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RESEARCH ARTICLE

OBSERVATION ON RENAL FUNCTION IN BURN PATIENTS

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ABSTRACT

Introduction: "The kidneys perform a critical regulatory function within the cardiovascular system." Burn injury of the skin increase local vascular permeability and and exudates rich in protein and salt leaks from the plasma to produce burn oedema. Prevention, identification and treatment of actual renal failure that occurs when the insult exceeds the capacity of normal protective renal homeostatic response to shock, have to be considered on this background. Material and Methods: 62 cases of both sex and different age group coming to surgical emergency within 48 hours after sustaining burn injury and involoving more than 10 percent body surface in children and more than 15 percent in adults. Results: Investigations was done to evaluate renal function by following tests- PSP excretion on 1st, 3rd and 7 th post op day, level of blood urea, serum creatinine level, serum sodium level, serum potassium level.

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INTRODUCTION

"The kidneys perform a critical regulatory function within the cardiovascular system." Social imbalance and dowery system have increased the incidence of burn injury in our society. Hence, it is essential to sound our knowledge to provide better management for the sufferers of burn injury. Burn injury damages the skin apparently, but the clinical manifestations and death are the result of other complications like neurogenic shock, hypovolemic shock and septic shock which lead to vital system failure inviting death (Sevitt, 1957). Burn injury of the skin increase local vascular permeability and an exudates rich in protein and salt leaks from the plasma to produce burn oedema. The oligaemia is mainly responsible for the haemodynamic complex leading to burn shock with its reduction in the carriage of arterial oxygen. It's essential features are a fall in cardiac output, diminished venous return and central venous pressure, regional vasoconstriction, increased sympathetic activity, respiratory failure with hypoxia and acidosis. The kidneys are unique in their perfusion: weight ratio. The renal homeostatic response to injury and hypovolemic shock, therefore, evolves from its high perfusion: weight ratio, which maximizes the flexibility of response to altered perfusion (Lucas, 1982).

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Prevention, identification and treatment of actual renal failure that occurs when the insult exceeds the capacity of normal protective renal homeostatic response to shock, have to be considered on this background.

MATERIALS AND METHOD

62 cases of both sex and different age group coming to surgical emergency within 48 hours after sustaining burn injury and involoving more than 10 percent body surface in children and more than 15 percent in adults. Wallace's "Rule of nine" was used to determine the extent of body surface burned. 'Rule of nine' for estimating percentage of body surface involved in burns

Anatomic area	Percentage of body surface
Head	9
Right upper extremity	9
Left upper extremity	9
Right lower extremity	18
Left lower extremity	18
Anterior trunk	18
Posterior trunk	18
Neck	1

Investigation:

Following investigations were done as parameter of renal function-

1. Examination of urine on 1st, 3rd and 7th day

- Volume of urine passed in 24 hours after admission.
- Specific gravity of urine.
- Reaction and pressure of protein.
- Microscopic examination of urine
- Urine culture on 7th day.

2. Blood urea estimation on 1st, 3rd and 7th day.
3. Serum creatinine estimation on 1st, 3rd and 7th day.
4. Serum sodium estimation on 1st, 3rd and 7th day.
5. Serum potassium estimation on 1st, 3rd and 7th day.
6. Phenolsulphonphthalein excretion test on 1st, 3rd and 7th day in some cases.

- Quantity of urine passed in 24 hours
- Specific gravity of urine
- Reaction of urine
- Urine protein
- Microscopic examination of urine
- Urine culture

A sample of urine was collected either from the catheter or midstream with due precaution of no touch technique in a sterile test tube. It was inoculated by standard platinum loop in mack konki plate.

- Blood agar plate.
- By lactose broth.
  - Collection of blood samples
  - Estimation of blood urea (Nesseler's method) :
  - For test – 4.4 ml of isotonic sodium sulphate, 0.1 ml of Blood and 0.1 ml of urease solution was taken into centrifuge tube.
  - For blank – 4.5 ml of isotonic sodium sulphate, and 0.1 ml of urease solution was taken into a test tube.

