

Original Article

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Pattern of Steroid Use in a Tertiary Care Hospital

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Abstract:

Introduction: Steroid is commonly prescribed anti-inflammatory drug used in some acute conditions as well as for prolong period in different indications. This life saving drug has significant side effects. Patients with steroid hazards are frequently encountered in our clinical practice which should be minimized.

Methodology: It was an Observational, Descriptive, Cross-sectional study. Study period was October 2013 to March 2014 in the department of Medicine & Endocrinology, Sir Salimullah Medical College & Mitford Hospital. Total 100 patients were taken who had history of steroid intake for more than 7.5 mg/day equivalent of prednisolone for more than 3 months by purposive sampling technique.

Results: The age of patients range from 13 to 82 years. The mean age \pm SD was 45.2 \pm 9.75 years. Among them 57% was female & 43% was male. Among 100 patients 67% was illiterate & 82% was from low socioeconomic condition. Out of them 80% was taking oral prednisolone for mean duration \pm SD was 8 \pm 4 months and mean dose \pm SD was 10 \pm 2 mg/day. Frequency of patients with different indications were 29% Rheumatological, 20% respiratory disease, 12% Dermatological, 12% Nephrological, 12% Hematological, 5% Neurological, 4% for mechanical pain, 3% gastrointestinal & 3% had self-intake for gaining weight. Among them 52% patients were receiving according to qualified physician's advice, 41 % overuse steroid beyond prescription & rest of them were taking without indication (abuse). The most commonly observed side effects were Cushingoid appearance (100%), skin changes (94%), weight gain (67%), Diabetes Mellitus (DM) - 64%, increased incidence of infection (56% cases) in which disseminated tuberculosis was 10%, Hypertension (HTN) - 39%, osteoporotic collapse 11%, myopathy 10%, iatrogenic adrenal insufficiency 3% and psychosis 2% patients.

Conclusion: Due to lack of awareness among patients and health care provider, significant number of people overuse and sometimes abuse steroid in our country. Therefore, awareness about judicious use in our country is needed.

Keywords: Steroid, Hazards, Minimized, Overuse, Abuse, Awareness.

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Introduction:

Glucocorticoid therapy was first introduced by Dr Philip Hench in the 1950s¹. The remarkable anti-inflammatory properties of glucocorticoids have led to their use in a Wide variety of clinical condition but the hazards are significant². Adverse effects are related to dose, duration, timing and pre-existing conditions^{2,3}.

Glucocorticoids are prescribed commonly for long time for anti-inflammatory action in Asthma, COPD, RA, SLE, Dermatomyositis, Vasculitis, Autoimmune hepatitis, Lymphoma, Pemphigus, eczema, Some nephrotic and nephritic causes and in Transplantation⁴.

Long-term glucocorticoid use worldwide is estimated at between 1% and 3% of adults⁵. In UK, a third of patients on glucocorticoids for more than 2 years took more than 7.5 mg equivalent prednisolone⁵. In Bangladesh, apart from treatment of various diseases, people also take steroid to become fatty and for getting chubby cheek and to get relief from pain where steroids are not indicated⁶. Different preparations are available for use in different route like oral pill, injection, topical preparations are dermal, eye drop, inhaler, and suppositories etc⁷. Equivalent doses of glucocorticoids are Hydrocortisone 20 mg, Cortisone acetate 25 mg, Prednisolone 5 mg & Dexamethasone 0.5 mg⁸.

