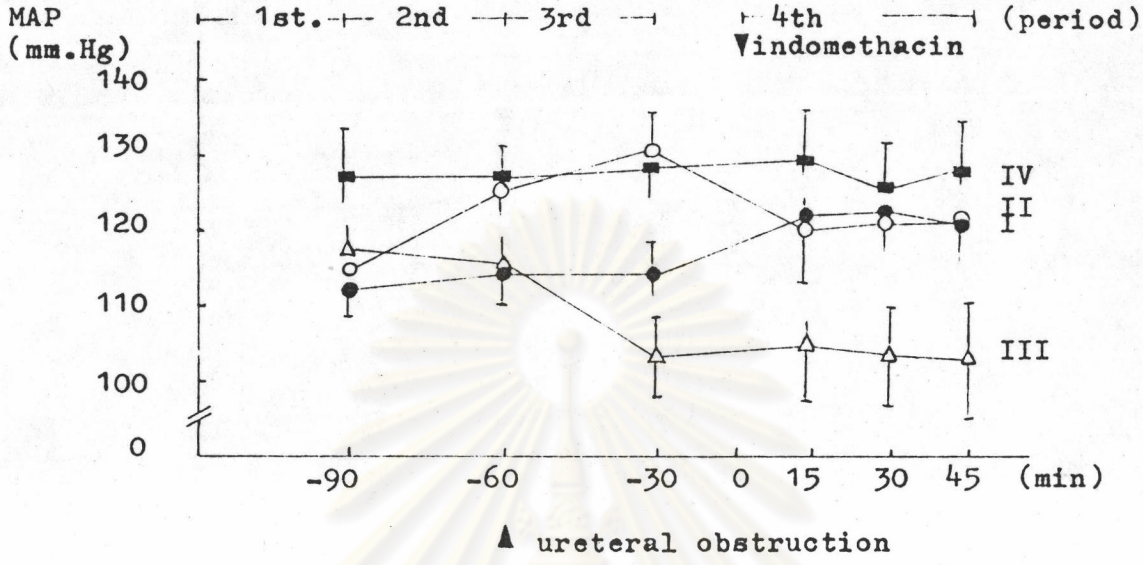

Figure I The changes in mean arterial pressure (MAP) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean ± S.D.

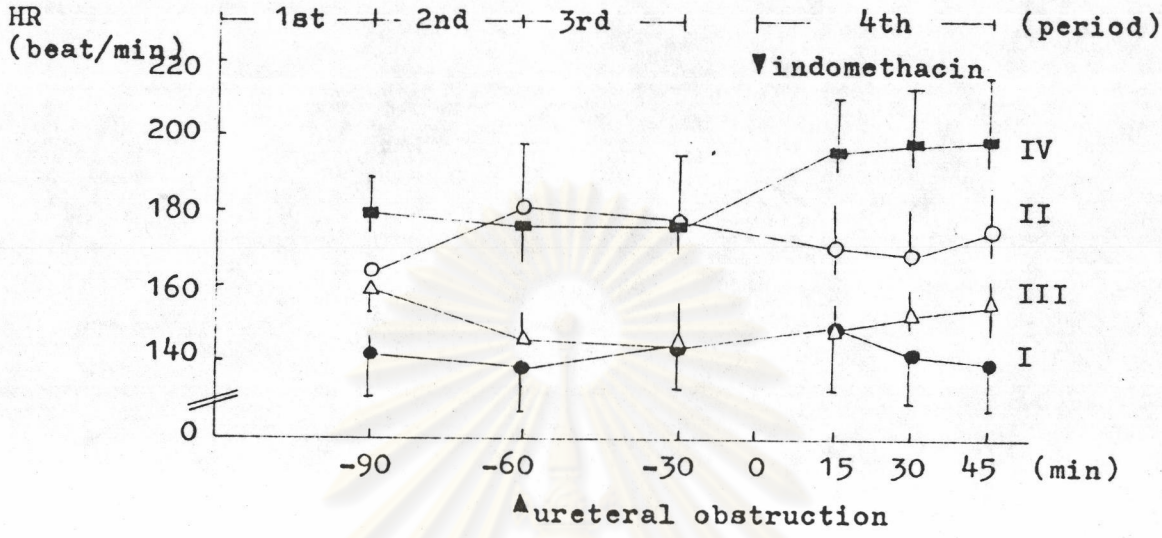

Figure 2 The changes in heart rate (HR) before and after indomethacin injection in the dogs group I(plasma hyperosmolality), group II(plasma hypoosmolality),group III(furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

