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RESEARCH ARTICLE

Drug Utilization (DU) 90% Study in Burn Population

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ABSTRACT:

Background: Burn injuries are common in India. The medical community should take steps to improve the rational use of drugs in burn population.
Objective: To determine the Drug Utilization (DU) 90% pattern in burn population.
Materials and Methods: A prospective cross-sectional study was conducted in burn ward, tertiary health care centre, Nashik in patients aged between 18-60 years and burn percentage >15%. Prescriptions were copied from the day of admission till discharge, death or non compliance of patients. DU 90%, core indicators and Defined Daily Dosage (DDD) were calculated.
Result: Average percentage of burn was 61.96%. 31 patients died (62%) and 19 were survived (38%). Mortality rate was 20% in < 40% Total Body Surface Area (TBSA), 33% in 40-60% TBSA, 95% in TBSA >60%. Drug used in percentage was higher for Ringer Lactate (21.57%), Inj. Gentamicin (8.52%), Inj. Rinitidine (8.38%), Inj. Metronidazole (8.25%), Inj. Cefoperazone + Sulbactum (8.24%) and Inj. Ciprofloxacin (5.58%). The DDD% was found highest for Inj. Dexamethasone (23.3%) and lowest for Inj. Cefoperazone + Sulbactum (0.75%). DU 90% includes Inj. Dexamethasone (23.3%), Inj. Adrenaline (15.85%), Inj. Hydrocortisone (14.35%), Tab. Ranitidine (8.41%), Inj. Diclofenac (3.84%), Tab. Folic Acid (3.76%), Inj. Deriphyllin (3.52%), Tab. Diclofenac (3.5%), Inj. Sulbactum (3.01%), Tab. Ciprofloxacin (3%), Tab. Calcium Citrate (2.44%), Inj. Ciprofloxacin (2.32%), Tab. Ferrous Sulphate (2.2%), Inj. Metronidazole (2.16%), Inj.Gentamicin (1.96%).
Conclusion: Based on the observations made in this preliminary study (DU90%), there is need of multicentric (including private hospitals) and long duration evaluation with consideration of age, sex, socioeconomic factors to estimate the rational DU pattern in burn population.

KEYWORDS: Drug Utilization, Burn, DU90%.

INTRODUCTION:

Burn injuries are common in India. These are; suicidal, homicidal, and accidental. Burn injuries may be ordinary burn, scald due to moist heat, electrical burn, chemical burn due to strong acid, radiation burn, burn due to lightening .[1] The mortality rate is 100% in burns above 60% Total Body Surface Area (TBSA), 69% in 41-60% burns, and 12% in burns of less than 40%.[2] The causes of deaths are acute renal failure, septicemia, acute respiratory syndrome, shock, and upper gastrointestinal bleeding due to peptic ulcer and severe anemia.[3]

Burn injuries treatments include volume replacement by crystalloid (Ringer Lactate), colloids like fresh frozen plasma and blood transfusions. Antibiotics are given to avoid infections, mainly Cephalosporin's.[4]

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Septicaemia shock due to infection is an important cause of death. Topical antibiotics are applied to burn wounds, antacids are given to avoid stress gastric ulcers, sedatives and analgesics are given for pain, vitamins to correct vitamin deficiency. Fluid replacement is given; if burn is >15% in adult and in children if it is >10%.[(5)] New therapy like split thickness skin grafting (autograph) on burn wounds, which avoids contractures and also protects infections and serum loss by acting as biological barrier.[6]

Wold Health Organisation (WHO) defined Drug Utilization (DU) research in 1977 as "the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences". Anatomical Therapeutic Chemical (ATC)/ Defined Daily Dosage (DDD) classification given by WHO Collaborating Centre for Drug Statistics Methodology, Oslo, Norway is used to calculate DDD, DDD%. DDD can be defined as the assumed average maintenance dose per day for a drug used for its main indication in adults. [7]

The principal aim of DU study in burn population is to facilitate rational use of drugs; it also contributes to how drugs are being used, early signals of irrational use of drugs and interventions to improve drug use in burn therapy. For the individual patient rational use of a drug implies the prescription of a well-documented drug in an optimal dose on the right indication, with the correct information and at an affordable price.

Without knowledge on how drugs are being prescribed and used, it is difficult to initiate a discussion on rational drug use and to suggest measures to change prescribing habits for the better. Especially, in a developing country like India, irrational prescribing is a common finding. DU study seeks to monitor, evaluate and, if necessary, suggest modification in prescribing practices of medical practitioners with the aim of making medical care rational and cost effective.[8] Till date no study has been conducted to focus the drug utilisation patterns in Indian burn population. Therefore it was necessary to study the DU pattern in burn therapy, which has impact on health, social, financial, mental aspects. This study was prospective cross sectional, data collected and analysed as per WHO guidelines.[9]

Objective:
To determine the Drug Utilization (DU) 90% pattern in burn population.