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Glucocorticoids taking >7.5 mg for >3 weeks causes HPA axis suppression and gradual adrenal atrophy⁹. Excessive doses of steroid may be absorbed from skin and mucosa but inhaled steroid rarely cause Cushing's syndrome but commonly cause adrenal suppression¹⁰. While recent studies suggest that even doses as low as 2.5 mg daily are associated with certain adverse effect¹¹. Rapid changes in steroid levels can also lead to marked mood disturbance¹². Glucocorticoids may mask signs of diseases specially perforation of a viscous, no febrile response to an infection¹³. It suppresses inflammatory action which can causes reactivation of latent Tuberculosis or Varicella Zoster¹⁴. In early onset of therapy emotional liability, insomnia, weight gain is unavoidable¹⁵. Diabetes mellitus, hypertension, peptic ulcer disease enhanced in patient with underlying risk factors¹⁶. When suprphysiological dose is sustained then Cushingoid appearance, HPA axis suppression, myopathy, osteonecrosis, poor wound healing, increase susceptibility to infections occur¹⁷. Delayed insidious administration causes atherosclerosis, cataract, fatty liver, osteoporosis, skin atrophy, growth retardation in growing age¹⁸. It can also cause glaucoma, pancreatitis, pseudo tumor cerebri and menstrual disturbance¹⁹. Weight gain is very common in about 80% of long-term user. Weight gained due to increased fluid retention and raised blood glucose causing more insulin secretion as a result of increasing Glycogen storage along with antilipolytic action of both insulin and steroid²⁰. Weight also contributed by increased appetite. Central fat deposition leading to typical moon face, plethora, buffalo hump, pendulous abdomen, thin extremities²¹. In 60% cases there is skin change includes atrophy of epidermis and underlying connective tissue leads to thinning, bruising, striation which are typically purple, depressed, wider (0.5-2cm) with visible capillaries particularly in areas where adipose tissue accumulated²². Skin infection is not uncommon especially fungal infection. There is not much study regarding frequency steroid use or abuse, its side effects and appropriate management in our country so far. So, this type of study will help us in early evaluation & better management of side effects

patients in future also limits its overuse & misuse.

Objectives: This study was carried out to evaluate the common indications & frequency of side effects in our population.

Materials and Methods

It was an Observational, Descriptive, Cross-sectional study. Medicine and Endocrine indoor & outpatient Department (OPD) of Sir Salimullah Medical College & Mitford Hospital, Dhaka. This study was conducted during October 2013 to March 2014. Patients admitted in Medicine & Endocrine indoor & OPD of SSMC & Mitford Hospital as per inclusion-exclusion criteria. Inclusion criteria were patients age more than 12 years with history of steroid intake and clinical evidence of steroid side effects or obesity who were taking steroid more than 7.5 mg/day equivalent prednisolone for more than 3 months. Exclusion criteria were patients unwilling to give informed written consent. Patients died or dropped out before completion of the investigation. A total of 100 cases were enrolled in the study. The sample size was calculated by using following statistical formula,

$n = z^2 pq/d^2$. Here, n is the desired sample size. p = the proportion of the target population estimated to have particular characteristic if no reasonable estimation, then we use 50% (0.5). q is (1-p) = (1-0.5) = 0.5. z is 5% level of significance or 95% confidence level and here z = 1.96. d is degree of accuracy or acceptable error usually set as 5% (0.05), but it should not exceed more than 20%. Here d is 10% (0.1) to keep the sample size desired with time.

So, $n = \frac{[(1.96 \times 1.96) \times 0.5 \times 0.5]}{0.1 \times 0.1} = 96.04$. A total number of 100 patients were taken. The sampling technique was a purposive sampling technique used as per inclusions and exclusion criteria. Data was recorded in structured data collection sheet and was analyzed by computer software SPSS (Statistical Package for social science) and the results were shown in tables & figures. Prior to the commencement of this study, the research protocol was approved by the ethical committee (Institutional review board of SSMC, Dhaka) of the institution. Informed

written consent was taken from the respondents prior to interview.

Osteopenia will be diagnosed when the T-score lies between -1.0 and -2.5, whereas Osteoporosis will be diagnosed when T-score value falls to -2.5 or below²³. The Western Pacific region Office of WHO recommends that amongst Asians, BMI >25 Kg/m² is obese²⁴. The World Health Organization (WHO) defines Impaired glucose tolerance when fasting blood glucose <7 =Ion and 2 hours after glucose load 7.8-11.0 mmol/L. Diabetes mellitus defines as fasting blood glucose more than or equal to 7 mmol/L. and or more than equal to 11.1 mmol/L²⁵. British Hypertension Society has defined ranges of arterial blood pressure chronically elevated measuring Systolic blood pressure 140 mm of Hg or more and Diastolic blood pressure 90 mm of Hg or more²⁶. Deficient adrenal production of glucocorticoids or mineralocorticoids as a consequence of destruction or dysfunction of the cortex or deficient pituitary ACTH secretion defined as adrenal insufficiency²⁷. Use of any substance or drug excessively beyond recommendation by standard committee or books is known as overuse²⁸. Use of any substance to bad effect or for a bad purpose is defined as abuse²⁹. Detailed history was taken then thorough clinical examinations were performed. Following investigations were done in all patients CBC with ESR, Blood glucose fasting and 2 hours post prandial, Urine RME, X-ray dorso-lumber spine and in selected patients CXR P/A view, USG of whole abdomen, ECG, S. electrolyte, fasting lipid profile, CPK, Upper GI endoscopy, BMD, Short Synacthen test, sputum for AFB, S. calcium and others investigations were done for determining the frequency & side effects of steroid. All these data were collected by using preformed data sheet.

