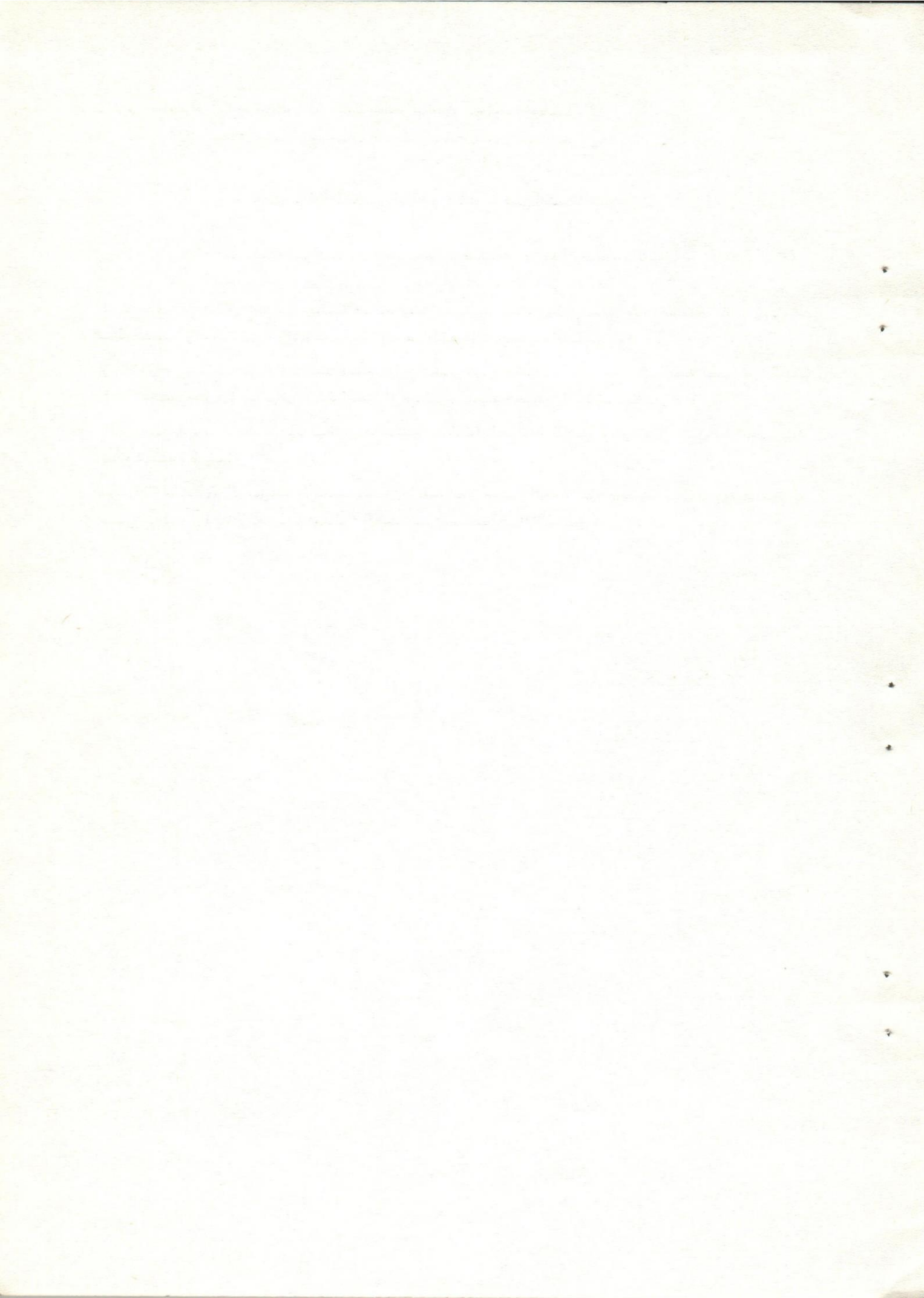


تسمى : الأمراض الباطنة والجراحة - كلية الطب البيطرى - جامعة أسيوط .  
رئيسى القسم : أ.د / سيد العمروسى ، أ.د / محمد المنزلى .