Methodology:
Prospective cross-sectional study was conducted at Tertiary Health Care Centre, Nashik for 10 weeks. The Institutional Ethical Committee (IEC) approval was received before initiation of study. The study was conducted in compliance with Schedule -Y and Indian Council of Medical Research (ICMR) regulatory guidelines of India. Patients between 18-60 years of age and burn percentage >15% admitted in burn ward were selected. Patient who had history of liver cirrhosis, congestive cardiac failure, diabetes mellitus, chronic renal failure were excluded. After taking an informed consent, patients were interviewed and the prescriptions were copied from the day of admission till the day of discharge, death or non compliance. Prescriptions were studied and analysis was done as per WHO Drug Utilization Study guidelines.

Core Indicators:[10]

1. Prescribing indicators:

a) Average number of drugs per encounter calculated by dividing the total number of different drug products prescribed by the number of encounters surveyed.

b) Percentage of encounters with an injection prescribed will be calculated by dividing the number of patient encounters during which an injection was prescribed by the total number of encounters surveyed, multiplied by 100.

c) Percentage of drugs prescribed from essential drug list was determined by dividing the number of products prescribed from Essential drug list of the hospital by the total number of drugs prescribed, multiplied by 100.

2. Patient Care Indicators:

a) Average consultation time determined by dividing the total time for a series of consultations, by the actual number of consultations.

b) Average dispensing time calculated by dividing the total time for dispensing drugs to a series of patients, by the number of encounters.

c*)* Percentage of drugs actually dispensed worked out by dividing the number of drugs actually dispensed at the health facility by the total number of drugs prescribed, multiplied by 100.

d*)* Patients' knowledge of correct dosage was found by dividing the number of patients who can adequately report the dosage schedule for all drugs, by the total number of patients interviewed, multiplied by 100.

3. Complementary indicators:

a*)* Average drug cost per encounter determined by dividing the total cost of all drugs prescribed by the number of encounters surveyed.

b) Percentage of drug costs spent on injection determined by dividing the cost of injections prescribed by the total drug cost multiplied by 100.

STATISTICAL ANALYSIS [(10)]: DDD/1000/day was calculated by following formula

$$\text{DDD/1000/DAY} = \frac{\text{total no of dosage units prescribed X strength of each dose unit X 1000}}{\text{DDD (ATC) X duration of study in weeks X total sample size}}$$

DDD%: It was calculated by following formula =

$$\frac{\text{DDD/1000/DAY of particular drug x 100}}{\text{Sum of DDD/1000/DAY total drugs}}$$

RESULT:

Total 50 patients were enrolled of which 36 (72%) were females and 14 (28%) were males. Total 430 prescriptions were copied from the day of admission till discharge, death or non compliance. Average percentage of burn was 61.96% of which 31 (62%) patients died and 19 (38%) survived. Mortality rate was 20% in < 40% TBSA, 33% in 40-60% TBSA, 95% in TBSA >60%.

Table 1. Core Indicators

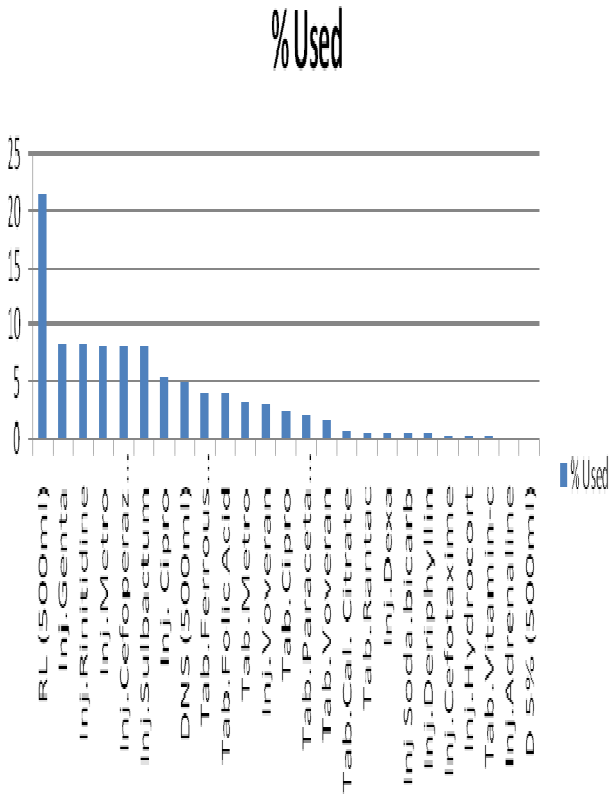
INDICATORS		
Prescription Indicators	Average no. of drugs/prescription	10.21
	Average no. of drugs dispensed	9.05
	Average no. of Injectables	6.36
	Percentage of drugs in Injectable form	62.34%
	Percentage of drugs from essential drug list	99%
Patient care Indicators	Average consultation time	2.28 min.
	Average dispensing time	10.21 min.
	% drugs actually dispensed	88.63 %
	% drugs actually labeled	100%
Complementary Indicators	Average cost per prescription	Rs.126
	Average cost per patient	Rs.1083.76
	Drug cost on injections	98 %

The key drug use indicators are given in Table 1.The percentage use of the various drugs dispensed in the healthcare centre and the calculated DDD/1000/day with DU90% is given in table 2 with graphs.