Formula –

$$\text{Blood urea} = \frac{T - B}{S - B} \times 100 \text{ mg/100 cc}$$

(T= Test, B = Blank, S# Standard)

Estimation of serum creatinine (Jaffe reaction):

For Test –
For blank –
For standard –

Estimation of serum sodium and potassium (By flame photometer):

Potassium-
Sodium-

Working sodium and potassium standards:

Working standard	Stock sodium (ml)	Stock Potassium (ml)	Sodium Content (mEq/L)	Potassium Content (mEq/L)
A	5.5	2	1.1	0.02
B	6.0	3	1.2	0.03
C	6.5	4	1.3	0.04
D	7.0	5	1.4	0.05
E	7.5	6	1.5	0.06
F	8.0	6	1.6	0.07
G	8.5	8	1.7	0.08

Phenolsulfonphthalein (PSP) Excretion Test

1 cc of phenol red was taken in 2 cc dry and sterilized syringe and injected intravenously. Urine was collected just after 15 minutes and in some cases collection was made in between 15 to 30 minutes as it was impossible to collect urine just after 15 minutes in the working condition of ward and specially from the female patients who were not catheterised.

Observations

Renal function tests in cases of burn were done on 1st, 3rd and 7th day in the total number of 62 cases.

Age group in Years.	Male		Female	
	No.	%	No.	%
1 – 10	2	3.23	2	3.23
11 – 20	3	4.84	10	16.13
21 – 30	13	20.97	14	22.57
31 – 40	2	3.23	6	9.67
41 – 50	2	3.23	3	4.84
51 – 60	1	1.61	2	3.23
Above 60	1	1.61	1	1.61
Total	24	38.72	38	61.28

Showing aetiological factors in the present study

Aetiological Factors	No. of cases	Percentage
Flame	51	82.26
Scald	6	9.68
Electric	2	3.22
Chemical	3	4.84

Showing interval between the injury and hospitalization

Interval (in hours)	No. of cases	Percentage
0 – 6	33	53.23
7 – 12	12	19.36
13 – 16	7	11.29
17 – 24	5	8.06
25 – 48	3	4.84
48 and more	2	3.22

Showing extent of burn

Extent of burn (%)	No. of cases	Percentage
Below 15	3	4.84
16 – 30	18	29.03
31 – 45	14	22.58
46 – 60	13	20.97
61 – 75	8	12.90
76 and above	6	9.68

Majority of cases (29.03%) sustained 15 – 30 per cent burn injury.

Showing urinary output in ml/24 hours on 1st, 3rd and 7th day

Urinary output in ml/24 hours	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Oliguria (below 300 ml)	9	14.51	5	8.33	-	-
Satisfactory (300 – 100 ml)	48	77.42	27	45.00	6	13.33
Above 1000 ml	5	8.07	28	46.67	39	86.67
	62	100	60	100	45	100

Urine output more than 1000 ml/24 hours was recorded in 8.07 per cent on 1st day, 46.67 per cent on 3rd day, and 86.67 per cent on 7th day.

Showing specific gravity of urine on 1st, 3rd and 7th day

Specific gravity	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
10.10 – 10.20	17	27.41	23	38.33	25	55.56
10.21 – 10.30	30	48.39	27	45.00	15	33.33
10.31 and more	15	24.20	10	16.67	5	11.11
Total	62	100	60	100	45	100

With increase in urinary output, there was a gradual decrease in the specific gravity of urine.

Showing urinary reaction and protein in the present study

Urinary reaction & presence of protein	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Acidic	54	87.09	52	86.67	38	84.44
Alkaline	8	12.91	8	13.33	7	15.56
Presence of protein	11	17.74	20	33.33	12	26.67

Acidic urine was found in 87.09 per cent, 86.67 per cent and 84.44 per cent on 1st, 3rd and 7th day respectively.

Showing type of pathogen in urine culture

Type of pathogen	No. of cases	Percentage
E.coli	20	64.52
Proteus	3	9.68
Klebsiella	3	9.68
Pseudomonas	1	3.22
Staphylococcus	4	12.90
Streptococcus	-	-
Total	31	100

Urine culture reports showed E.coli in 64.52 per cent of cases.