### الانسداد التجريبي للحالبان فى الكلاب

حمدى ابراهيم ، محمود طنطاوى ، عبد الرحيم عبد المطلب

- استخدم فى هذا البحث خمسة كلاب وتم ربط الحالبان بهدف دراسة التغيرات الاكلينيكية والدوائية والكيمائية وقد أظهر البحث ما يلى :-
- 1- انخفاض درجة حرارة الجسم ومعدل التنفس فى حين كان معدل النبض سريعا كما تم تسجيل الأعراض الاكلينيكية الأخرى بعد اجراء العملية .
  - 2- نقص كمية الهيموجلوبين ونسبة الهيماتوكريت وكذا العدد الكلى للكريات الدموية البيضاء مع شدة ظهور الأعراض .
  - 3- زيادة مستوى اليوريا والكرياتينين والفسفور غير العضوى والبوتاسيوم والصود يوم فى سيرم الدم بعد اجراء العملية حتى النفوق .



CLINICAL, HAEMATOLOGICAL AND BIOCHEMICAL  
STUDIES ON EXPERIMENTAL BILATERAL URETER OBSTRUCTION IN DOGS  
(With 4 Tables)

By

H. IBRAHIM, M. TANTAWY and A.A. MOTTELIB

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SUMMARY

Experimental closure of both ureters were conducted on five male dogs. Clinical, haematological and biochemical changes were recorded before and at regular intervals following the operation till death. It was noticed that body temperature and respiratory rates lowered while the pulse rate accelerated postoperative. Haemoglobin content, packed cell volume and total leucocytic count were decreased till time of death. Serum urea, creatinine, inorganic phosphorus, potassium and sodium were progressively increased post operation.

INTRODUCTION

Canine urinary calculi are fairly common and originate either in the kidneys (SMART and FLETCH, 1972) or the bladder (REWLINGS, 1969) or in male urethra (OSBORN, LOW, and FINCO, 1972). The calculi are expected to be lodged in any part of the urinary tract. The condition usually ends with various degree of uraemia depending on the degree and the site of obstruction. The course of the disease from the time of complete obstruction of both ureters to death is not sufficiently documented in dogs in the available literature.

The aim of the present work is to establish some important haematological and serum biochemical as well as recording the clinical signs of dogs with complete bilateral obstruction of the ureters. Our study is a trial to help the clinician in the field to make an early diagnosis and prognosis of such cases.

MATERIALS AND METHODS

A number of 5 adult male dogs were used in this study. Pre-operative obstruction period extended for 5 days through which animals were examined to be clinically healthy before operation.

The abdomen was surgically opened under complete aseptic condition and the both ureters were closed by ligation. After the surgical operation, each animal was kept in a separated metal box.

Body temperature, pulse and respiratory rates as well as the clinical signs appeared were noticed and recorded before and after operation. Citrated blood and whole blood samples were collected before operation and every 12 hours post-operation till death of the animal. The citrated blood samples were used for the determination of Hb, PCV and total leucocytic count values. The methods adopted were described by COLES (1974). The obtained clear serum was subjected to chemical analysis for urea (RAITASKA, 1970), Creatinine (FOLIN and WU, 1920); inorganic phosphorus (ANTONOVA and PLINOVA, 1971); sodium and potassium using flame photometer.

RESULTS AND DISCUSSION

The clinical signs of all experimental animals were rather similar 12 hours post-operation and afterwards. These included depression, anorexia and slight muscular tremors. Slight salivation was observed in all cases, while purulent lacrymation was only clear in three out of five. The mucous membrane become gradually dirty and congested. Animals were found recumbent with the advance of the disease.

A gradual decrease of body temperature (from 37.4-38.2 to 37.1-37.2°C) was evident in all animals 84 hours post-operation. This is followed by death in two cases while fluctuation of body temperature was observed in the rest animals till death.