Table 2: Drug Utilization 90%

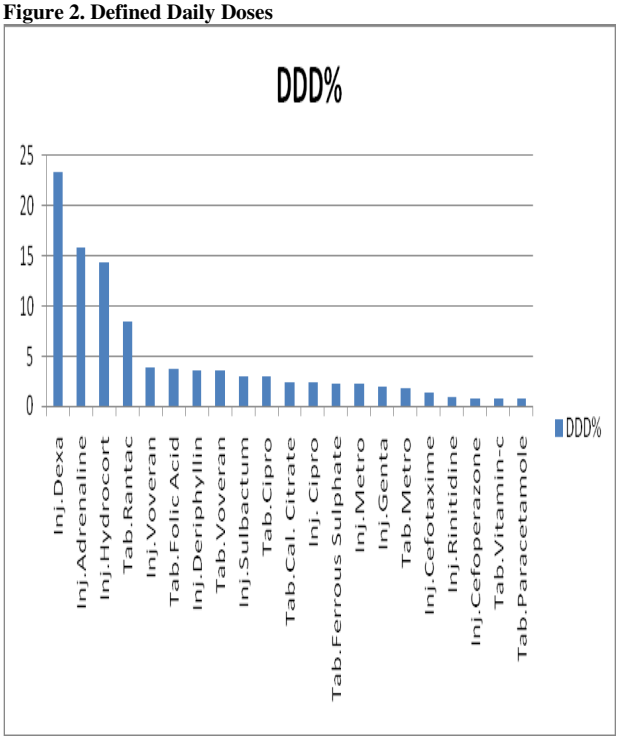
Name of Drug	DDD/1000/ Day	DDD%	% Used
Inj. Dexamethasone	773.33	23.3	0.65
Inj. Adrenaline	526.15	15.85	0.21
Inj. Hydrocortisone	476.19	14.35	0.44
Tab. Ranitidine	279.16	8.41	0.75
Inj. Diclofenac Sodium	128.44	3.84	3.2
Tab. Folic Acid	125	3.76	4.13
Inj. Deriphyllin	117.02	3.52	0.61
Tab. Diclofenac Sodium	116.12	3.5	1.61
Inj. Sulbactum	100.13	3.01	8.24
Tab. Ciprofloxacin	99.55	3	2.52
Tab. Calcium Citrate	81.17	2.44	0.77
Inj. Ciprofloxacin	77.18	2.32	5.58
Tab. Ferrous Sulphate	75	2.2	4.13
Inj. Metronidazole	71.87	2.16	8.25
Inj. Gentamicin	65.12	1.96	8.52
Tab. Metronidazole	57.92	1.74	3.44
Inj. Cefotaxime	42	1.26	0.47
Inj. Ranitidine	32.04	0.96	8.38
Inj. Cefoperazone	25.03	0.75	8.24
Tab. Vitamin-c	25	0.75	0.34
Tab. Paracetamol	24.17	0.72	2.13
Ringer Lactate (500ml)			21.57
DNS (500ml)			5.09
Inj. Sodium bicarbonate			0.62
Dextrose 5% (500ml)			0.02
Total	**3317.59**	**99.8**	**99.91**

Figure 1. Percentage of drugs used in descending order



Drug used in percentage was higher for RL (21.57%), Inj. Gentamicin (8.52%), Inj. Rinitidine (8.38%), Inj. Mertronidazole (8.25%), Inj. Cefoperazone + Sulbactum (8.24%) and Inj. Ciprofloxacin (5.58%) (Table 2) (Figure 1). DU 90% includes following drugs with DU% ; Inj. Dexamethasone 23.3%, Inj. Adrenaline 15.85%, Inj. Hydrocortisone 14.35%, Tab. Ranitidine 8.41%, Inj. Diclofenac Sodium 3.84%, Tab. Folic Acid 3.76%, Inj. Deriphyllin 3.52%, Tab. Diclofenac Sodium 3.5%, Inj. Sulbactum 3.01%, Tab. Ciprofloxacin 3%, Tab. Calcium Citrate 2.44%, Inj. Ciprofloxacin 2.32%, Tab. Ferrous Sulphate 2.2%, Inj. Metronidazole 2.16%, Inj. Gentamicin 1.96%. The DDD% was higher for Inj. Dexamethasone and lower for Inj. Cefoperazone + Sulbactum (0.75%), Inj. Gentamicin (1.96%); this may be due to DDD does not consider the alteration of dosage by disease and patient related factors (Figure 2).

