DISCUSSION
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In this study, 12,901 diabetic patients were attended in diabetic O.P.D. department of medicine & 38 patients with diabetic foot admitted in surgery department of M.L.B. medical College, Jhansi, from June 05 to July 06, were studied under the following heads :-

A. O.P.D. PATIENTS

1) INCIDENCE OF FOOT PROBLEMS:

➢ In a study at S.C.B. Medical College, Cuttack the incidence of diabetic foot was 10%.

➢ Scott D. Ramsay et al. in their study showed that among 8,905 patients identified with diabetes, 514 developed a foot ulcer over 3 years of observations (i.e. incidence was 5.8%). The incidence of ulcers in this cohort of patient with diabetes was nearly 2% per year.

➢ Branko Novak, Zeljko Metelko, Nikica Car in their study reported about 15% of diabetes patient affected by foot problems.

➢ In another study, held in Deptt. Of medicine, Manchester Royal infirmary, UK, the cumulative life time incidence of foot ulcerations in diabetic patients was a high as 15%.

➢ The prevalence of diabetic foot has been estimated to be 3-8%. [Ebskov B., Ebskov L.; Diabetologica; vol.39; number 12/nov.1996;pg.1607-10].

➢ In another study held in Deptt. Of Medicine, College of Health Sciences University of Nairobi, Kenya (2003 Jan), the incidence of foot ulcers in diabetic patients was 4.6%.

➢ The incidence of diabetic foot in patients of Diabetes mellitus in our study is 9.03% (i.e. 1165 out of 12901). This incidence is comparable to Indian study at Cuttack, but show higher incidence than other international studies. The higher
incidence of Diabetic foot in Diabetic patients in Bundelkhand region is due to poor foot care, illiteracy and inadequate medical facilities in this socio-economically backward region.

2] DOMINANT PRESENTATION:

Dominant Presentation of Diabetic foot:-

➢ In a study at Cuttack hospital, Dominant presentations of Diabetic foot were as neuropathy (50%). Septic diabetic foot (16%) and PVD (26.6%).

➢ In their study, Pecoraro et. al. (1991) showed that PVD was associated with 62% of non-healing foot ulcers in diabetes as seen in the western population and presentation as septic diabetic foot in 26%.

➢ It has reported that 60% of patients with diabetes have some form of neuropathy [www.niddk.nih.gov].

➢ Branko Novak, Zeljko Metelko, Nikica Car reported peripheral neuropathy in 80% cases.

➢ A population based study in North of England showed that 42% of Type II Diabetes had clinical evidence of neuropathy another study at Flinders University Northern territory Clinical School and Royal Darwin Hospital, Darwin, Australia showed that peripheral neuropathy was dominant presentation of diabetic foot in about 63% cases.

➢ S.C.N.A. Vol.78; June 1998; pg-393 reported virtually every diabetic with diabetes for more than 10-15 years has some evidence of neuropathy.

➢ In our study, dominant presentation in O.P.D. (diabetic) was peripheral neuropathy (47.55%), where as peripheral vascular disease was observed in 25.15% cases. Still sepsis, in general, is a common problem (20.69%) in rural areas; and Diabetics are the more susceptible to septic complications in general and in foot especially.
B) SURGERY INDOOR PATIENTS

1) AGE DISTRIBUTION:
➢ In a study at Medical College, Cuttack, maximum number of cases was seen in 6th decade.
➢ In another study held at Diabetic research centre, Royapuram, Chennai, India (2000 Mar.) age at presentation was 44-64 years.
➢ Pecararo RE et al, in their study showed that among hospital discharges for foot ulcers during 1983-90 the highest percentage was in persons aged 45 to 64 years.
➢ According to another study, Qari FA, Akbar D King Abdulaziz University Hospital, Saudi Arabia, Majority of patients with diabetic foot were male above 50 years of age group.
➢ The average age of presentation were 71 in Germany, 56 in India & 51 in Tanzania {Morbach S, Lutale JK, Vishwanath V et al. Diabet. Med. 2004 jan;21(1):91-5}.
➢ In our study also the age of presentation of Diabetic foot was 40-60 years {47.37%}, & >60 years {42.10%}. Thus in most of the studies, the average of presentation of diabetic foot were 40-60 year.