Showing level of PSP in urine 15 minutes after administration on 1st, 3rd and 7th day

Level of PSP excretion	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Low (below 28%)	29	96.67	25	83.33	21	75.00
Normal (above 28%)	1	3.33	5	16.67	7	25.00
Total	30	100	30	100	28	100

PSP excretion test was done only in 30 cases on 1st and in 28 of them on the 7th day.

Showing relation of PSP excretion with extent of burn on 1st day

Extent of burn (%)	Low (below 28%)		Normal (above 28%)	
	No.	%	No.	%
Below 15	2	6.67	1	3.33
16 – 30	12	40.00	-	-
31 – 45	7	23.33	-	-
46 – 60	8	26.67	-	-
61 – 75	-	-	-	-
75 and more	-	-	-	-
Total	29	96.67	1	3.33

Normal (above 28%) PSP excretion was observed in 3.33 per cent cases, on first day.

Showing the relation of PSP excretion with extent of burn on 3rd day

Extent of burn (%)	Low (below 28%)		Normal (above 28%)	
	No.	%	No.	%
Below 15	1	3.33	2	6.67
16 – 30	10	33.33	2	6.67
31 – 45	6	20.00	1	3.33
46 – 60	8	36.67	-	-
61 – 75	-	-	-	-
75 and more	-	-	-	-
Total	25	88.33	5	16.67

Only 13.34 per cent of cases with less than 30 per cent burn showed normal PSP excretion on 3rd day.

Showing relation of psp excretion with extent of burn on 7th day in 28 cases

Extent of burn (%)	Low (below 28%)		Normal (above 28%)	
	No.	%	No.	%
Below 15	-	-	3	10.71
16 – 30	10	35.71	2	7.14
31 – 45	6	21.44	1	3.57
46 – 60	5	17.86	1	3.57
61 – 75	-	-	-	-
75 and more	-	-	-	-
Total	21	75.01	7	24.99

Normal Psp excretion was recorded in 17.85 per cent cases with less than 30 per cent burn and 7.14 per cent cases with 31 – 60 per cent burn.

Showing level of blood urea on 1st, 3rd, and 7th day

Level of blood urea in mg/100cc	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Below 40	40	64.51	38	63.34	37	82.22
41 – 80	13	20.97	11	18.33	5	11.11
Above 80	9	14.5	11	18.33	3	6.67
Total	62	100	60	100	45	100

Normal blood urea level was found in a 64.51 per cent cases on 1st day, 63.34 per cent cases on 3rd day and 82.22 per cent cases on 7th day.

Showing relation of blood urea level with extent of burn on 7th day in 45 cases

Extent of burn (%)	Below 40 mg/100cc		41 – 80 mg/100cc.		Above 80 mg/100cc.	
	No.	%	No.	%	No.	%
Below 15	3	6.67	-	-	-	-
16 – 30	16	35.55	2	4.44	-	-
31 – 45	10	22.22	3	6.67	1	2.23
46 – 60	8	17.78	-	-	-	-
61 – 75	-	-	-	-	-	-
Above 75	-	-	-	-	-	-
Total	37	82.22	5	11.11	3	6.67

13.34 per cent cases below 45% burn showed high level of blood urea and 4.44 per cent cases above 45% burn showed high level of blood urea on 7th day.

Showing level of serum creatinine on 1st, 3rd, and 7th day in the present study

Level of serum creatinine (mg/100 cc.)	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Below 1.5	43	69.35	41	68.33	30	66.67
1.6 – 3	16	25.81	11	18.33	12	26.67
Above 3	3	4.84	8	13.34	3	6.66
Total	62	100	60	100	45	100

Serum creatinine was below 1.5 mg/100cc in 69.35 per cent on 1st day, 68.33 per cent on 3rd day and 66.67 per cent on 7th day. High serum creatinine level was found on 7th day in 6.66 per cent.

In 8.06 per cent cases with less than 45% burn there was raised serum creatinine and 22.59 per cent cases with more than 45% burn showed high level of serum creatinine on 1st day.