Figure 2. Defined Daily Doses



DISCUSSION:

Drugs prescribed for a brief period can have their prescribing prevalence; underestimated variations in dosage pattern, duration of study, the scatter of population over different age groups etc. can therefore contribute to difference in audit reports using DDD methodology to determine prevalence of prescribing.

Most commonly used antibiotics are Inj. Gentamicin (8.5%), Inj. Cefoperazone + Sulbactum (8.24%), Inj. Ciprofloxacin (5%), Inj. Metronidazole (8.25%); as compared to previous study, Benzyl penicillin, Gentamicin, Cephalosporines were most commonly used antibiotics.

Absence of Benzyl penicillin may be due to hypersensitivity and replacement by combination of Inj. Cefoperazone + Sulbactum.

Mortality rate was 95% in TBSA >60%, 33.33% in TBSA 40-60%, 20% in <40% TBSA; as compared to previous study it was 100%, 69%, 12% respectively. Difference in mortality rate 33% in TBSA 40-60%, as compared to previous study which was 69%, may be due to good health care facilities provided in burn ward at Civil Hospital Nashik.

More percentage of female patients (72%) than male (28%) patients may be due to type of work pattern and psychological stress. The ointment used was the combination of Intravenous Metronidazole, Intravenous Normal Saline, powder of Silver Sulphadiazine and Liquid Paraffin as a base, needs detail evaluation for its rational use. The increased survival rate in 40-60% TBSA burn patients and use of above ointment needs detailed evaluation.

Two patients (4%) were suffering from psychiatric illness needs detail evaluation for suicidal tendency of psychiatric patients. Drug cost on inject able was 98% and percentage drugs in inject able form were 62.34%. This might be due to IPD nature of treatment. No patient was aware about the dose and treatment. This may be due to IPD treatment and severity of disease. 88.63% of drugs were dispensed out of actually prescribed drugs. This deviation may be due to unavailability of intravenous lines due to burn induced thrombophlebitis.

There was no such DU 90% study in burn population to compare for standard pattern is the limitations of study. On the basis of above DU 90% study it is difficult comment rational and irrational DU pattern. It demands multicentre (including private hospitals) and long duration evaluation with consideration of age, sex, socioeconomic factors. Poor prescription practices and lack of exact dispensing record encountered during data collection may have interfered with estimating DU pattern.

CONCLUSION:

Based on the observations made in this preliminary study (DU90%), there is need of multicentre (including private hospitals) and long duration evaluation, cost-based study of prescribing prevalence with consideration of age, sex, socioeconomic factors estimate the rational DU pattern in burn population.

While report could not discuss the rational or irrational DU pattern but there are clear implication for the evaluation of rational and irrational use of ointment and its relation to reduced mortality rate. It can be concluded that females more vulnerable for burn injuries.

REFERENCES:

1. Muqim R, Zareen M, Dilbag, Hayat M. Epidemiology and outcome of Burns at Khyber Teaching Hospital Peshawar. **Pakistan Journal of Medical Sciences** 23(3); 2007: 420-24.
2. Subrahmanyam M, Joshi A. Analysis of burn injuries treated during a one-year period at a district hospital in India. **Annals of Burns and Fire Disasters** 16: 2003: 2.
3. Olaitan PB, Jiburum BC. Analysis of burn mortality in a burns centre**, Annals of Burns and Fire Disasters** 19; 2006:2.
4. May AK, Melton SM, McGwin G. Reduction of Vancomycin-resistant enterococcal infections by limitation of broad-spectrum cephalosporin use in a trauma and burn intensive care unit, **Shock** 14 (3);2000: 259-64.
5. Das S. A concise text book of surgery. Calcutta. 3rd ed 2001; 50-61.
6. Papini R. Management of burn injuries of various depths. **BMJ** 329; 2004: 158-60.
7. WHO booklet. Introduction to drug utilization research. 2003.
8. Singh P, Tiwari P. Drug utilisation studies: The need for a common protocol: Express healthcare management. Indian express business publication. Bombay 2001.
9. Guidelines for ATC classification and DDD assignment. WHO Collaborating Centre for Drug Statistics Methodology. Oslo. Norway 2001.
10. Sutharson L. Hariharan RS. Vamsadhara C. Drug utilization study in diabetology outpatient setting of a territory hospital. **Indian Journal Of Pharmacology** 2003; 35:237-40.