

**IMMUNOGLOBULINS AND THERMAL BURN INFECTIONS**

N. K. MEHDIRATTA AND H. P. SINGH

**SUMMARY**

*Burn patients have higher susceptibility to infections, causes of which are many fold. Leakage of immunoglobulins in blister fluid is one of them. The present work was undertaken to find out the relationship between the types of infections and the levels of various immunoglobulins in the sera of burn patients. Radial immunodiffusion technique of Mancini was utilized to measure the levels. It was observed that all types of infections produced rise in immunoglobulin levels. In mixed and Pseudomonas infections the rise of all major immunoglobulins was found statistically insignificant while in fungally invaded patients IgM levels were significantly raised but on excision of the invaded areas, IgM levels dropped to within normal range.*

Immune response consists of both cellular and humoral components. Humoral immune response is one of the several components of reticuloendothelial system which is directly involved in some of the mechanisms by which body protects itself. Burnt patients are susceptible to infections, further leading to higher amount of stress and toxicity. The present work was undertaken to study the humoral immune profile of burn patients with infections.

**Material and Methods**

The study was carried out on 60 patients of thermal burns. Immunoglobulins G, M and A were measured in serum utilising tripartigen plates and radial immunodiffusion technique of Mancini (Mancini et al, 1965).

**Observations**

Twenty adults admitted to this hospital for unrelated benign diseases were taken as controls. It was ensured that patients had nearly identical age groups, socio-economic and nutritional status and were free from any infections, infestations or autoimmune diseases. The values of G, M and A in their sera is depicted in Table I.

*Study group:* All the sixty patients studied for their immune status after thermal burn

injury were classified into groups i.e. below 40% and above 40% burnt surface area (Table II).

Patients who died within 4 days of their burn were excluded from the study as they were having no signs and symptoms of infection and virtually their death was due to initial burn shock while in rest 48 patients who survived, 26 patients were unlucky to have infection.

Immunoglobulin G, M and A profiles of 22 non-infected patients are depicted in Table III at different time intervals as blood samples were taken on first 48 hours, 3rd day and then on 10th, 17th, 24th and on 31st days post burn. The mean values are shown in figures I, II and III.

The major immunoglobulin profile (G, M and A) in different types of infected patients are shown in figures I to IV. The diagnosis of infection was dependent upon sum total of clinical picture of burnt area, culture studies and subeschar plane biopsy. Infections were classified into 3 main groups: Mixed infections group, Pseudomonas group and Fungally invaded group. Their immunoglobulin profiles are depicted in figures IV, V and VI respectively.

**Table I. Control Immunoglobulin Values**

Type of immunoglobulins	No. of cases	Mean values mg/dl	SD $\pm$	Range mg/dl
IgG	20	1365.7	407.72	937-2075
IgM	20	140.7	22.83	123-230
IgA	20	179.5	41.69	116-178

**Table II. Age and sex distribution of study group**

Age group in years	Upto 40% burn		Above 40% burn	
	Male	Female	Male	Female
Below 10	3	3	3	—
11-20	2	6	2	8
21-30	1	3	4	11
31-40	0	2	2	2
41-50	0	1	1	3
Above 50	0	0	1	2
Total	6	15	13	26

**Table III. Immunoglobulins in Non-infected group**

	Upto 40% burn mean values			Above 40% burn mean values		
	with Standard deviation $\pm$			with Standard deviation $\pm$		
	IgG	IgM	IgA	IgG	IgM	IgA
48 hrs	802.1	128.4	128.3	565.08	120.2	118.4
	170.44	21.2	29.5	168.41	21.2	30.5
3rd day	881.12	124.3	126.4	854.04	116.4	114.3
	342.12	23.8	22.2	332.74	23.3	28.6
10th day	1131.41	161.2	154.2	1052.00	178.3	142.3
	470.44	19.9	24.2	472.54	24.6	26.2
17th day	1344.00	141.3	186.2	1241.70	154.4	178.2
	380.09	23.4	21.4	382.28	21.5	24.2
24th day	1380.56	143.2	194.3	1371.79	158.2	188.3
	361.61	21.4	31.3	381.65	20.4	38.2
31st day	1398.41	152.4	199.1	1380.79	164.1	192.4
	371.12	22.2	28.4	380.40	23.3	44.2

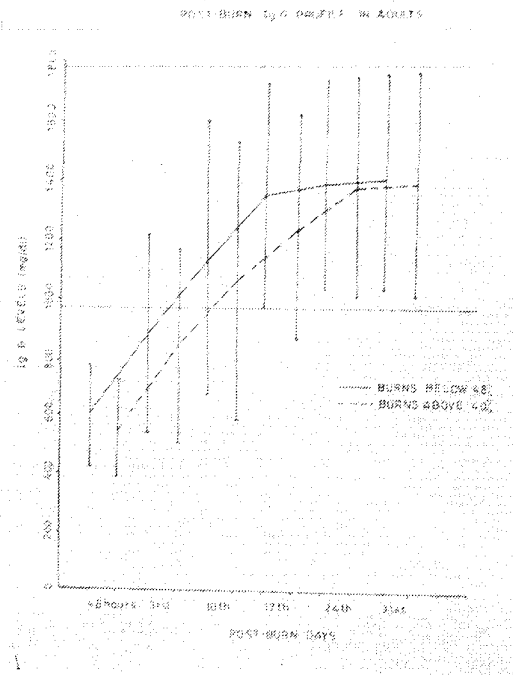


Fig. I. IgG profile of non-infected adult burn patients.