Momentary accelerated respiration was shown 12 hours postoperation followed by a slow rate of its value with slight fluctuations in some cases till death.



The recorded clinical signs of our experimental animals were similar to that recorded by BODDIE (1970) and BLOOD and HENDERSON (1974) in cases of urolithiasis.

Screening the data of haemoglobin and packed cell volume (Table, 2) revealed lowering in their values from the time of obstruction till death. The changes in these blood parameters in the view of COLES (1974) were due to the destruction of red blood cells and retention of the fluids in the body. SMART and FLETCH (1972) found that when blood urea was greater than 150 mg/100 ml, a lowered blood haemoglobin could be met with. A slight leucocytopenia (Table, 2) was observed in all animals post-operatively till death. Leucocytopenia may indicate a blocking of cellular defense by the retained toxic waste products or damage to the myelopoietic function of the bone marrow.

It was clear from (Table, 3), that the values of blood urea nitrogen increased progressively till death. However, the most critical levels began after 60 hours post ligation. KIRK (1957), considered that serum urea level of 120 mg% or more indicated bilateral urolithiasis in dogs.

Serum creatinine had a similar behaviour like that of blood urea nitrogen. Elevation of serum creatinine above 6 mg% is usually an indication of a hopeless uraemia (FREUDIGER, 1973). The above values of blood urea nitrogen and creatinine may indicate that a diminished glomerular filtration took place. The elevated serum inorganic phosphorus after operation may support these findings which simulate the observations of SMART and FLETCH (1972) and DOXEY (1971).

Hyperkalaemia was also noticed and the highest levels were recorded with the beginning of the 4th post-operative day (Table, 4). This is of course a serious complication in renal failure and may be one of the principal causes that reflect its effect on the recorded pulse rate (Table, 1) with the resultant fatal heart failure that ensued afterwards.

#### REFERENCES

- Antonova, V.Y. and Plinova, P.H. (1971): *Laboratory methods in Veterinary Medicine*. 1st. Ed. Koloc, Moscow, USSR.
- Blood, O.C. and Handerson, J.A. (1974): "Veterinary Medicine", 4th. Ed. Ballier Tindall, London.
- Boddie, G.F. (1970): *Diagnostic methods in Veterinary Medicine*, 6th. Ed. T and A Constable Ltd. Edinburg, Great Britain.
- Coles, E.H. (1974): *Veterinary Clinical Pathology*. 2nd. Ed. Saunder's Philadelphia, U S A.
- Doxey, D.L. (1971): *Veterinary Clinical Pathology*. Verlag Ballier Tindall, London.
- Folin, O. and Wu, H. (1920): A system of blood analysis supplement. *J. Biol. Chem.*, 41, 367.
- Freudiger, U. (1973): Pathogenese und pathophysiologic der uraemie des hundes. *Tierarztl. Umschau.*, 28, 371.
- Kirk, P.W. (1957): Peritoneal lavage in uraemia in dogs. *J.A.V.M.A.* 131, 101.
- Osborn, C.A.; Low, D.A. and Finco, D.R. (1972): *Canine and feline urology*. Saunder's Philadelphia, U S A.
- Raitaska, U.E. (1970): *Method of zoo technical and biochemical analysis of rations, products of metabolism*. 1st Ed. Moscow, USSR.
- Rawlings, C.A. (1969): Experimental urinary bladder rupture and urinary fistula in dogs. *J.A.V.M.Ass.* 155, 123.
- Smart, M.E. and Fletch, S.M. (1972): Progressive renal failure in dog. *J.A.V.M.Ass.* 161, 1402.

