

BURN BLISTER FLUID IMMUNOGLOBULINS

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Ever since Prometheus brought fire to man severe burns have been a scourge, international in distribution, affecting all species of life, all races, all ages, burns constitute one of the most destructive forces that have beset mankind from the earliest times. Burn problem is a major health hazard not only in India but abroad also (Ganguli et al, 1976). In past death of burnt patients occurred due to fluid and electrolyte disturbances but now a days with the better concepts of fluid and electrolyte maintenance, the infection is becoming the major cause of death in these patients as they have heightened susceptibility to infections (Varder et al, 1961; Leidberg et al, 1964). Humoral immune defence mechanism in burnt patients, is the least studied (Howard, 1979) but one of the important host defence mechanisms as antibiotics can not eliminate infections without concomitant adequate host response (Walker et al, 1964; Weinstein et al, 1968). Recently a combined studies by various disciplines have been made to study the immunological consequences of thermal burns and interesting changes in both cellular and humoral status have been noted.

In the present study the major immunoglobulin levels were measured in the thermal

burn patients who were having blisters at the time of their admissions. With simultaneous same day's serum immunoglobulin levels, to establish a correlation between serum/blister fluid immunoglobulins in burnt patients.

MATERIAL AND METHODS :

Twenty adult patients of both sexes admitted with blister on their burnt surface, in the emergency ward of S. R. N. Hospital, Allahabad in 1983 were taken for study.

These patients were assessed for their levels of shock and the burnt surface areas were calculated with the help of Lund and Browder's chart. They were resuscitated with Ringers lactate, volume of which was calculated by Brooke Army Hospital formula.

Three ml. of blister fluid and 5 ml. of blood were taken in dry syringes simultaneously in first 48 hours of post burn period. The serum of blood was separated on centrifuge machine at 5000 rpm. for 20 minutes. The blister fluid and sera both were kept at 4°C in fridge after adding 1 crystal of sodium azide to preserve the samples.

The quantitative immunological assay of immunoglobulins G, M and A were performed by means single radial immuno-diffusion

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technique (Mancini et al, 1965) using tripartite immuno-diffusion plates manufactured by M/S Hoechst Pharmaceuticals Ltd., Bombay. These plates contained agar, gel in which H-specific antiserum to respective immunoglobulin was incorporated.

To know the values of immunoglobulins G.M and A in normal healthy individuals, 20 adult, age, nutrition, and socio-economic status-matched patients were taken as control. Study and control group patients were from Allahabad and neighbouring districts.

OBSERVATIONS :

The values of immunoglobulin G,M and A were as follows :

Table—I

Showing adult control values of IgG,
IgM and IgA

Type	No. of patients	Mean value mg/dl	SD \pm	Range mg/dl
IgG	20	1365.7	407.72	937-2075
IgM	20	140.7	22.83	123-280
IgA	20	179.5	41.60	116-178

In study group all the patients were of adult age group with 15-80% burns. Out of these 20 patients, 16 were males (80%) and 4 were females (20%). Different immunoglobulin levels measured in the blister of these patients were as shown in Table-II.

Table—II

No. of patients	Blister/ fluid value with mean	SD \pm	Serum/ blister/ fluid immunoglobulin level ratio
IgG 20 Range	52-870	151.655	1:0.673
	380.5 \pm		
IgM 20 Range	52-272	32.158	1:0.537
	64.85 \pm		
IgA 20 Range	38-112	22.614	1:0.559
	67.80		

To establish serum blister fluid immunoglobulin relationship study samples were collected simultaneously and to show values difference significance t and p values were calculated (Table III).

Table—III

	Blister fluid immunoglobulin		Serum immunoglobulin		t	p
	No.	Mean value	No.	Mean value		
IgG	20	380.05 \pm 151.65	11	565.08 \pm 168.40	3.129	.01
IgM	20	64.85 \pm 32.15	11	120.2 \pm 21.4	5.102	.001
IgA	20	67.80 \pm 22.66	11	118.4 \pm 30.5	5.270	.001

DISCUSSION :

Immunoglobulins constitute the essential component of host defence mechanism which ultimately would affect burn mortality, therefore loss of immunoglobulins becomes vital.