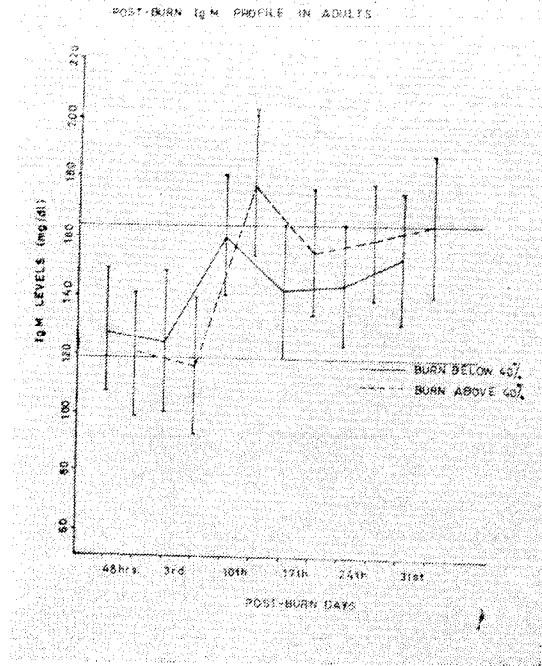


Fig. II. IgM profile of non-infected adult burn patients.

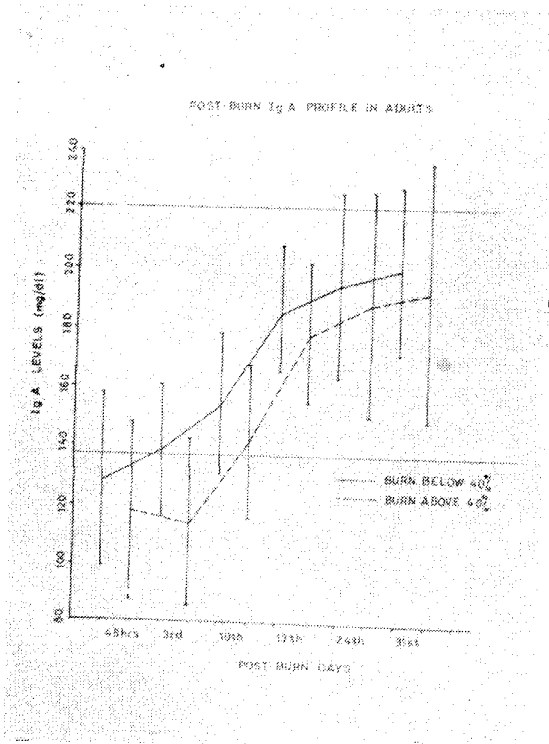


Fig. III. IgA profile of non-infected adult burn patients.

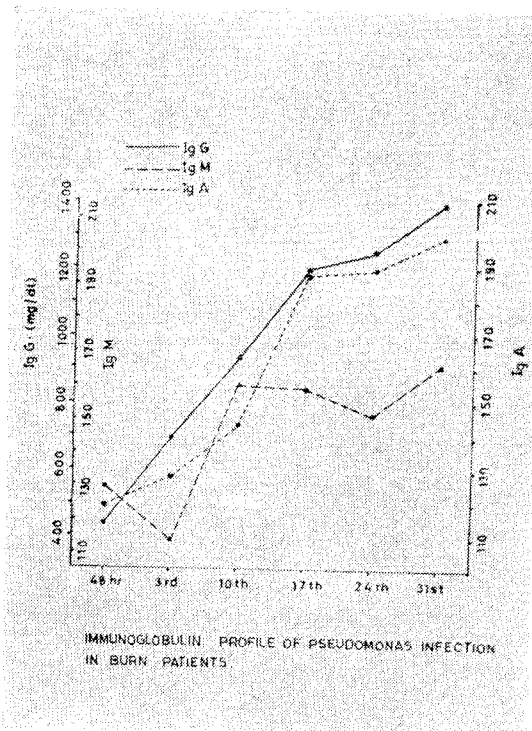


Fig. IV. Immunoglobulin profile of mixed infection in burn patients.