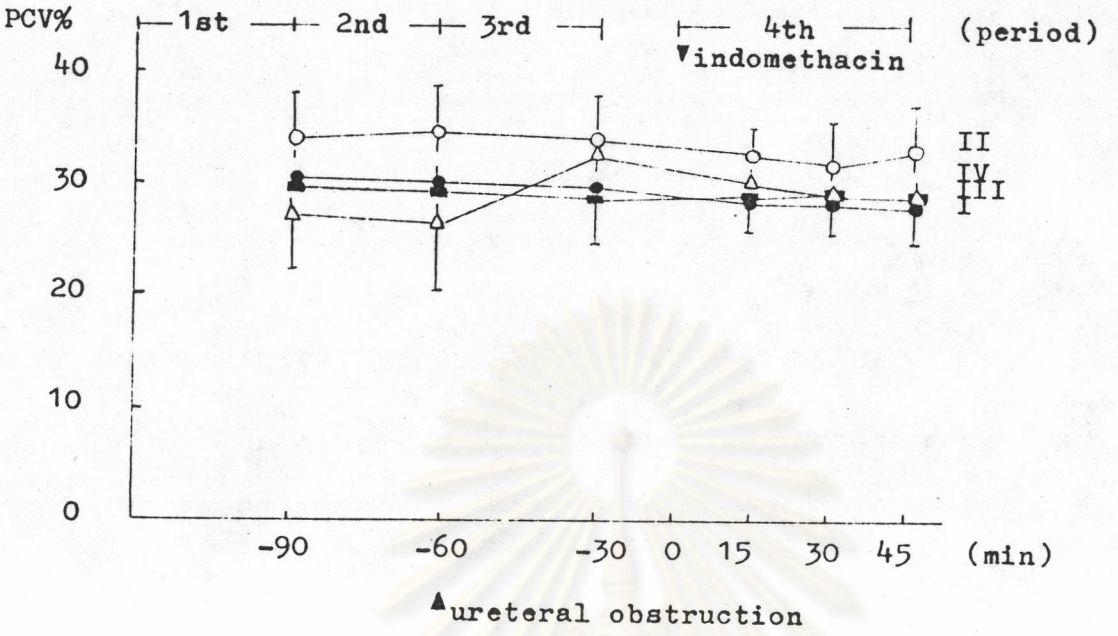

Figure 3 The changes in packed cell volume (PCV) before and after indomethacin injection in the dogs group I(plasma hyperosmolality),group II(plasma hypoosmolality),group III (furosemide) and group IV(ADH). The values are mean$\pm$S.D.

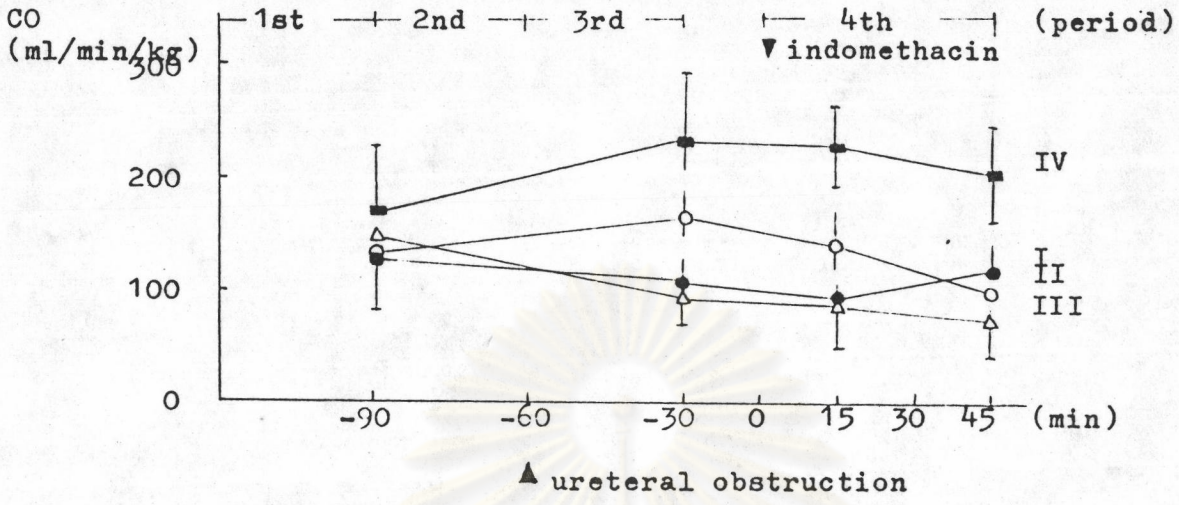

Figure 4 The changes in cardiac output(CO) before and after indomethacin injection in the dogs group I(plasma hyperosmolality),Group II (plasma hypoosmolality),group III(furosemide) and group IV(ADH). The values are mean ± S.D.