Showing relation of serum creatinine level with extent of burn on 1st day

Extent of burn (%)	Below 1.5 mg/100cc		1.6 - 3 mg/100cc.		Above 3 mg/100cc.	
	No.	%	No.	%	No.	%
Below 15	3	4.84	-	-	-	-
16 – 30	15	24.19	3	4.84	-	-
31 – 45	12	19.35	2	3.22	-	-
46 – 60	9	14.52	4	6.46	-	-
61 – 75	3	4.84	4	6.46	1	1.61
Above 75	1	1.61	3	4.84	2	3.22
Total	43	69.35	16	25.82	3	4.83

Showing relation of serum creatinine level with extent of burn on 3rd day

Extent of burn (%)	Below 1.5 mg/100cc		1.6 - 3 mg/100cc.		Above 3 mg/100cc.	
	No.	%	No.	%	No.	%
Below 15	3	5.00	-	-	-	-
16 – 30	15	25.00	-	-	-	-
31 – 45	12	20.00	2	3.33	-	-
46 – 60	8	13.33	2	6.67	1	1.67
61 – 75	3	5.00	-	-	4	6.67
Above 75	-	-	2	3.33	3	5.00
Total	41	68.33	11	18.33	8	13.43

Raised serum creatinine was observed in 8.33 per cent cases below 45 per cent burn.

Showing relation of serum creatinine level with extent of burn on 7th day

Extent of burn (%)	Below 1.5 mg/100cc		1.6 - 3 mg/100cc.		Above 3 mg/100cc.	
	No.	%	No.	%	No.	%
Below 15	3	6.67	-	-	-	-
16 – 30	12	26.67	5	11.11	1	2.22
31 – 45	9	20.00	4	8.89	1	2.22
46 – 60	6	13.33	3	6.67	1	2.22
61 – 75	-	-	-	-	-	-
Above 75	-	-	-	-	-	-
Total	30	66.67	12	26.67	3	6.66

Serum creatinine was raised in 24.44 per cent cases below 45% burn, and 8.89 per cent cases above 45 per cent burn.

Showing serum sodium level on 1st, 3rd and 7th day

Level of serum sodium in mEq/L	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Low (below 136)	42	67.74	29	48.33	24	53.33
Normal(136 – 149)	20	32.26	28	46.66	21	46.67
High (above 149)	-	-	3	5.01	-	-
Total	62	100	60	100	45	100

Hypernatraemia was noted in 5.01 per cent on 3rd day.

Showing relation of serum sodium level with extent of burn on 1st day

Extent of burn (%)	Low (below 136mEq/L)		Normal (136 – 149mEq/L)		High (above 149mEq/L)	
	No.	%	No.	%	No.	%
Below 15	3	4.84	-	-	-	-
16 – 30	8	12.90	10	16.13	-	-
31 – 45	6	9.68	8	12.90	-	-
46 – 60	11	17.75	2	3.22	-	-
61 – 75	8	12.90	-	-	-	-
Above 75	6	9.68	-	-	-	-
Total	42	67.75	20	32.25	-	-

Normal serum sodium level was observed in 29.03 per cent cases below 45% burn while in 3.22 per cent cases above 45 % burn.

Showing relation of serum sodium level with extent of burn on 3rd day

Extent of burn (%)	Low (below 136mEq/L)		Normal (136 – 149mEq/L)		High (above 149mEq/L)	
	No.	%	No.	%	No.	%
Below 15	-	-	3	5.00	-	-
16 – 30	10	16.67	8	13.33	-	-
31 – 45	10	16.67	4	6.67	-	-
46 – 60	3	5.00	8	13.33	2	3.33
61 – 75	4	6.67	2	3.33	1	1.67
Above 75	2	3.33	3	5.00	-	-
Total	29	48.34	28	46.66	3	5.00

Hypernatraemia was present only in 50% cases above 45 per cent burn on 3rd day.