Results

Table 1. Distribution of patients according to age group

Age Group	Frequency	Percent (%)
13 - 22	6	6.0
23 - 32	10	10.0
33 - 42	20	20.0
43 - 52	40	40.0
53 - 62	15	15.0
63 - 72	7	7.0
73 - 82	2	2.0
Total	100	100.0
Sex	Frequency	Percent (%)
Male	43	43.0
Female	57	57.0
Total	100	100.0

Table 1 shows the demographic characteristics of patients according to age and sex group. Highest numbers of patients were from age group of 43 to 52 years (40.0%) followed by age group 33 -42 years (20%) and lowest numbers of patients were from age group of 73 to 82 years (2.0%). The mean \pm SD was 45.2 \pm 9.41 with a range of 13-82 years. Among 100 cases Female is predominant than Male which was 57(57.0%) cases and 43(43.0%) cases respectively. The male and female ratio was 1: 1.32.

Table 2 Distribution of patients according to Indications

Indications	Frequency (%)	Judicious	Overuse
Rheumatological	(29)	16	13
SLE	10	9	1
RA	9	5	4
Others	10	2	8
Nephrological	(12)	12	0
Minimal	4	4	0
Membranous	4	4	0
FSGN	2	2	0
MPGN	2	2	0
Respiratory	(20)	3	17
Bronchial asthma	10	1	9
COPD	8	0	8
LLD	2	2	0
GIT	(3)	3	0
IBD	2	2	0
Autoimmune	1	1	0
Hepatitis	(5)	4	1
Neurological	1	0	1
Myasthenia gravis	2	2	0
CIDP	2	2	0
MS	12	6	6
SKIN	12	12	0
Hematological			

Table 2 shows distribution of patients according to indications. Highest (29%) use was found to be due to rheumatological indications followed by respiratory 20% next dermatology 14% nephrology & hematology both were 12%. Among Rheumatological indication 10% was SLE (9% was judicious use, 1% overuse), 9% (5% judicious use, 4% overuse), 10% for Polymyositis, Dermatomyositis, JIA, Rheumatic fever, Henoch Schonlein purpura(2% was judicious use , 8% overuse). 12% was of nephrological indication among them 4% minimal, 4% membranous, 2% FSGN, 2% MPGN; all of them are taking steroid as per prescription. 20% patients were respiratory cases; 10% was with Bronchial asthma (9% was judicious use, 1% overuse), 8% COPD (0% was judicious use, 8% overuse), 2% ILD (2% was judicious use, 0% overuse).3% cases were from GIT indications among them 2% was IBD 1% autoimmune hepatitis; all of them are taking steroid judiciously. 5% taking for neurological indications; 1% myasthenia gravis taking over dose, 2% was CIDP & 2% was MS; these two groups taking judicious. 12% cases were of dermatological indication, 6% judicious use 6% over use. Hematological indications were ITP, ALL, Lymphoma & autoimmune hemolytic anemia. All were taking judiciously.

Table 3 Distribution of patients according to Rationale of steroid use

Indications	Frequency	Percent (%)
Judicious	52	52.0
Overuse	41	41.0
Abuse (Mechanical, Gaining Weight)	7 (4, 3)	7.0

Table 3 shows 52% patients were taking steroid judiciously as directed by physician, 41% were over using beyond prescribed duration, 3% was self-intake for gaining weight.

Table 4: Distribution of patients according to use of the steroids, their name, and frequency of use, dose, duration & routes of administration

Name of the Drugs	Percentage (%) of Patients	Dose (Mean ± SD) mg/day	Duration (Mean ± SD) Months	Route
Prednisolone	80.0	10±2	8±4	Oral
Dexamethasone	8.0	3±2.5	12±6	Oral, IV
Hydrocortisone	1.0	10±2	6±3	Oral, IV, Skin
Betamethasone	4.0	2±1	24±12	Skin
Triamcinolone	2.0	40±0	3±2	IM
Others	5.0	N/A	13±5	Skin