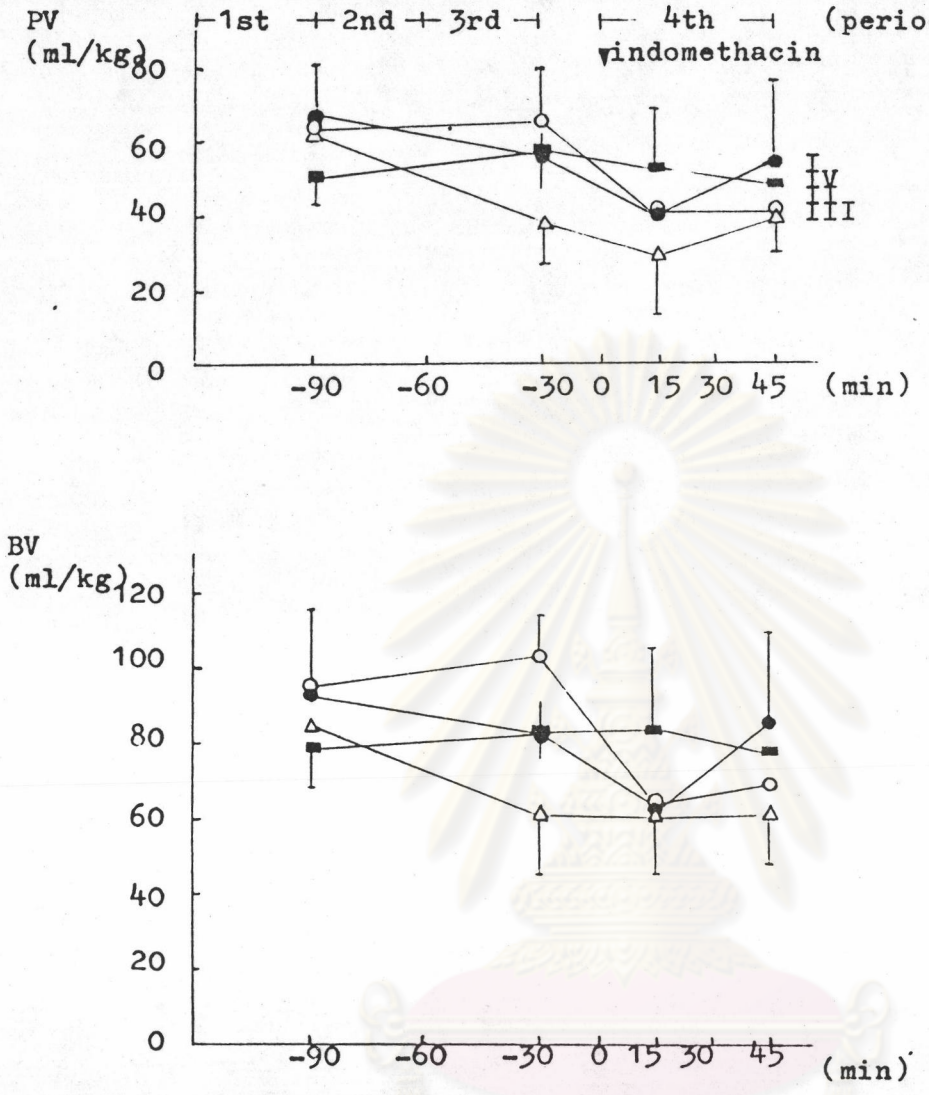

Figure 5 The changes in plasma volume(PV;upper panel) and blood volume (BV;lower panel) before and after indomethacin injection in the dogs group I(plasma hyperosmolality),group II(plasma hypo-osmolality),group III(furosemide) and group IV(ADH). The valvues are mean $\pm$ S.D.

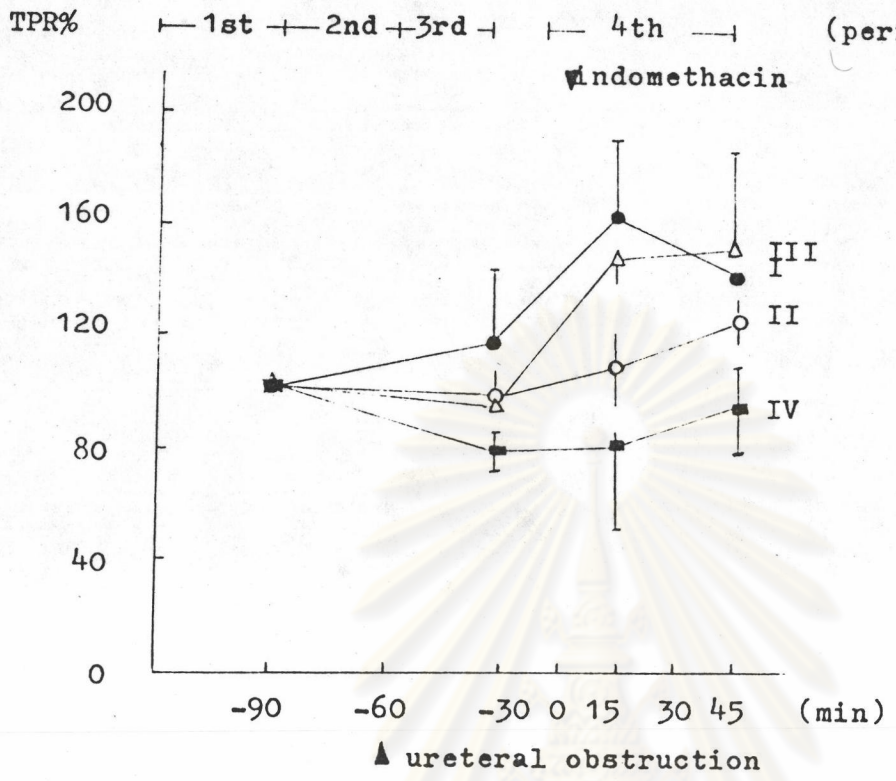

Figure 6 The changes in total peripheral resistance(TPR) before and after indomethacin injection in the dogs group I(plasma hyperosmolality),group II(plasma hypoosmolality),group III (furosemide) and group IV(ADH). The values are mean ± S.D.