TABLE (1)

Clinical picture in dogs with experimental ureter obstruction

a) Body temperature°C

Anim. No.	Pre-oper.	Post-operation in hours											
		12	24	36	48	60	72	84	96	108	120	132	144
1	38.2	38.6	37.9	37.1	37.0	37.1	37.2	37.1	Death	-	-	-	-
2	37.9	38.1	37.8	37.8	37.3	37.3	37.2	37.1	37.1	37.2	37.3	36.9	Death
3	37.8	38.0	37.8	37.3	37.1	37.3	37.2	37.1	38.1	37.3	38.1	37.1	Death
4	38.1	38.3	38.0	37.6	37.5	37.6	37.5	37.2	Death	-	-	-	-
5	38.0	38.3	38.0	37.9	37.7	37.5	37.3	37.1	37.2	37.1	37.0	36.8	Death
Mean	38.0	38.3	37.9	37.5	37.3	37.4	37.3	37.1	37.5	37.2	37.5	36.9	-

b) Pulse rate/minutes

1	80	90	92	96	82	84	110	120	Death	-	-	-	-
2	84	90	96	96	100	110	120	120	130	120	130	130	Death
3	96	100	110	120	110	120	120	133	130	140	140	140	Death
4	82	90	96	110	100	120	120	133	Death	-	-	-	-
5	80	96	96	100	100	104	109	110	120	120	130	36	Death
Mean	84.4	93.2	98.0	104.4	98.4	107.6	115.8	122.6	126.7	126.7	133.3	135.3	-

c) Respiratory rate/minutes

1	20	23	20	18	18	17	15	15	Death	-	-	-	-
2	22	24	20	18	20	17	23	18	19	20	18	17	Death
3	18	20	22	20	18	18	17	15	16	16	15	16	Death
4	18	20	21	20	18	18	16	16	Death	-	-	-	-
5	21	24	20	20	18	18	17	16	16	18	18	16	Death
Mean	19.8	22.2	20.0	19.2	18.4	17.6	17.6	16.0	17.0	18.0	17.0	16.3	-



TABLE (2)

Haematological changes in dogs with experimental ureter obstruction

a) Hb. (gm /100 ml)

Anim No.	Pre-oper.	Post-operation in hours											
		12	24	36	48	60	72	84	96	108	120	132	144
1	13	13	13	12	11	10	11	10	9	Death			
2	15	15	14	14	13	11	11	10	10	10	11	9	Death
3	12	13	13	12	11	10	10	11	9	9	10	8	Death
4	14	13	14	14	11	12	11	10	6	Death			
5	14	12	15	12	11	10	10	11	9	9	8	8	Death
Mean	13.6	13.2	13.4	12.8	11.4	10.6	10.0	10.4	9.0	9.3	9.7	8.3	

b) PCV (%)

1	36	36	36	33	33	34	35	30	28	Death			
2	38	38	39	40	35	32	30	30	32	30	30	26	Death
3	36	38	38	36	35	34	32	34	30	30	28	28	Death
4	40	42	40	40	36	36	35	34	32	Death			
5	40	40	40	36	36	35	34	34	32	32	30	30	Death
Mean	38.0	38.8	38.6	37.0	35.0	34.2	33.2	32.4	30.8	30.7	29.3	28.0	

c) W E Cs ( $10^3/100$  ml.)

1	6.6	6.5	6.1	6.1	5.9	5.9	5.8	5.3	5.1	Death			
2	8.3	8.1	7.3	7.1	7.1	6.9	6.8	6.1	6.3	6.1	5.9	5.6	Death
3	7.4	7.1	7.1	6.8	6.7	6.7	6.6	6.3	6.3	6.1	6.1	6.6	Death
4	5.9	5.6	5.3	5.1	6.1	5.1	5.1	5.2	5.1	Death			
5	8.9	8.3	7.4	6.9	6.3	6.3	6.1	5.9	6.1	6.2	5.8	5.2	Death
Mean	7.	7.1	6.6	6.4	6.4	6.2	6.1	5.8	5.8	6.1	5.9	5.7	

## BILATERAL URETER OBSTRUCTION IN DOGS

TABLE (3)

Serum urea, creatinine and phosphorous changes in dogs with ureter obstruction

a) Serum urea(mg/100 ml.)

