BURNS SHOCK—A SIMPLE CLINICAL GUIDE FOR ITS MANAGEMENT IN A COMMUNITY HOSPITAL

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Understanding of the sequal changes following burn and adequate replacement of fluid, are the two most important considerations in the prevention and management of burn shock.

Various regimes (Blocker 1940; Evans et al, 1952 ; Feller and Dewesse, 1962 ; Haynes B.W., 1960) are available as guide to fluid replacement. However they differ widely in the ratio of colloid to crystalloid volume and in the time intervals recommended for the effective administration (Baxter, 1973).

Modern methodology has enabled us to have a look at the serial changes occurring in the body following burns. We can monitor changes not only in R.B.C., plasma volume but also in the interstitial fluid volume these days.

But in a large developing country like ours it is difficult to get sophisticated equipment to monitor various complex biochemical changes i.e. PO_2. or blood volume etc. therefore various clinical parameters are enumerated for guidance.

Reception

The patient is received in the casualty service and assessment of the site and percentages of burn alongwith its depth is made. He is placed in one of the three catagories as far as adults are concerned ;

(*a*) *Critical Burns :*

1. Partial thickness burns of more than critical level of burn shock as per age (Table 1).
2. Burns complicated by respiratory tract involvement.
3. Full thickness Burns of face, hands or more than 10-15 percent burns.
4. Burns complicated by fractures or other major soft tisse injuries
5. Electric or deep chemical burns.

(*b*) *Moderate Burns :*

1. Partial thickness burn between 15-20 percent.
2. Full thickness burns between 5-10 percent.

(*c*) *Minor Burns :*

1. Partial thickness burn less than 10%.
2. Full thickness less than 2%.

Table 1

Critical Level of Burn

Sl.No.	Age in Years	Percentage of Burn
1.	0—1	5
2.	1—5	5—8
3.	5—8	9—10
4.	8—15	10—15
5.	15—18	15—18
6.	20	20—more

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Table 2

Adequate output of urine under Stress

Sl. No.	Age in Years	Output/n cc/hour
1.	0—1	5—10
2.	1—5	10—15
3.	5—8	15—20
4.	8—15	20—30
5.	15—20	30—40
6.	20	40—50

Management

All the critical burns are placed in the Intensive Care Unit while moderate degree burns are treated in the regular Burn Ward and minor burns are managed as out patient cases.

First Aid

1. Cover the patient with sterile or clean sheet.
2. Do not apply antiseptic cream or Jelly or other colouring agents.
3. Keep the patient flat with some warming.
4. Morphia to counteract pain.
5. Shift the patient to Intensive Care.
6. Weigh the patient during the shifting process.

Priorities

The patient is placed comfortably on the bed and covered with sterile sheet.

Venesection is done preferably in right upper extremity (Basilic or anticubital vein). 80 cm. long polythene catheter is guided nearer the junction of superior veva cava and Right atrium under fluroscopic control. The catheter is connected to three way water monometer. This provides easy access to the circulation and CVT can be monitored easily from same venesection. (Normal 8-15 cms of water. Thus repeated blood samples can also be obtained.

Fluids

We strongly recommend crystalloids (ringer lactate) as the initial fluid of choice for first 24-36 hours. In the initial phase of burn shock, colloids as compared to cryastalloids, after their escape from the circulation produce further, more odema because of their greater osmotic pressure.

Soda bicarb is added in the fractions of 100 c.c. each time depending upon the reaction of urine. Urine is to be kept alkaline. urinary output is measured by keeping an indwelling catheter.

The circulating fluid volume should reach to normal values in 36 hours. About 350 c.c. of blood is transfused for every 10% deep burn.

Calculation and rationing of fluids

We follow the following formula ;

(3 c.c. Ringer Lactate X Body weight X percentage of Burns) + Daily requirement as glucose in water.

$\frac{1}{2}$ of the total quantity is transfused in first 8 hours from the time of burn and then the remaining in the next hours.

But the rate of infusion at a particulrr time depends mainly on CVP, urinary output and its specific gravity and general condition of the patient.

Fluid Calculations for 24-48 hours

(1.5 c.c. of infusion fluid X percentage of burn X body Wt)$\pm$ the previous day balance.