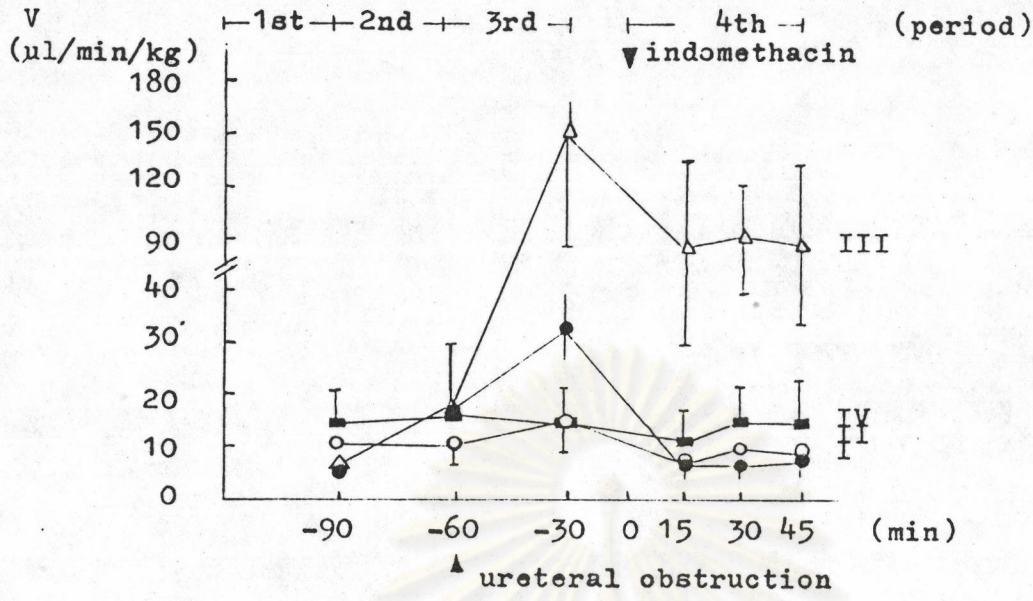

Figure 7 The changes in contralateral urine flow rate(V) before and after indomethacin injection in the dogs group I(plasma hyperosmolality),group II(plasma hypoosmolality),group III (furosemide) and group IV(ADH). The values are mean ± S.D.

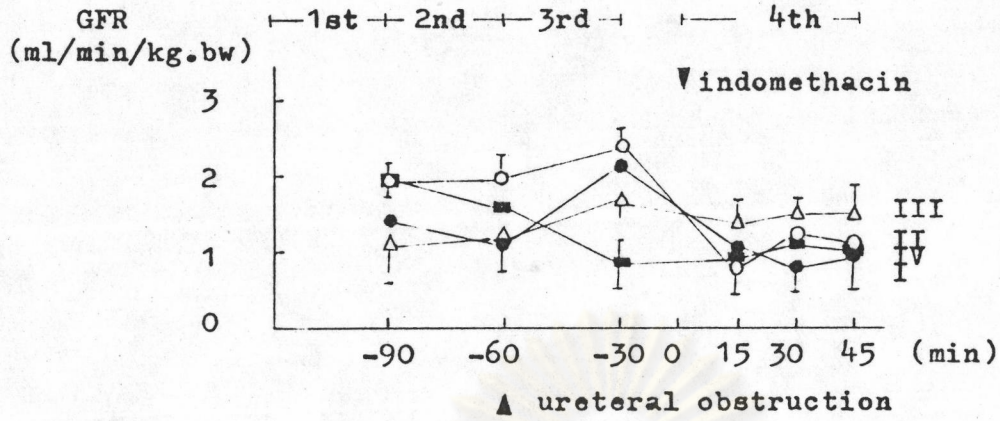

Figure 8 The changes in contralateral glomerular filtration rate (GFR) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