Table 4 shows 80 % of patients taking prednisolone mean dose± SD was 10±2 mg/day & mean duration± SD was 8±4 Months through oral route , 8% patients taking dexamethasone mean dose+ SD was 3±2.5 mg/day & mean duration± SD was 12±6 Months through oral , IV route , 1 % patients taking hydrocortisone mean dose± SD was 10±2 mg/day & mean duration± SD was 6±3 Months through oral IV , skin route , 4 % patients taking betamethasone mean dose± SD was 2+1 mg/day & mean duration± SD was 24±12 Months through skin route , 2 % patients taking triamcinolone mean dose± SD was 40±0 mg/day & mean duration± SD was 3±2 Months through IM route, 5 % patients taking others mean duration± SD was 13±5 Months through skin route

Table 5 Distribution of patients according to side effects

Examination Findings	Frequency (%) of Male	Frequency (%) of Female	Total (%)
	Cushingoid appearance	43(43.0%)	
Skin change	35 (81.4%)	50 (87.7%)	85
Iatrogenic adrenal insufficiency	2 (4.65%)	1 (1.75%)	61
Anemia	1(2.32%)	9(15.78%)	10
Eye change (Cataract)	4(9.3%)	3(5.26%)	7
Psychosis	1(2.32%)	2(3.5%)	3
Infections	20(46.51%)	50(87.71%)	70
Diabetes Mellitus	25(58.13%)	39(68.42%)	64
Osteoporotic Collapse	3(6.97%)	8(14.03%)	11
Hypertension	22(51.16%)	17(29.82%)	39
Myopathy	4(9.3%)	6(10.52%)	10
Peptic Ulcer Disease	8(18.6%)	12(21.05)	20
Obesity	25(58.13%)	42(73.68%)	67

Table 5 shows that Cushingoid appearance develop among 100% patients, skin changes occur in 85% patients among them 87.7% was female & 81.4% was male, Iatrogenic adrenal

insufficiency was present in 3% patients among them 4.65% was male & 1.75% was female, anemia was present in 10% patients among them 15.78% was female & 2.32% was male, psychosis was present in 3% patients. 39% was hypertensive male was predominant, 64% was diabetic female were more osteoporotic compression 11% mostly was elder female, myopathy among 10% patients, infection among 70% patients. weight gain noticed among 67% of patient female were predominant, PUD among 20% patients, cataract was in 7% patients.

Table 6 Frequency of different Infections among steroid users in relation to dose & duration of steroid

Name of infection	Mean (Dose ±SD) (mg) Equivalent to prednisolone	Mean Duration (Months)	Frequency (%) of Male	Frequency (%) of Female	Total (%)
Tuberculosis	10±4	28±8	7(16.27%)	3(5.2%)	10
Candidiasis	7.5±2.5	9±6	8(18.6%)	26(45.61%)	34
UTI	20±5	5±3	5(11.63%)	50(87.71%)	55
Pneumonia	5	12±4	8(18.6%)	4(7.01%)	12
Tineaasis		17±3	9(20.9%)	7(12.2%)	16
Others	10±3		7(16.27%)	13(22.8%)	20

Table 6 shows Frequency of different Infections among steroid users in relation to dose & duration of steroid. 70% developed infection. 10% tuberculosis patients 7% male & 3% female mean ±SD dose 10±4mg, mean duration ±SD 28±8 months. 34% patient's candidiasis 8% male & 26% female mean ±SD dose 7.5±2.5 mg, mean duration ±SD 9±6 months. 55% patients Uri 5% male & 50% female mean ±SD dose 20.5±5 mg, mean duration ±SD 5±3 months. 12% of patient with pneumonia in mean ±SD dose 5±2mg, mean duration ±SD 12±4 months, 8% male & 4% female. 16% had Tineaasis patients 9% male & 7% female mean ±SD dose 10±3mg, mean duration ±SD 17±3 months. 20% patients have other infections 7% male & 13% female.

Table 7 Blood Glucose status among steroid user

Sex	Past WO DM (%)	FBS in mmol/L mean ± SD	2hrPPC in mmol/L mean ± SD	Frequency (%)
Male	4(9.3%)	9±2.5	16.2±4.7	25(58.13%)
Female	9(15.78%)	8.2±3.5	14.6±3.9	39(68.42%)
Total	13			64

Table 7 shows that Blood Glucose status among steroid user 64% patients shows raise blood glucose female was 68.42% & male was 58.13%. Mean FBS±SD of female was 8.2±3.5 & male was 9±2.5mmol. Mean 2hr PPG±SD of female was 14.6±3.9& male was 16.2±4.7mmol/L. New onset diabetes developed among 51% patients.