Investigations

1. Soon after the admission, Blood samples are withdrawn for following investigations ;

1. *Blood :*
   (*a*) Hb%, PCV.
   (*b*) Blood urea.
   (*c*) Electrolytes if possible.
2. *Urine is collected for :*
   (*a*) Sp. gr.
   (*b*) pH.
   (*c*) Chlorides/24 hours.
   (*d*) Microscopic examination for RBC or Haematuria.
3. Swabs are obtained for culture from the various regions of the vody.

Monitoring of the patient

The patient is monitored hourly intervals ;

1. Sensorium, Thirst, Nausea, Bowel sounds, Restlessness.
2. Urine output/hr. specific gravity. reaction.
3. Central venous pressure (CVP).
4. Serum electrolytes every 6 hourly or earlier if required.
5. Urinary chlorides/24 hours excretion.

First 12-24 hours

The expected and desired response in the general condition of the patient in first 12-24 hours in seen. Thirst disappears, patient becomes calm and quet, mental state becomes clear. Pulse rate slows down and B.P. is on the verge of stabilization. C.V.P. comes to stay between 7-10 cms. of water.

The patients with larger degree of burns i.e. above 45-50 percent may still be in unstable haemo-dynamics and may take additional 12-16 hours to stabilise.

Efforts are made in the direction of maintain following minimal optimal levels during first 12-24 hours ;

Sensorium — clear
Pulse — Settling down
B. P. — Normal or slightly higher
Urine — Houly output (Table II)
— Specific gravity 1010-1030
— pH Alkaline.

The kidney, the heart, the circulation are supported depending upon the observed pattern of course, overall clinical situation has to be analysed and the entire wisdom of the treating physician is put to a challenge.

Use of Digitalis, Diuretics, other special drugs like insulin etc. may be warranted as situation arises.

24-36 Hours

During the period gradually colloids are added in the transfusion in the form of plasma or blood or Dextravan. We prefer fresh blood if it has to be given as our cases have poorer haematocrit to start with. We may require even 350-700 c.c. of Blood depending on the volume of the burn. Amount of blood requird is guided by haematocrit valves.

36-40 Hours

During this period there is loss of fluid from the body as evaporation increases. Oral or I/V glucose in water is given in sufficient amount to maintain normal serum sodium concentration (135-145 mg. eq/L) oral fluids (100 c.c. water has a pinch of salt, pinch of $NaHc_0$, one teaspoonful of sugar..a lemon for taste) is given. If there is no ilius, potassium replacement is often between 70-150 me/L/24 hours to maintain the normal concentration in the serum.

Patient is dressed at this stage to minimise evaporation loss. Generally the CVP stabilises itself between 8-15 cms of water. Urinary output is between 40-60 c.c. of hour with normal specific gravity and alkalive pH. Patient is calm and mentally clear.

48 Hours and more

During this period the phase of diuresis sets in Body weight goes down. Packed cell

transfusion or whole blood transfusion is given if anaemia becomes profound and progressive. Drip is only suppertive to supplement fluid loss.

Fruit juices, vitamins and minerals and adequate calories replacement is started orally gradually over the period of next 2-3 days. Banana provides calories initially. A good size banana which is easily available in our country provides between 70-90 cal.l. The elderly patient especially above 50% Burn require careful monitoring of the heart because of myocardial depression and slow response to I/V fluid administration. Nitrogen balance by adding high protein diet will allow early debridement of dead skin in deep burns. Serial excision of deep burnt area as early as possible with all aseptic precautions is recognised procedure all over the world. And if need be coverage with mesh skin graft will not only prevent death due to toxaemia of infection but will prevent see page of plasma and infection to set in.

Discussion

The management of the burn shock has undergone tremendous change because of increased laboratory help.

There has been much discussion as to the proper and correct choice of the fluid. The quantity of fluid to be given in early phase is guided by the body weight and surface area involved.

The younger children often require more fluids than the standard formulae. The Lund and Browder modification (1944) of the Berkow table (1924) is used for determining surface.

There is a general belief that deep burns require more colloids and vice varsa. Blood as colloid and Ringer Lactate as cryotalloid are our choice as fluids.

The rate of infusion depends upon the general condition, CVP and urinary output of the patient. Efforts are made to have minimal optimal urinary output.

Elderly patient especially above 50 percent burn require careful monitoring of the circulation because of myocardial depression and slow response to infusion. A close watch on CVP is warranted.

Summary

Burn a common problem in day to day life has been dealt covering the physiopathological aspects. The treatment is based on simple clinical parameters which can serve as an useful guide even in a small community hospitals.

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