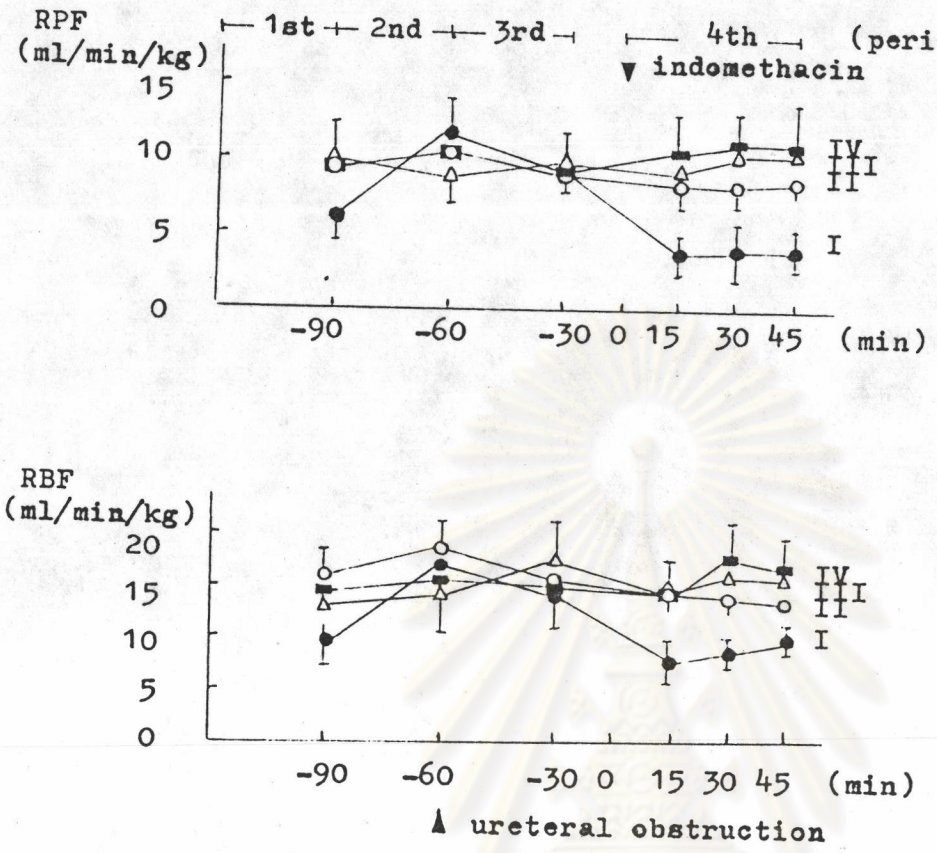

Figure 9 The changes in contralateral renal plasma flow (RPF; upper panel) and renal blood flow (RBF; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

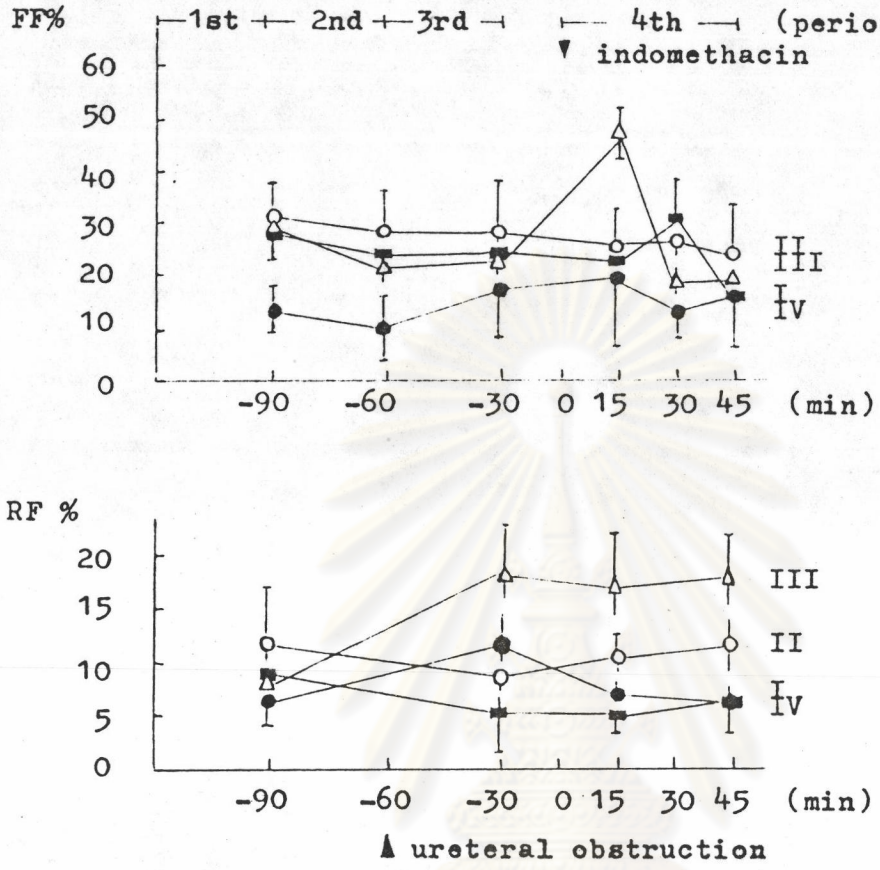

Figure 10 The changes in contralateral filtration fraction (FF; upper panel) and renal fraction (RF; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