Table 8 Osteoporotic collapse

Sex Distribution	Age ±SD (years)	Mean Dose ±SD (mg)	Mean Duration ±SD months	Frequency (%)
Male	65.4±6.9	9±2.5	7±2	3(6.9)
Female	55.6±9.2	8.2±3.5	10±4	8(14.0)
Total				11(11.0)

Table 8 shows that Osteoporotic collapse 14% in female mean age ±SD 55.6±9.2 years. Mean dose±SD 8.2±3.5mg mean duration ±SD 10±4 months. 6.9% in male mean age ±SD 65.4±6.9 years. Mean dose ±SD 9±2.5mg mean duration ±SD 7±2 months.

Discussion

This study was carried out in 100 patients having history of taking steroid admitted in different medicine and endocrine wards & OPD of Sir Salimullah Medical College & Mitford Hospital, Dhaka from October 2013 to March 2014. One hundred patients were enrolled in the present study by purposive sampling who took steroid for more than 7.5 mg/day for more than 3 months. To study its use, abuse and hazards in our community.

This study shows that highest number of patients were from age group of 43 to 52 years (40.0%) followed by 33-42 years (20%) and lowest numbers of patients were from age group of 73 to 82 years (2.0%). The mean \pm SD is 45.2 ± 9.41 with a range of 13 - 82 years. A population-based assessment of adverse events associated with long-term glucocorticoid use was done in USA on 2006 shows similar mean age (53 ± 14 years)³⁰.

In our study patient between 13 -22 years were getting steroid mostly for HA, RF & HSP. Most common side effects among them were Cushingoid appearance, PUD and candidacies. Multiple pediatric and adolescent age group study shows long term steroid use even when adjusted for weight-based dosing, significantly higher incidences of growth retardation. But growth retardation could not be assessed since it was not a long-term study.

Main indications of steroid use for age group 23-32 years were SLE and others connective tissue disease; age group 33-42 years patients were nephrological; age group 43-52 years patients were RA, COPD, Myasthenia Gravis, MS, CIDP, Skin problem; age group 63-72 years were ILD & Osteoarthritis and age group 73-82 Years were bronchial asthma and the frequency were 10%, 20%, 40% 7% and 2% respectively. There're indication varies with age.

This study shows that Among 100 cases, female was predominant (57%). The male and female ratio is 1: 1.32. Studies done in abroad also show female predominance (71%) 49 which is similar with our study. This may be due to Rheumatological disease which is the most common indication or steroid and more common in female.

Among 100 patients, housewife tops the table 52(52.0%) cases and service holder is at bottom 5(5.0%) cases. There is no data available in South Asian Population. In Abroad study 56% was employed"- As housewife incidence was more in this study which reflects our cultural scenario³¹. Affluent educated service holders are conscious and most of the time they go to private center. The frequency may vary in different centers.

In this study 67% patients were illiterate so frequency of steroid use is more among illiterate

person. Most of the illiterate persons were taking, steroid injudiciously from nearby pharmacy. Frequency of side effects among them was more due to lack of awareness. Graduate 4% was taking steroid as per prescription. In previous population-based study 8% was Asian others were Americas and African; 38% of them having high school or less education'.

Therefore, clearly gives us a message that increased awareness will be able to reduce the complications.

This study shows that out of 100 cases 82% patients were from low socioeconomic condition. More-over poor people cannot afford qualified doctors. As a result, they suffer more due to injudicious use of steroid.

This study shows among 100 patients 84% was married. 3% unmarried patients abused steroid for gaining weight and beatification. This trend of self-intake of steroid is a concern for us. Regarding indications highest (29%) was Rheumatological. Out of them 10% was SLE (9% was judicious use 1% overuse), 9% RA (5% judicious use , 4% overuse), 10% for Polymyositis, Dermatomyositis, JIA, Rheumatic fever, Henoch Schonlein purpura (2% was judicious use , 8% overuse). In USA 14% of patients take glucocorticoids for musculoskeletal conditions. A recent analysis of the national databank for rheumatic diseases in the USA found prednisone use in 38% of rheumatoid arthritis (RA) patients³⁰. In this study Nephrological indication was 12% among them 4% minimal, 4% membranous, 2% FSGN, 2% MPGN; all of them are taking steroid as per prescription. 20% patients were respiratory cases; 10% was with Bronchial asthma (9% was judicious use, 1% overuse), 8% COPD all of them had overuse, 2% ILD (2% was judicious use, 0% overuse). 3% cases were from GIT indications among them 2% was IBD 1% autoimmune hepatitis; all of them are taking steroid judiciously. 5% taking for neurological indications; 1% myasthenia gravis taking over dose, 2% was CIDP & 2% was MS; these two groups taking judicious. 12% cases were of dermatological indication, 6% judicious use 6% over use. Hematological indication was 12% taking steroid for ITP, ALL, Lymphoma, Autoimmune Hemolytic anemia. All of them are