Showing relation of serum sodium level with extent of burn on 7th day

Extent of burn (%)	Low (below 136mEq/L)		Normal (136 – 149mEq/L)		High (above 149mEq/L)	
	No.	%	No.	%	No.	%
Below 15	-	-	3	6.67	-	-
16 – 30	6	13.33	12	26.67	-	-
31 – 45	10	22.22	4	8.89	-	-
46 – 60	8	17.78	2	4.44	-	-
61 – 75	-	-	-	-	-	-
Above 75	-	-	-	-	-	-
Total	24	53.33	21	46.67	-	-

Showing level of serum potassium on 1st, 3rd and 7th day

Level of serum potassium in mEq/L	1st day		3rd day		7th day	
	No.	%	No.	%	No.	%
Low (below 3.8)	20	32.26	11	18.33	7	15.56
Normal(3.8 – 5.2)	32	51.61	44	73.33	35	77.78
High (about 5.2)	10	16.13	5	8.34	3	6.66
Total	62	100	60	100	45	100

Hyperpotassium was observed in 16.13 per cent cases on 1st day, 8.34 per cent on 3rd day and 6.66 per cent on 7th day.

Showing relation of serum potassium level with extent of burn on 1st day

Extent of burn (%)	Low (below 3.8 mEq/L)		Normal (3.8 – 5.2 mEq/L)		High (above 5.2 mEq/L)	
	No.	%	No.	%	No.	%
Below 15	1	1.62	2	3.22	-	-
16 – 30	8	12.90	9	14.52	1	1.62
31 – 45	6	9.68	6	9.68	2	3.22
46 – 60	5	8.06	7	11.29	1	1.62
61 – 75	-	-	6	9.68	2	3.22
Above 75	-	-	2	3.22	4	6.45
Total	20	32.26	32	51.61	10	16.13

Hyperpotassaemia was found in 4.84 per cent cases below 45 per cent burn and in 11.29 cases above 45per cent burn.

Showing relation of serum potassium level with extent of burn on 3rd day

Extent of burn (%)	Low (below 3.8 mEq/L)		Normal (3.8 – 5.2 mEq/L)		High (above 5.2 mEq/L)	
	No.	%	No.	%	No.	%
Below 15	-	-	3	5.00	-	-
16 – 30	5	8.32	13	21.67	-	-
31 – 45	4	6.67	10	16.67	-	-
46 – 60	2	3.33	9	15.00	-	-
61 – 75	-	-	6	10.00	1	1.67
Above 75	-	-	3	5.00	4	6.67
Total	11	18.32	44	73.34	5	8.34

Showing relation of serum potassium level with extent of burn on 7th day

Extent of burn (%)	Low (below 3.8 mEq/L)		Normal (3.8 – 5.2 mEq/L)		High (above 5.2 mEq/L)	
	No.	%	No.	%	No.	%
Below 15	-	-	3	6.67	-	-
16 – 30	-	-	18	40.00	-	-
31 – 45	3	6.67	11	24.44	-	-
46 – 60	4	8.88	3	6.67	3	6.67
61 – 75	-	-	-	-	-	-
Above 75	-	-	-	-	-	-
Total	7	15.55	35	77.78	3	6.67

Hyperpotassaemia was present in 6.67 per cent cases above 45 per cent burn on 7th day.

Showing causes of death within 7 days.

Causes	No. of cases	Percentage
Shock	3	4.84
Renal failure	5	8.06
Heart failure	1	1.61
Respiratory failure	1	1.61
Tetanus	1	1.61
Septicemia	3	4.34
Non – conclusive	1	1.61
Other	2	3.22
Total	17	27.42

Renal failure was found responsible for death in 8.06 per cent of burn cases. Shock and septicemia was 4.84 cases equally.