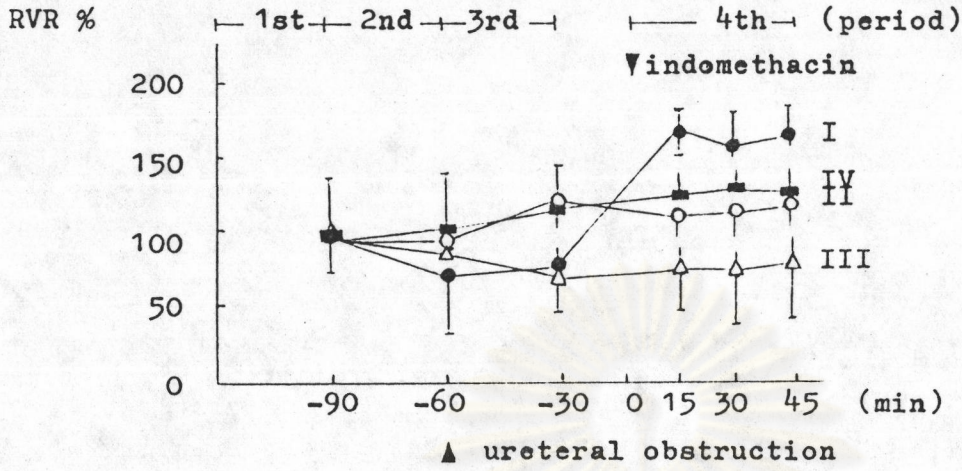

Figure 11 The changes in contralateral renal vascular resistance (RVR) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

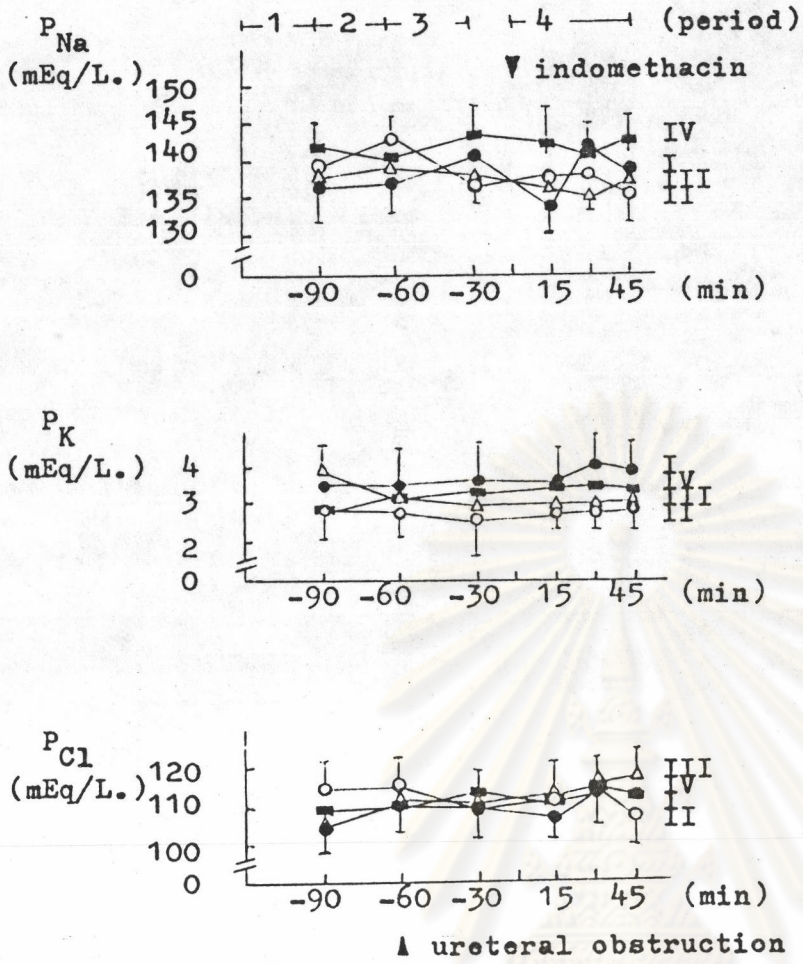

Figure 12 The changes in plasma concentration of sodium (P_{Na}; upper panel), potassium (P_K; mid panel) and chloride (P_{Cl}; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypo-osmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

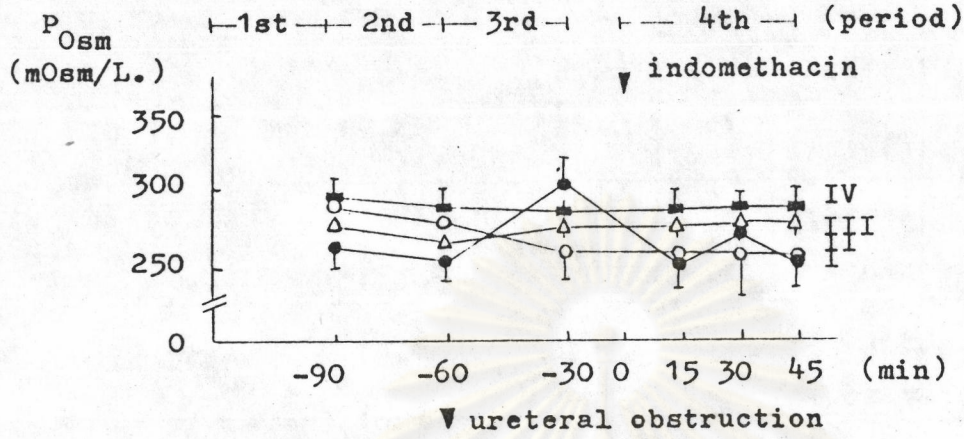

Figure 13 The changes in plasma osmolality (P_{Osm}) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