taking judiciously. In multicenter study it was found that RA was 14%, SLE 12%, COPD 13%, Bronchial asthma 12% IBD 8%⁵⁴. Our study shows uncommon diseases which is diagnosed by specialized investigations in hospital setting by qualified physician they may be properly counseled and they also being motivated not to go anywhere without specialized center. In developed countries compared with rates prior to the advent of biologics (47%) it seems that glucocorticoid use remains quite prevalent despite the advent of newer biologic glucocorticoid-sparing therapies. In our country there is limited use of biological agents due to cost and still steroid is widely used. In this study shows indications were though mostly judicious but 7% had no indication (4% osteoarthritis & 3% was taking for gaining weight). 52% patients were taking steroid as directed by physician, 41% were over using beyond prescription. This study shows 80% of patients taking prednisolone mean dose \pm SD was 10 ± 2 mg/day & mean duration \pm SD was 8 ± 4 Months through oral route, rest 20% patients were taking dexamethasone, hydrocortisone, betamethasone triamcinolone. These data show availability and frequently prescribed drug. Patients of nephrological indication taking steroid at higher dose. For connective tissue disease and respiratory disease low dose for long duration are taken. In another observational study prednisolone mean dose \pm SD was 16 ± 14 mg/day and duration mean \pm SD was 284 ± 177 days³. This study shows that Cushingoid appearance develop among 100% patients, Skin changes occurs in 85%, Hair thinning was present in 63% and Iatrogenic adrenal insufficiency was present in 3% patients were very moribund. Anemia was present in 10%, Psychosis was present in 3%, cataract 7%. Hypertensive was 39% where male was predominant, 64% was diabetic female frequency were more, osteoporotic collapse 11% mostly was elder female, myopathy among 10% patients, infection among 70% patients. Therapy with high-dose glucocorticoids muscle mass declined significantly in the first 2 months of therapy. Weight gain noticed among 67% patient female were predominant, PUD among 20% patients. Anemia was present in 10% cases; some of them have chronic peptic ulcer bleeding

and rest of them have anemia of chronic disease. So, this study has shown that steroid has negative effect on anemia. Psychosis was in the form of depression, delusion and mood change. Skin change was more distressing in young female. Oedema was present in most of the nephrotic patient. It became a concern in nonrenal patients fearing of having kidney disease. The incidence of various glucocorticoid-associated adverse events was identified in a large population-based study of over 3 million members of a national managed care organization, 6517 long-term glucocorticoid users. The adverse event with the greatest prevalence was weight gain, experienced by 80% of patients in the highest quartile of glucocorticoid use. Skin bruising/thinning and sleep disturbance were the next most commonly reported adverse events. Cataracts (15% overall) and fractures (12% overall) were reported less frequently but were still common³. Another observational cohort study conducted in France enrolled patients before initiation of long-term (defined as >3 months) or high-dose (>20 mg/day) therapy and followed them for 3 months to assess the relative frequency of glucocorticoid-associated adverse events²⁰. Sixty-three percentage of patients developed glucocorticoid-type skin changes and abnormal fat deposition. Neuropsychiatric disorders, including irritability, anxiety, depression, euphoria, hyperactivity, and manic episodes, were reported in 52.5%.

In this study the distribution of BMI of patients shows that highest frequency (46%) of patients were moderately obese and 10% patients was of normal BMI, 20% patients was severely obese; 11.62% male & 26.31% female. 1.75% was morbid obese was female. This study shows that female had greater propensities to become obese than male. 3% was underweight 4.65% male & 1.75% female; after stopping steroid had developed iatrogenic adrenal insufficiency. Other studies in abroad shows 90% of patients became obese⁵.

In these study 67% patients shows obesity. The studies were in. Western & European population.