Biochemical parameters of blood and 15 minute PSP excretion in control group

Name	Age & sex	Blood urea In mg/100cc	S.creatininie in mg/100cc	Serum sod. In mEq/L.	Serum Pots. In mEq/L	15min PSP excretion (%)
Y.R.	20,M	22	0.8	140	4.2	36.4
B.Y.	32,M	25	1.2	138	3.9	32.5
C.S.	24,F	19	0.9	137	4.0	35.3
V.M.	17,M	16	0.4	141	4.1	38.6
A.K.	52,M	34	1.4	142	4.6	34.2
L.P.	63,M	36	0.5	139	4.8	31.5
M.S.	19,F	23	0.7	135	3.8	37.2
J.P.	38,M	36	0.5	143	4.3	40.4
B.R.	9,M	12	0.3	134	4.4	43.0
R.D.	45,F	27	1.0	136	5.0	29.0

Level of blood urea, serum creatinine, serum sodium, serum potassium and 15 minutes PSP excretion in the control group

Investigation	Range	Average
Blood urea (mg/100 cc)	12 – 26	24.00
Serum creatinine (mg/100 cc)	0.3 – 1.5	0.87
Serum sodium (mEq/L)	134 – 145	138.5
Serum potassium (mEq/L)	3.8 – 5.0	4.3
PSP excretion (percentage)	29 – 53	35.81

DISCUSSION

While analyzing the aetiological factors in the present series, 82.26 per cent injuries were due to open flame, 9.68 per cent cases due to scald, 4.84 per cent due to chemical and 3.22 per cent cases due to electric. Blocker et al(1960) in a statistical analysis of 1000 burnt cases, observed that 78.3 per cent cases were due to flame and flash and 12 per cent were scald injury. Campbell et al (1969) and pushkar (1983) observed major electric burn in 2- 3 per cent cases. Majority of the patients (72.59%) attended the hospital within 12 hours of injury. Rest of the patients reported after 12 hours of the injury. 29.03 per cent cases had 15 – 30 per cent burn, 22.52 per cent cases were of 31 – 45 per cent burn, 20.97 per cent cases were involved with 46 – 60 per cent burn, 12.90 per cent cases were having 61 – 75 per cent burn and only 4.84 per cent cases had below 15 per cent burn. In the present study, extent of burn observed served the same purpose as reported by the above authors. Measurement of 24 hours urinary output has shown that oliguria was present in 14.51 per cent of cases, on 1st day, 8.33 per cent cases on 3rd and in no case on 7th day. Urine output more than 1000 ml was recorded in 8.07 per cent cases on 1st day, 46.67 per cent cases on 3rd day and 86.67 per cent on 7th day. Bull et al (1954) observed urine output between 500 – 1000 ml in 1st 48 hours in cases of larger burn even when adequate colloidal and non – colloidal fluid therapy was given. Sevitt (1965) reported reduction in urine flow in early post burn period even after adequate transfusion. Agrawal (1973) noticed dieresis from 6 to 12 days post burn period. The finding of the present series is comparable to the above workers. Specific gravity of the urine between 10.21 to 10.30 was present in 48.93 per cent of cases on 1st day,45 per cent cases on 3rd day and 33 per cent of cases on 7th day. Specific gravity more than 10.31 was recorded in 24.20 per cent of cases on 1st day, 16.67 per cent on 3rd day and 11.11 per cent of cases on 7th day in the present series. Acidic urine was found in 87.09 per cent cases on 1st day, 86.67 per cent on 3rd day and 84.44 per cent of cases on 7th day. Presence of protein was noted in 17.74 per cent, 33.33 per cent and 26.67 per cent of cases on 1st, 3rd and 7th day respectively. R.B.C. in urine were present in 14.51 per cent of cases on 1st day, 11.67 per cent on 3rd day and 8.89 per cent of cases on 7th day. Sevitt (1965) observed temporary reversible function disorder with fall in urine output, reduced glomerular filtration rate probably from vasoconstriction, moderate rise of plasma urea and creatinine. He further noted that persistant functional disorder in two forms:-

(i) Oliguric form of renal failure caused by insufficient balance between decrease in water filtered and reduction in tubular reabsorption.
(ii) Non oliguric form of renal failure in which the relatively normal urine output was described owing to a decreased tubular absorption which compensates in water excretion for the reduced glomerural filtration rate.