The levels of immunoglobulin G in blister fluid of this study was 380.05 ± 151.6 mg/dl with a range of 52-870 mg/dl and the same day serum immunoglobulin G level was found to be 565.08 ± 168.40 . So the serum/blister fluid ratio was 1.47 : 1 (Fig. 1). Kohn and Cort (1969) noted serum blister fluid IgG ratio as 1.2-1.4 : 1 while Sharma et al (1980) reported it to be 1 : .619.

The level of immunoglobulin M in blister fluid in present study was found 64.85 ± 32.12 mg/dl with a range of 50-272 mg/dl. The blister fluid IgM was found to be 53.95% of serum IgM taken on the same day.

Kohn and Cort (1969) also supported the same. Sharma et al (1980) found serum blister fluid IgM ratio as 1 : 0.68. In this study it was 1 : .55.

When the immunoglobulin A level in blister fluid was 67.80 ± 22.61 mg/dl ranging from 38-112 mg/dl. On comparing these value it was found to be 55.90% (1.74 : 1) of serum value. Kohn and Cort (1969) demonstrated that serum/blister fluid ratio as 3-4 : 1 while Sharma et al (1980) found it to be as 1 : 57. Arturson et al (1969) also made comparative studies of serum/blister fluid immunoglobulins. The 't' concluded that serum values were always higher and concentration difference was minimum for IgG, intermediate for IgA and maximum for IgM.

The cause of appearance of different immunoglobulins in the blister fluid can be due to increased capillary permeability after burn leading to leakage of immunoglobulins in burnt areas as well as due to redistribution of proteins and fluid between oedema and vascular space (Foley, 1970). This explains the less and nearly equal concentration difference in serum/blister fluid for IgG, and IgA as both have lower and nearly equal molecular weights. IgM having higher molecular weights and being basically intravascular immunoglobulin so its leakage can not be due to above factors and it can only be explained on the basis of immediate and sustained damage to microvasculature in burns.

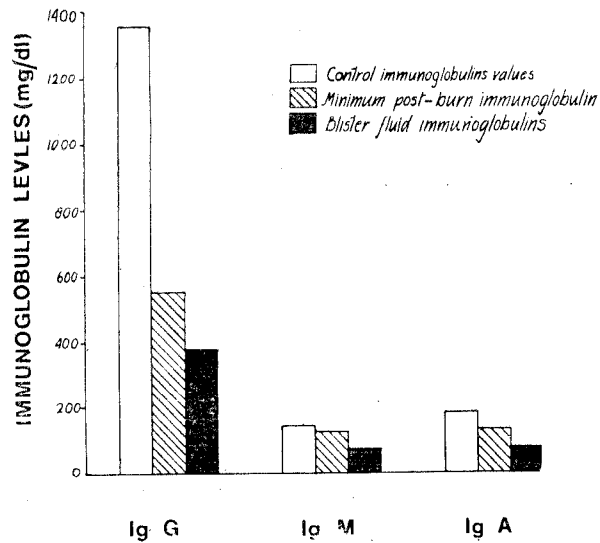
The blister fluid immunoglobulin levels were having statistically significant difference from the serum values on application of students 't' test ($p < .05$) (Table-III).

CONCLUSIONS :

With present study of 20 patients blister fluid immunoglobulin levels measurements the following were the results.

1. In all the blister fluids all the major immunoglobulins levels are present.
2. The maximum serum blister fluid immunoglobulin level difference was for IgM, intermediate for IgA and minimum for IgG as their serum/blister fluid level ratio for IgM, IgA and IgG were 1/ .53, 1/ .65 and 1/ .67.
3. Leakage of all these immunoglobulins in blister fluid may be responsible for the decreased host defence in burnt patients.

SERUM-BLISTER FLUID IMMUNOGLOBULINS

(MEAN \pm 1 S.D.)

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