Their usual BMI is high. Only large population-based incidence studies would be able to clarify whether our study reflect the actual situation or

not. This study shows that CBC normal WBC distribution, Neutrophilia, decreased Lymphocyte, Eosinophil and Monocyte count. ESR in normal distribution may be a misleader in presence of infection like tuberculosis. Hemoglobin also in upper limit of range. Though in ALL, Lymphoma and other hematological cases CBC picture are widely variable than others which may show a reflection in data interpretation but in our study those patients were in remission.

This study shows the frequency of male & female according to blood pressure 39% patient was hypertensive. 3% was hypotensive due to iatrogenic adrenal insufficiency. Rest of the patients was normotensive. In USA population based observational study shows 85% patients as hypertensive³¹, this study result varies may be due to high incidence of metabolic syndrome in that population.

This study shows that 10% of patient's myopathy in higher dose equivalent to prednisolone mean \pm SD 30 \pm 8mg, mean duration \pm SD 13 \pm 4 months, 4% male & 6% female. In a retrospective study of bone marrow transplant recipients with graft versus host disease being treated with high-dose glucocorticoids (2 mg/kg), 41% developed glucocorticoid-associated myopathy. This was of moderate severity; severe debilitating glucocorticoid-associated myopathy was seen in only 3% of patients. Among 100 patients 70% had developed infection. Among them 10% tuberculosis patients mean \pm SD dose was 10 \pm 4mg and mean duration \pm SD was 28 \pm 8 months. Candidiasis among 34% patients especially in female vaginal and in both sexes oropharyngeal. UTI was in 5% male & 50% female. So, female steroid users were more sufferer of UTI. Pneumonia had among 12% of patients in mean \pm SD dose 5 \pm 2mg, mean duration \pm SD 12 \pm 4 months. In a large observational study of patients with RA treating with glucocorticoid (mean dose 5 mg/kg) was associated with an increased risk of hospitalization for pneumonia. The increased rate of serious infections was more pronounced during the first 90 days after initiation of treatment with glucocorticoids¹³. A recent cohort study of 15 597 RA patients from a Medicare beneficiary database found that glucocorticoid

use doubled the rate of serious bacterial infections compared with methotrexate use with a dose—response relationship for dosages greater than 5 mg/day¹⁴. So, our study shows the similar picture with the others.

This study shows the distribution of female patients according to menstrual disturbance. Among 57 patients 2 cases had developed Amenorrhea in young girl taking Triamcinolone injection for skin disease.

This study shows that Osteoporotic collapse was 8% in female mean age \pm SD 55.6 \pm 9.2 years and 3% in male mean age \pm SD 65.4 \pm 6.9 years. Mean dose \pm SD was 10 \pm 4mg mean duration \pm SD was 16 \pm 6 months. This study shows that female osteoporotic collapse was at lower age than male may be due to decreased BMD in post-menopausal women incidence is higher. In outside study shows that 80% incidence of osteopenia among prolong steroid users which improved after stopping steroid¹¹. In 2 patients of this study BMD was done T-score was -2.5 to -3.8. In a cross-sectional Italian study found increased incidence of asymptomatic vertebral fracture in patients with a variety of underlying diseases requiring chronic glucocorticoid use³². An estimated 50% of patients taking glucocorticoids for longer than 6 months will develop secondary osteoporosis. In a study in abroad 3125 adult men and women on long-term glucocorticoid therapy (7.5mg/day of prednisone equivalent for >6months) reduction of bone mass measurements among postmenopausal women from 10% in 1996-1997 to 19% in 2000-2001, but remained below 6% in all intervals among women under age 50 and men³³. Patients with glucocorticoid-induced osteoporotic fracture occur at higher BMDs than nonglucocorticoid-treat³⁴. So, our study is consistent with others study.

This study shows that Blood Glucose status among steroid user 64% patient shows raised blood glucose; 15.78% of female & 9.3% of male had previous history of DM, mean FBS \pm SD of female was 8.2 \pm 3.5 & male was 9 \pm 2.5mmol, mean 2hr PPG \pm SD of female was 14.6 \pm 3.98c male was 16.2 \pm 4.7mmol/L. In others abroad study prevalence of raised blood glucose was 75%³⁵. The incidence of this study was nearer to others. This study also proved that steroid has direct effect on blood glucose.

This study therefore revealed that injudicious use of steroid is common in our population resulting in considerable morbidity due to various factors.

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