Effects of intravenous pulse dexamethasone on total leukocyte count and absolute lymphocyte count

Sir,

Steroids are commonly used in autoimmune disorders such as pemphigus, bullous pemphigoid and many other skin diseases. Pulse therapy with supra-pharmacological doses of steroids has been tried in open uncontrolled trials in pemphigus. However, the possible side-effects and lack of good quality evidence for efficacy of pulse therapy have been recently highlighted.[1] The exact mechanism of pulse therapy is not known, but it may act by sequestration of lymphocytes. [2] This pilot study was undertaken to assess the effect of suprapharmacological doses of intravenous dexamethasone on total leukocyte count, absolute lymphocyte count and neutrophils.

We included nine patients, eight cases of pemphigus vulgaris and one case of systemic lupus erythematosus. The diagnosis was confirmed by histopathology and direct immunofluorescence.

All patients received 100mg of dexamethasone pulse over three hours. After obtaining informed consent, the total leukocyte count (TLC), absolute lymphocyte count (ALC), and neutrophil counts was monitored at baseline, six hours, 12 hours and 24 hours after pulse therapy. The mean counts of TLC, ALC and neutrophil counts are also shown [Tables 1-3]. The ALC was initially lowered by six hours and gradually increased to reach the baseline by 24 hours whereas TLC and neutrophil counts were found to be increased by the end of six hours and gradually decreased to reach close to the baseline by 24 hours.

Pulse therapy with steroids is administered in many centers, especially for the treatment of pemphigus. It is also used in systemic lupus erythematosus, bullous pemphigoid, toxic epidermal necrolysis, systemic sclerosis and other auto immune disorders. [3] The exact mode of action of pulse therapy is not known. However, as the disease is mostly mediated by B-lymphocytes, reduction of B cells may account for

Table 1: Total leukocyte count (10^9/L)

Case No.	Before Pulse (Baseline)	6hrs after pulse	12hrs after pulse	24hrs after pulse
1.	7.7	20	14.4	8.2
2.	12.6	21	15.6	12.2
3.	6.2	15.6	10.4	7.4
4.	14.5	19.5	10.4	11.2
5.	8.6	24.4	9.5	8.2
6.	6.0	22.7	17.3	9.7
7.	9.8	19.0	14.8	13.3
8.	7.9	14.8	11.9	9.2
9.	11.4	20.3	14.1	12.2
Total	84.7	177.3	118.4	91.6
Mean	9.41	19.7	13.15	10.17

Table 2: Absolute lymphocyte count

Case No.	Before Pulse (Baseline)	6hrs after pulse	12hrs after pulse	24hrs after pulse
1.	2695	820	1140	2450
2.	2318	440	1236	2670
3.	1520	1220	1342	1390
4.	7250	2574	4450	2350
5.	2070	710	1240	2090
6.	2520	970	1450	2340
7.	4230	1400	2670	3400
8.	2100	820	1400	1900
9.	2980	930	1700	2500
Total	27683	9884	16628	21090
Mean	3075.89	1098.22	1847.55	2343.33

Table 3: Neutrophil count (mm^3)

Case.No.	Before Pulse (Baseline)	6hrs after pulse	12hrs after pulse	24hrs after pulse
1.	58	90	74	59.4
2.	70	93.9	82.3	73.7
3.	66	88	71.4	62.7
4.	44	80.9	80.2	51.9
5.	71	92.7	80.7	70.5
6.	44.9	87.6	72.8	49.9
7.	62	92.4	79.3	63.7
8.	74	81.9	61.4	78.5
9.	57	93.7	82.1	59.4
Total	546.9	801.1	684.2	569.7
Mean	60.77	89.01	76.02	63.30

effectiveness of treatment. Pountain *et al.* studied the effect of oral corticosteroids on T cells in 12 healthy volunteers and found that following administration of 20mg of oral prednisolone, lymphocyte counts reduced by seven hours and recovered by 24 hours. [4] The most likely explanation seems to be a change in lymphocyte trafficking with sequestration in the lymphoid organs and probably not due to cell lysis. In guinea pigs this has been shown to be due to redistribution to the bone marrow.[5] A study by Fan PT *et al.* revealed maximal lymphocyte suppression by six hours and complete recovery by 24 hours following intravenous 1 g of methylprednisolone pulse in cases of rheumatoid arthritis. [6]

We also found that the absolute lymphocyte counts drop by six hours following the pulse, but gradually reverts to normal by the end of 24 hours. Although this study does not throw much light on the exact pathomechanism of pulse therapy, further studies delineating the subsets of lymphocytes and cytokines present before and after 24 hours may identify the reason for the apparent clinical effectiveness of corticosteroids. We plan further studies to determine on lymphocyte subsets affected by intravenous dexamethasone pulse.

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DOI: 10.4103/0378-6323.62976 -

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