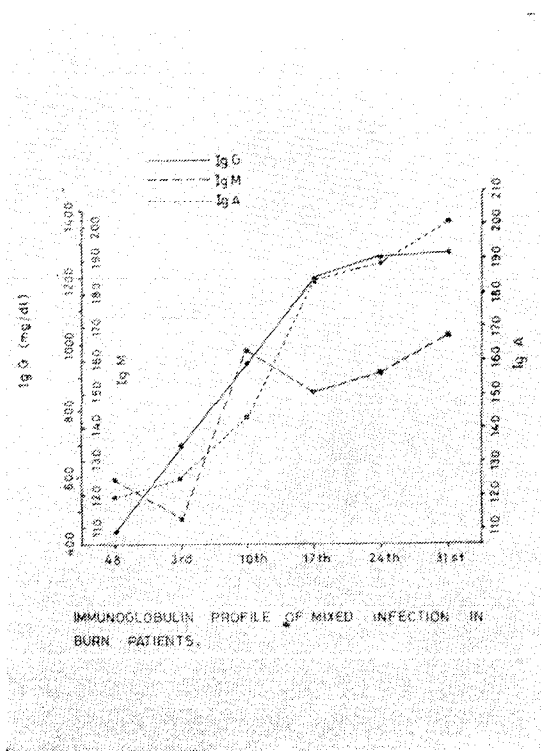


Fig. V. Immunoglobulin profile of Pseudomonas infection in burn patients.

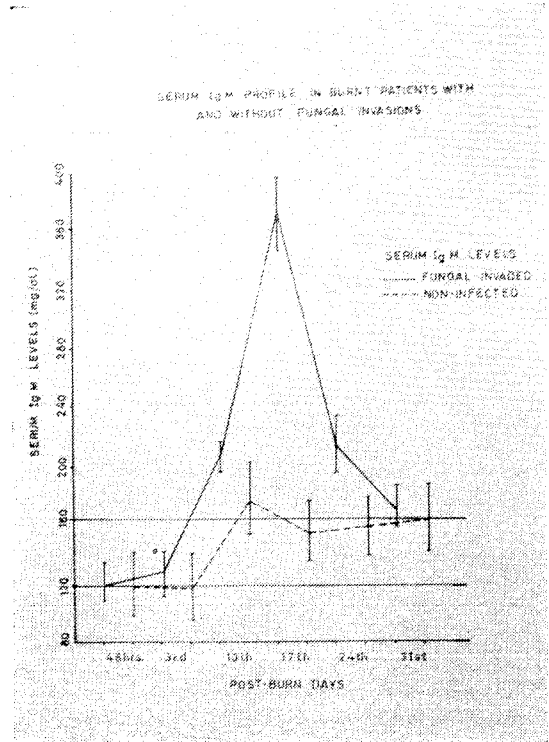


Fig. VI. Serum IgM profile in burnt patients with and without Fungal invasions.

**Discussion**

The immunoglobulin 'G' levels in patients having Pseudomonas infection, gave essentially the same pattern as of IgG in non-infected patients with slight variations in their concentrations at different post burn periods. On application of students' 't' test these values were having insignificant difference ( $P > .05$ ). The IgG levels in mixed infection group and fungally invaded groups were having the same pattern as a Pseudomonas group. Munster et al (1970, 1972) also confirmed that IgG response to bacterial infection is poor and there was no statistical difference between infected and non-infected patients. Gupta et al (1978) also supported the same.

Immunoglobulin 'M' levels in Pseudomonas and mixed infection group showed insignificant difference from the identical values of non-infected patients excepting the 'four' who

had fungal invasions. At the time of diagnosis of fungal invasion the values of IgM were significantly raised ( $P < .05$ ). These patients of fungal invasion were treated by surgical excision of the involved area. In the post excision serum sample taken a week after the excision, the values of IgM decreased significantly and later it followed the same pattern as was in non-infected patients (Fig. III). Munster et al (1970) noticed the same pattern. In present study the maximum levels of IgM was upto 400 mg/dl while Munster et al (1972) noted it upto 600 mg/dl. They also noticed a good response of immunoglobulins in cases of gram negative infections. They concluded from their study that IgM response in burn was better than the IgG. The elevations in serum IgA levels of infected and non-infected group of patients had insignificant difference, statistically ( $P > .05$ ). None of our patients

had viral infections. Kolber et al (1977) observed only slight increase in IgA levels in infected and non-infected patients.

### Conclusions

1. All types of infections produced rise in immunoglobulins G, M and A.

2. Rise was statistically insignificant in all types of infections except in fungally invaded patients, where the rise in IgM level was statistically significant which declined to control levels after excision of invaded areas.

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### The Author

DR. N. K. MEHDIRATTA, M.S., M.S., M.N.A.M.S., *Reader in Surgery*, M.L.N. Medical College, Allahabad-211001 India.

DR. H. P. SINGH, M.S., *Medical Officer*, P.M.H.S.

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DR. N. K. MEHDIRATTA, M.S., M.S., M.N.A.M.S., *Reader in Surgery*, M.L.N. Medical College, Allahabad-211001 India.