2) SEX DISTRIBUTION:-
➢ In a study at medical college Cuttack the male and female ratio was 9:1 (i.e. 90% were male).
➢ According to another study held at Diabetic research centre Royapuram, Chennai India (2000 Mar.) male to female ratio was 1.54:1 (i.e. incidence was higher is males).
➢ In a retrospective study conducted at Carilion Raaroka Community Hospital in Virgina USA by Stepfa L. et al. it was shown that 53% male & 47% females had diabetic foot ulcer i.e. incidence was significantly higher in males.
In our study, percentage of male & females with diabetic foot are 76.32% and 23.68% respectively. Thus in most of the studies, the incidence of diabetic foot is higher is males, may be due to comparatively more outdoor activity in males.

3. RURAL AND URBAN DISTRIBUTION:

In our study, 47.37% patients belonged to rural area; & a 52.64% patient from urban area. This incidence in rural & urban area was almost equal in this study.

4. DURATION OF DIABETES AT PRESENTATION OF FOOT COMPLICATION:-

In a study average diabetes duration until the onset of the initial foot lesion was 14 years in Germany, 12 years in India & only 5 years in Tanzania [Morbach S, Lutale JK, Vishwanath V et al. Diabet. Med. 2004 Jan;21(1):91-5].

In a study at medical college, Cuttack the incidence of foot complications in Diabetic patients was 50% within 5 year duration.

According to another study held at Diabetic foot clinics, Deptt. of internal medicine, Marienkrankenhaus, Soest, Germany average diabetes duration until the onset of initial foot lesion was 14 years in Germany, 12 years in India & only 5 years in Tanzania.

In our study, 65.79% patients (i.e. 25 out of 38) had diabetes of less than 10 years.

5. DOMINANT PRESENTATION OF DIABETIC FOOT IN SURGERY WARDS:-

In a study at Cuttack hospital, Dominant presentation of Diabetic foot was as neuropathy (50%). Septic diabetic foot (16%) and PVD (26.6%).

In their study, Pecoraro et. al (1991) showed that PVD was associated with
62% of non-healing foot ulcers in diabetes as seen in the western population and presentation as septic diabetic foot in 26%.

- **Oyibo S.O.; Jude E.B.; Tarawneh I. et al. Diabetic Medicine; vol.18; pg.133 / feb2001** reported majority (67%) diabetic foot ulcers are neuropathic.

- Peripheral vascular disease was 48% in Germany, 12% in Tanzania & 13% in India [Morbach S, Lutale JK, Vishvanath V et al. Diabet. Med. 2004 jan;21(1):91-5].

- A population based **study in North of England** showed that 42% of Type II Diabetes had clinical evidence of neuropathy another study at **Flinders University Northern territory Clinical School and Royal Darwin Hospital, Darwin, Australia** showed that peripheral neuropathy was dominant presentation of diabetic foot in about 63% cases.

- In our study, dominant presentation of diabetic foot was septic foot (76.31%) where as peripheral neuropathy was observed in 18.42% cases & peripheral vascular disease in 5.26% cases. But cases of diabetic septic foot having associated problem of peripheral neuropathy in 78.94% cases & peripheral vascular disease in 63.16% cases. Still sepsis, in general, is a common presenting problem in this area; and Diabetics are all the more susceptible to septic complications in general and in foot especially. The involvement of foot as compared to any other part of body is higher in world at large. In our rural dominant population, the foot involvement is still higher because people walk bare footed and is prone to various kinds of trauma everyday. Over & above, there is lack of foot care, illiteracy and inadequate medical facilities in this group of people in Bundelkhand region.

6. **SYSTEMIC COMPLICATIONS:-**

- In western countries diabetes is most common cause of blindness in people
aged 20-60 years. Approximately 80-90% of patients show some degree of retinopathy 20 years of diagnosis; 10-20% of patients with type 2 diabetes, however, may have retinopathy at the time of diagnosis[fast facts-diabetes mellitus-oxford-Campbell I.W., Lebovitz Harold, 2000].

- Diabetic nephropathy develops in 6-27% of type 1 diabetic patients & 10-33% of type 2 diabetes[fast facts-diabetes mellitus-oxford-Campbell I.W., Lebovitz Harold, 2000].

- In our study Cardiopathy present in 15.79%, nephropathy in 34.21% & Ophthalmopathy in 55.26% cases. In this study most of the cases associated with Ophthalmopathy.

7. BACTERIOLOGY:-

- In a study at Cuttack hospital, dominant infective organisms were Staph. aureus (35.7%) Proteus (25%) and pseudomonas (14.3%) in Septic diabetic foot.