Anim. No.	Pre-oper	Post-operation in hours											
		12	24	36	48	60	72	84	96	108	120	132	144
1	12.3	20.4	36.2	37.5	40.5	60.3	70.2	90.3	120.3	Death			
2	10.3	15.3	25.3	40.9	40.3	60.2	72.3	80.3	90.3	95.3	110	130	Death
3	13.4	15.3	20.3	40.3	40.2	60.3	60.0	72.3	80.2	85.0	90	120	Death
4	15.3	20.3	25.3	40.3	40.9	62.3	65.5	80.3	100.2	Death			
5	13.9	22.3	26.9	36.2	40.3	63.2	69.5	79.2	96.2	100.9	109.2	130	Death
Mean	13.0	18.7	26.8	39.0	40.4	61.3	67.4	80.5	97.4	95.7	103.1	126.7	

b) Serum creatinine(mg/100 ml.)

1	0.8	1.9	1.9	2.2	2.9	3.1	3.1	3.4	5.9	Death			
2	0.7	2.2	2.3	3.9	3.8	4.1	5.1	5.1	6.1	7.1	7.2	7.3	Death
3	1.1	1.2	2.9	2.3	3.2	3.2	4.2	4.2	5.1	5.2	6.1	6.7	Death
4	0.6	1.2	1.2	2.3	2.9	3.4	4.1	4.3	5.9	Death			
5	0.7	1.9	1.2	1.9	1.8	2.9	2.8	4.2	6.2	6.3	7.1	7.1	Death
Mean	0.8	1.7	1.9	2.5	2.9	3.3	3.9	4.2	5.8	6.2	6.8	7.0	

c) Serum phosphorous (mg/100 ml.)

1	5.3	6.1	6.1	5.9	6.2	6.3	7.1	6.2	7.1	Death			
2	4.3	5.1	5.1	5.3	6.1	6.2	6.1	7.1	6.1	5.9	6.1	7.2	Death
3	3.2	4.3	4.9	5.1	5.9	5.3	5.9	6.1	6.2	6.3	6.9	6.3	Death
4	5.9	6.1	6.2	5.9	6.1	6.3	6.8	6.9	6.9	Death			
5	5.3	5.9	6.1	6.9	7.1	6.9	7.1	6.2	7.1	7.1	7.2	7.9	Death
Mean	4.8	5.5	5.7	5.8	6.3	6.2	6.6	6.5	6.7	6.4	6.7	6.1	

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TABLE (4)

Serum sodium and potassium changes in dogs with experimental urter obstruction

## a) Serum potassium (m.Equ/l.)

Anim. No.	Pre-oper	Post-operation in hours											
		12	24	36	48	60	72	84	96	108	120	132	144
1	4.0	5.9	6.1	7.2	9.1	10.2	11.1	11.9	12.9	Death			
2	5.3	6.3	7.2	8.9	9.2	9.3	10.1	11.0	11.1	11.2	10.1	12.1	Death
3	3.9	4.3	4.9	8.1	8.1	7.2	5.9	7.8	8.9	11.1	11.1	11.3	Death
4	4.4	5.1	4.9	4.2	8.1	9.3	11.8	11.1	12.1	Death			
5	5.5	6.1	7.2	8.1	8.2	10.9	11.7	8.9	11.1	10.0	11.2	11.0	Death
Mean	4.6	5.5	6.1	7.3	8.5	9.4	10.0	10.0	11.0	10.8	10.8	11.5	

## b) Serum sodium (m. Equ/L.)

1	150	188.8	190	193.3	193.8	190	188.9	199	200	Death			
2	145	190.8	180	183	190	193	198.3	190	193	196	200	201	Death
3	133.9	150.9	160	168	173	170	173	180	190	200	200	200	Death
4	122.8	160	166	170	170	180	190	198	197	Death			
5	120.9	150	156	167	180	190	195	190	196	200	200	199	Death
Mean	134.5	168.1	159.2	176.3	181.4	184.6	189.0	191.4	195.2	195.2	200	200	