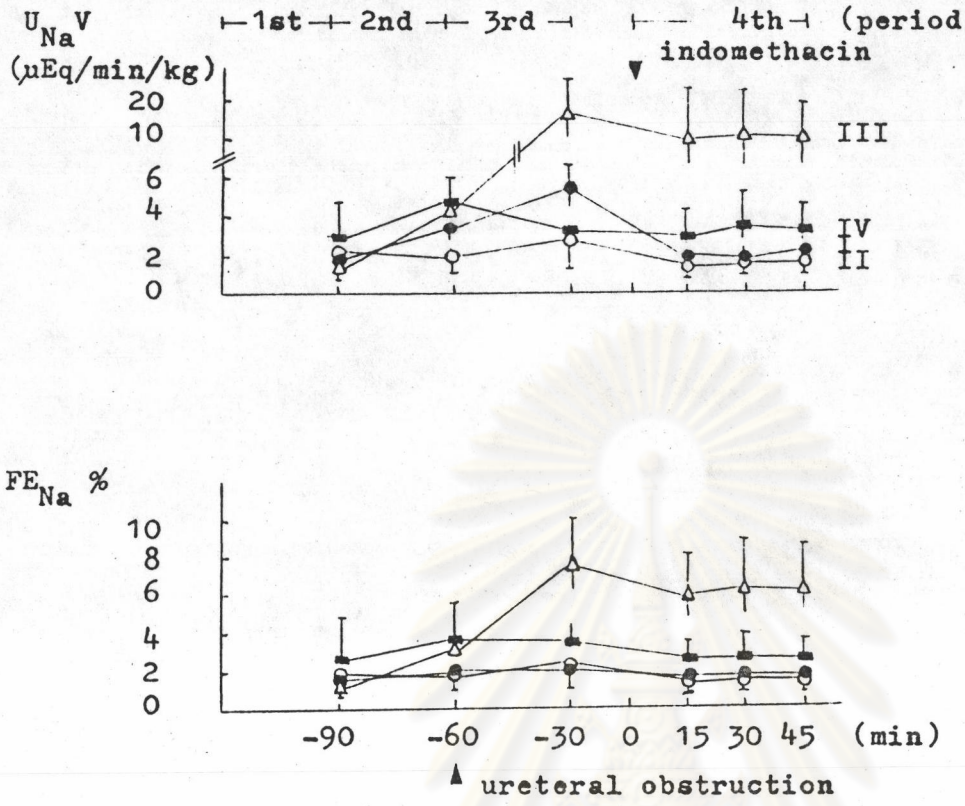

Figure 14 The changes in contralateral urinary excretion of Na ($U_{Na}V$; upper panel) and fractional excretion of sodium (FE of Na; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean ± S.D.

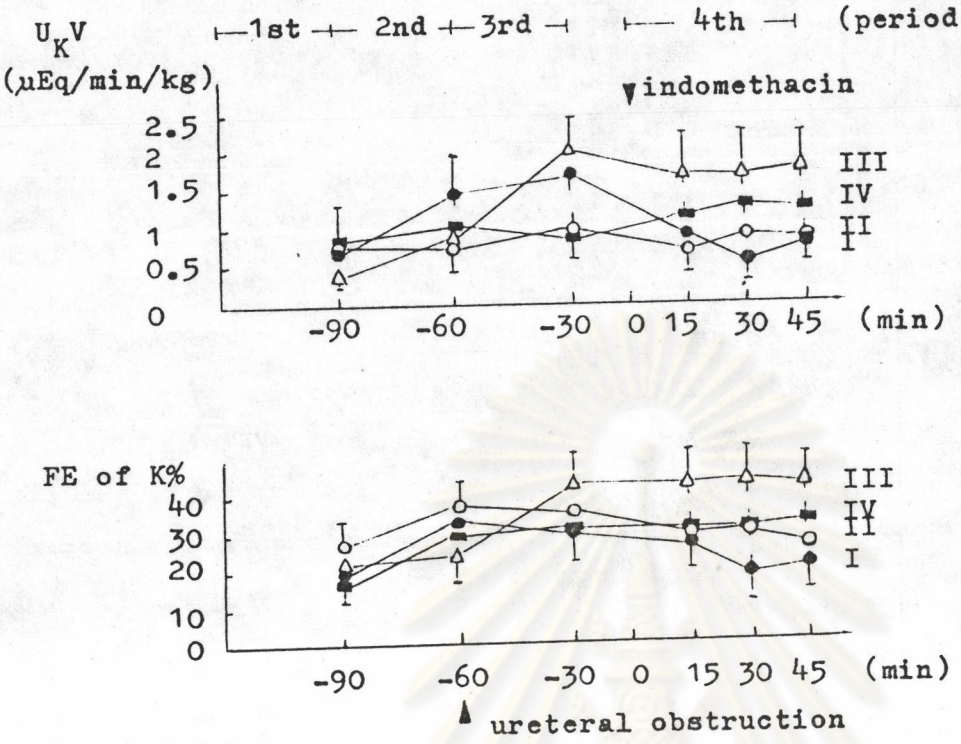

Figure 15 The changes in contralateral urinary excretion of K (U_KV; upper panel) and fractional excretion of potassium (FE of K; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