- In a study at Diabetic Research Centre Royapuram, Chennai, India, aerobic pathogens (66.8%) were the most common organisms isolated from infected diabetic foot.

- Qari FA, Akbar D, in their study at King Abdulaziz university hospital, Jeddah. Saudi Arabia, found that Proteus and Pseudomonas were the most common organisms isolated from infected diabetic foot.

- Rooh-Ul-Muqin, Ahmed M, Griffins in their study at Khyber Teaching Hospital, Peshwar, Pakistan observed that Staphylococcus was the commonest organism isolated from cultures obtained from infected diabetic foot.

- Zafar, A. Ayub Medical College, Abbottabad, observed that Staphylococcus aureus (54%) was the most common organism isolated from cultures obtained from infected diabetic foot.

- In our study, predominant infecting organism was Staph. aureus (39.47% cases) followed by mixed infection (18.42%).
8. COLOR DOPPLER STUDY FOR PERIPHERAL VASCULAR INVOLVEMENT:

➢ In a study by Debkaran Bhavesh, Minhas SS, Bharadwaj Rajeev in Indira Gandhi Medical College, Shimla, they reported 76% patients were found to have involvement of peripheral vessels.

➢ In our study all the 38 patients were examined for vascular involvement by color Doppler ultrasonography. The 66.42% patients (26 out of 38) show vascular involvement.

9. MODE OF TREATMENT GIVEN:

A) DRESSING, DEBRIDEMENT & SKIN GRAFTING:

➢ *Qari FA, Akbar D at King Abdulaziz University, Hospital, Jeddah, Saudi Arabia* showed that 65% of patients with diabetic foot lesions need dressing & debridement.

➢ *Caraveauai C. D.E. Gislio R. et. al. Oct. 2003.* They achieved a complete ulcer healing in 65.3% cases in treated group and 49.6% in control group after weekly assessment, aggressive debridement, and adequate pressure release.

➢ In our study, all patients with diabetic septic foot were treated by incision & drainage and aggressive debridement either in single setting or in multiple settings.

B) AMPUTATIONS:

➢ *Scott D. Ramsay et. al.* in his study reported a lower extremity amputation rate of 11.2% in patients with diabetic foot lesions.

➢ *Moulik PK et. al.* University Hospital, Aintree, Liverpool, U.K., reported five year amputation rate for ischemic (29%), neuroischaemic (25%) and neuropathic (11%) ulcers.

➢ Approximately 40-60% of all amputation of lower extremity are performed in
patients with diabetics. [Ebskov B., Ebskov L.; Diabetologica; vol.39; number 12/nov.1996; pg.1607-10].

➢ Qari FA et. al. in his study reported a major amputation rate of 23.5% in patients with diabetic foot lesions.

➢ DEPT. of surgery, Derer’s University Hospital, Bratislava, Slovakia. Reported 50% patients of diabetes need amputations due to complications mainly gangrene.

➢ O’Rourkee I, Heard S, et. al. in his study found that 37% and 23% of patients with diabetic foot lesions required minor & major amputations respectively.

➢ Vega Daniel, West Kristine, Tellado Jose M. reported 30-50% of diabetes with critical limb ischemia requires amputation.

➢ In our study the amputation rate is significantly higher due to high rate of infection in Indian set up. Amputations were necessary, beneficial, cost effective & life saving in cases of extensive gangrene in diabetic foot. In our study, amputation was done in 52.63% cases {in form of minor (28.95%) or major (23.68%) amputations}.

10. DURATION OF HOSPITAL STAY:

➢ In our study the maximum number of patients stayed in hospital for 51-60 days {36.84%} followed by 31-40 days {23.68%}. the average stay is of 49.71 days.

11. MORTALITY:—

➢ Moulik P K et al, in his study reported five year mortality rate of 45% for Neuropathic, 18% for Neuroischemic and 55% for ischemic ulcers.

➢ Wang et. al. in his study concluded that considerable international differences were found not only in mortality rate following amputations but they also very according to the type of diabetes. In his opinion, IDDM have a high mortality rate.

➢ In a study {by Oyibo S.O.; Jude E.B.; Tarawneh I. et al. Diabetic Medicine; vol.18;
4% patients died.

In our study, mortality rate was NIL. Mortality rate in patients with diabetic foot lesions have reduced significantly due to improved medical care and antibiotics; but in our study it was nil because follow-up of patients was only for one year & poor patient compliance for follow-up.