Acidic urine found in majority of cases may be due to liberation of various types of acidic in the body, some of which excreted in urine making it acidic. The presence of R.B.C., pus cells, casts show definite tissue distruction leading to their excretion in urine. However these microscopic findings are of limited value to evaluate kidney pathology. In 68.89 per cent cases bacterial growth was observed on urine culture on 7th day. Among the types of pathogen, E. coli was isolated in 64.52 per cent of cases, staphylococcus in 12.90 per cent of cases and proteus and klebsiella in 9.68 per cent cases each. Lapides and bobbit (1958) reported that PSP excretion test was found more sensitive, since there might not be obvious alteration in blood urea and serum creatinine level until there was loss of 50 per cent excretory function of kidney. Stoven (1964) expressed his own views that plasma creatinine level and 15 minutes PSP excretion in urine were sufficient to give accurate estimation of kidney functions. It means where there

is reduction of renal blood flow, there is low excretion of PSP. On nalysis of the blood urea level in the present series, normal blood urea level was found in 64.51 per cent on 1st day, 63.34 per cent on 3rd day and 22.22 per cent of cases on 7th day. blood urea level between 41 – 80 mg/100 ml was recorded in 20.97 per cent on 1st day, 18.33 per cent on 3rd day and 11.11 per cent of cases on 7th day. High level of blood urea (above 80 mg/100 ml) was found in 14.52 per cent cases on 7th day. They belived that is was due to excessive urea production rather than diminished renal function. Normal values were obtained after the 3rd day with occurrence of azotaemia, ao the level of blood urea increased for the initial few days, and then returned to normal in most of the patients. They also found high blood urea level ranged between 80 - 120 mg/100 ml in majority of their patients. On 3rd day, raised serum creatinine level was observed in 8.33 per cent of cases with more than 45 per cent burn. They further viewed that serum cretinine level along with urinary output measurement could give the better information about renal function in the early stage of burn. Cameron (1951) stated that endogenous creatinine was neither reasbsorbed nor secreted by the tubules in the cases of normal human beings. Within first one or two days, glomerular rate rose and fell again.

1. 62 cases of burn injury patients were taken for the study in the present series to evaluate their renal functions.
2. The age group commonly involved was from 21 to 30 years. 20.97 per cent of cases were males and 22.57 per cent were females.
3. Flame was the causative factor in most (82.26%) of the cases.
4. Majority of the cases (53.23%) reported for hospitalization within 6 hours of injury.
5. Maximum number of cases (29.03%) sustained burn injury over 15 to 30 per cent of burn.
6. Urinary output more than 1000 ml was recorded in 8.07 per cent cases on 1st day, 43.67 per cent on 3rd day and in 86.67 per cent cases on 7th day.
7. With the increase of urinary output, there was a gradual decrease in specific gravity of urine.
8. Acidic urine was found in most of the the cases (87.09 per cent, 86.67 per cent and 84.44 per cent on 1st, 3rd and 7th day respectively).
9. On 1st day, erythrocytes were present in urine in 14.51 per cent of cases.
10. In 68.89 per cent of cases, growth was present on urine culture collected on 7th day. E. coli was isolated in most of the cases (64.52%)
11. 15 minute PSP excretion was found initially low in majority of cases (96.67 per cent on 1st day, 83.33 per cent on 3rd day and 75 per cent cases on 7th day). Normal PSP excretion was observed in 3.33 per cent cases on 1st day having less than 30 per cent burn. 13.34 per cent of cases with less than 30 per cent burn showed normal PSP excretion on 3rd day. Normal PSP excretion was recorded in 17.85 per cent cases with less than 30 per cent burn, and 7.14 per cent cases with more than 30 per cent burn on 7th day.
12. Raised blood urea in 35.49 per cent and serum creatinine in 30.65 per cent cases were preserved ply with more than 15 per cent burn on 1st day.
13. Renal failure was found responsible for death in 8.06 per cent of cases.

Conclusion

Consider the overall results of the present series, it can be concluded that failure of renal function is one of the important cause of mortality in burn cases, specially of larger burns. Beside glomerular function deteroration, there is depression of tubular function in the very early stage after burn which can be saved by proper management of shock and infections. Early diagnosis of renal dysfunction can be made by PSP excretion test which is very simple, sensitive and significant and can be done even as a bed side procedure.

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