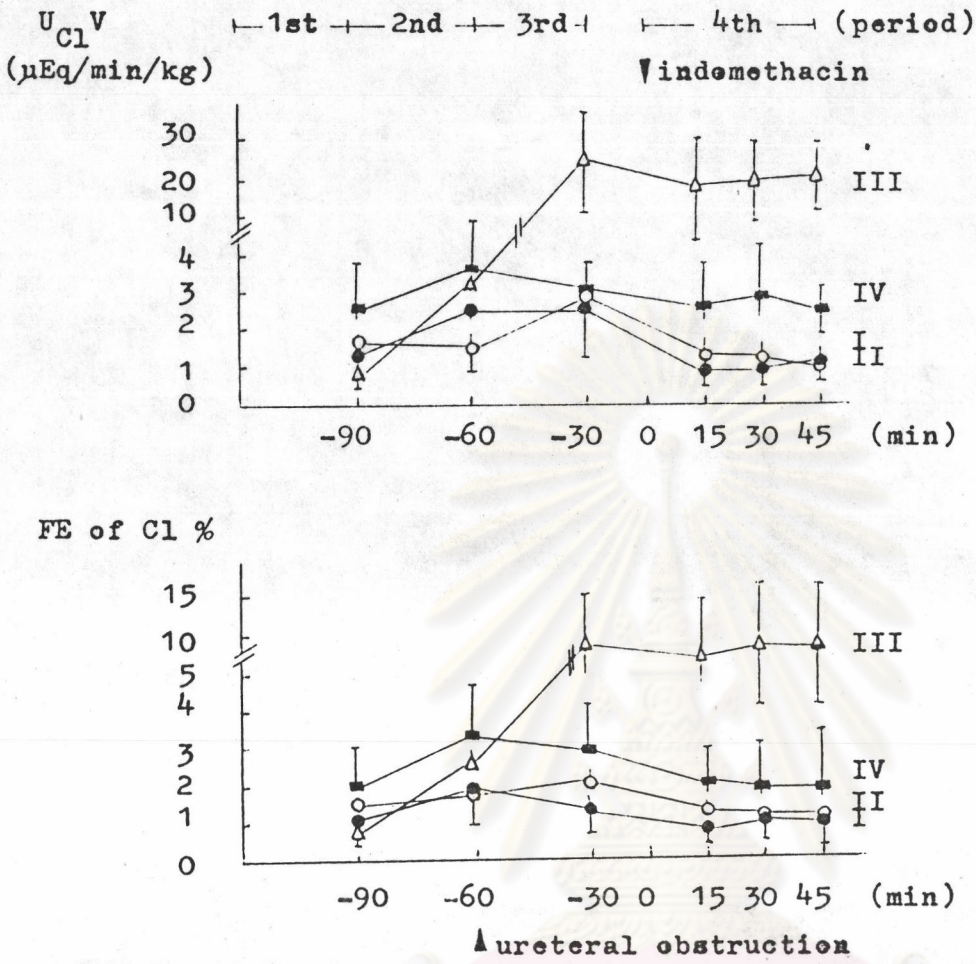

Figure 16 The changes in contralateral urinary excretion of Cl ($U_{Cl}V$; upper panel) and fractional excretion of chloride (FE of Cl; lower panel) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypo-osmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.

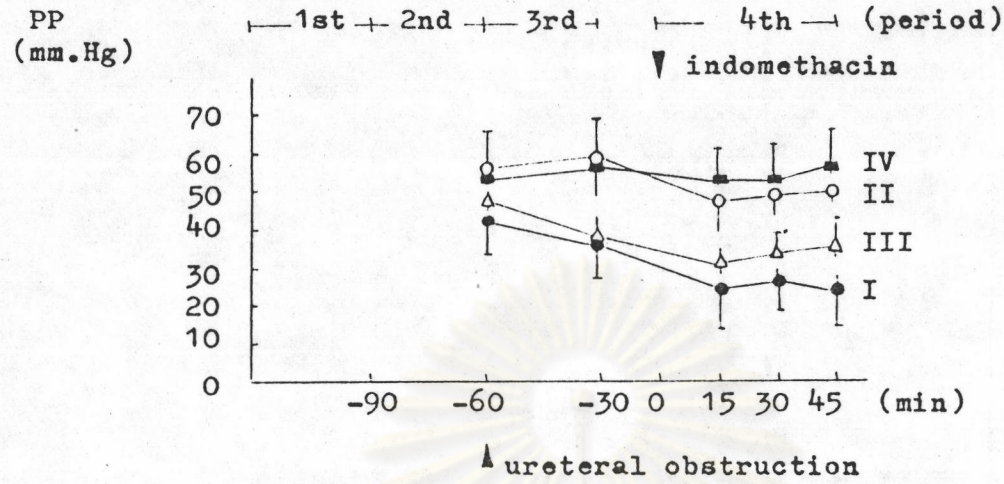

Figure 19 The changes in pelvic pressure (PP) before and after indomethacin injection in the dogs group I (plasma hyperosmolality), group II (plasma hypoosmolality), group III (furosemide) and group IV (ADH). The values are mean $\pm$ S.D.