Diabetic Foot

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Abstract: Background: Diaphyseal humeral injuries account for 3–5% of all injuries. Treatment option varies from conservative cast and brace to internal fixation with plate and screws and intramedullary nailing. Among all options, plate osteosynthesis remains the gold standard for the operative fixation of humeral shaft fractures. In present series we have studied operative result of two different techniques in terms of operative difficulties, functional outcome and complications. Methods: Study was conducted over a period of three years on thirty patients with closed acute humeral shaft fracture requiring operative interventions. In all patients, an AO 4.5 mm dynamic compression plate or Locking Compression Plate was used through anterior approach in 15 patients and posterior approach in 15 patients. Post-operatively regular follow up done (Minimum 1 year) and during each follow up radiological and functional outcome evaluated. Result: In all patients fracture united in 13 to14 weeks with good shoulder and elbow range of motion. Out of 15 patients of posterior plate group complications were: Infection- 1 (6.6%); iatrogenic radial nerve palsy – 4(26.6%). Out of 15 patients of anterior plate group no complications were observed. Conclusion: For patients requiring surgical treatment of shaft humeral fractures by plating, anterior and posterior approach both provide statistically comparable results but anterior humerus platting provides less complication rate and convenient operative position (for anesthesia) which makes it preferred approach. [Bhavik D NJIRM 2017; 8(3):145-148]

Key Words: Shaft humerus fracture, plate osteosynthesis, anterior vs posterior approach

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Introduction: The prevalence of Type 2 diabetes is increasing all over the world. According to the recent WHO report, the prevalence of diabetes in adults worldwide will rise from 4.0% in 1995 to 5.4% in 2025. In terms of number of patients it will rise from 135 million to 300 million. The WHO has acknowledged that India has the maximum number of diabetic patients in any given country in the year 1995 (10 million) and that it would increase to 57 million by 2025[1]. India has thus become the "Diabetic Capital of the World".

An epidemiological study carried out in Chennai shows that the prevalence of diabetes has increased from 5.2% in 1883 to 8.2% in 1989 to 11.6% in 1995 and 14.7% in 2000 in subjects aged 20 years or more. (Table-I)

Table-I:

NIDDM %	1990	1995	2000
Urban	8.2	11.6	14.7
Rural	2.4	2.4	2.4
Number of Diabetics (Million)	22	28	33

It has been found that onset of diabetes in Indians is at a younger age as compared to several other races. Due to the rise in the number of diabetics the number suffering from vascular complications is also increasing. Prevalence of PVD in Asian Indians (3.7%) is comparatively low as compared to white population (9.3%). Low prevalence of PVD was demonstrated in Indians was demonstrated by Mohan et.al. (3.9%). [2]

The prevalence of PVD using Ankle/Brachial index criteria is low among Indians this may be the probable cause of low incidence found by Mohan et al[2].

But if sophisticated techniques like Duplex Colour Doppler is used than almost 30% persons with normal A/B index demonstrate Plaques/Stenosis in the peripheral arteries.

Extent of problem - Diabetic Foot is one of the most common complications of diabetes mellitus. Approximately 15% of persons with diabetes will have an ulcer in their life time with annual incidence of 2-3%. It is the leading cause of non traumatic amputation accounting for 50-80% of all amputations. Amputation of a part of lower limb is 15 times more common in diabetics. In most studies the incidence of lower leg amputation is estimated to be 5-25/100,000 inhabitants/year, while amongst diabetics the figure is 6-8/1,000. Nearly 20% of admissions for diabetes are due to diabetic foot.

Economic Burden - Diabetic Foot is a significant economic burden both to an individual and the country at large. The persons with diabetes mellitus use up 12-15 % of health care resources. Diabetes complications account for 60% of diabetes related health care costs (direct cost i.e. Cost of Ambulatory Care and Cost of Hospitalization) and almost 80-90% of indirect cost (Man Days lost and loss of personal and family income).[3] Comparative cost of diabetes care is given in Table II.

Table II.

Sr.No	Country	Year	Cost in US$
1	India (BUD)	1998	191
2	Argentina	1994	330
3	France	1992	675
4	Denmark	1994	3535

Reorganization of Problem - Diabetic Foot can be recognized by the presence of any of the following -

- Planter Callus
- Planter Pressure Points
- Foot Deformity
- Limited Joint Mobility
- Tinea Infection
- Trauma
- Fissures in the Skin
- Ulcer
- Cellulites
- Deep Soft tissue Infection
- Osteomyelitis
- Necrotizing Fascitis
- Absence of pulse
- Decrease or absent joint position vibration sense

Classification of Problem - diabetic foot can be classified into - • Neuropathic or • Neuro-ischemic

Neuropathic foot is warm, painless, with normal skin colour, there can be callus which is thick at pressure points, and ulcers if present are planter at pressure and some times dorsal at areas of stress. On examination peripheral pulse is bounding and ABI (Ankle /Brachial Index) is >0.9.

Neuro-ischemic foot is cold, painful with skin showing dependent rubor. Callous may or may not be present, ulcers when present are on the margins of the toe. Peripheral pulse is feeble and ABI is <0.9.

Grading of problem - Meggit - Wegner classification system is most widely used. Diabetic foot lesions are graded up to five as under -

Grade 0 - High Risk Foot, no ulcer
Grade 1 - Superficial ulcer, not clinically infected
Grade 2 - Deep ulcer, often with cellulites, no abscess or bone infection Grade 3 - Deep ulcer with bony involvement or abscess formation
Grade 4 - Localized gangrene (toe, fore foot or heel)
Grade 5 - Gangrene of whole foot

Measures to be taken - certain principles are to be followed to manage these persons. Some of them are -

- A multidisciplinary approach is needed
- Metabolic control
- Off - loading the wound
- Ensuring adequate blood supply
- Empirical anti - microbial treatment
- Surgical intervention when needed
- Meticulous wound care
- Appropriate foot wear

Treatment of diabetic foot is multifaceted and depends on the stage of
the disease. It has to be immediate and aggressive even in initial stage to
prevent it from progression to a more severe stage.
Main emphasis should be to
maintain the integrity of the epithelium as it helps in foot to remain intact despite
deformity.
Infection control is most important as it delays wound healing. Antibiotics should be started empirically which should cover most of the common pathogens. Severe infections may be life or limb threatening; they affect deep soft tissue and bones or joints.

Adequate offloading of the ulcer should be done and foot to be placed in cast to avoid pressure and give rest to the foot. It usually heals the ulcer in 10-12 weeks. In extensive cases radical debridment may be needed. Early radical debridment in the anatomical space helps to prevent amputation.

Vascular lesions may need revascularization either by angioplasty or bypass. Even after treatment life long surveillance is needed. Prevention of diabetic foot - we are all aware that direct and indirect cost of treating diabetic foot is very high. It s not only a personal

problem but is also a social and economic burden to the society at large. In developing countries like ours the problem is more acute as majority of the population stays in rural area and without foot wear and the chances of injury and hence ulceration is more. Diabetes is a self managed disease and the participation of the individual and his family id very essential in managing the disease and preventing its complications. A few preventive measures that should be adopted are -

- Screening and identifying the foot at risk
- Taking adequate and aggressive measure on detection
- Patient should be taught to -
  - o Examine the feet daily
  - o Wash the feet daily with soap and water o Do not use hot water to wash feet
  - o Do not use hot water bottle or heater to warm the feet o Use lotion to keep the feet soft
  - o Check the feet daily with the help of mirror
  - o Dry the feet carefully even in between the toes o Look for noticeable redness or discoloration o Look for unusual hotness of foot
  - o See for any discharge
  - o See if the feet smell bad
  - o Do not use any corn medicine or blade to cut it
  - o Cut nails straight across
- Foot wear advice is a must
  - o Wear well fitting foot wear
  - o Consult doctor immediately when a corn or any ulcer or abnormality is noted
  - o Take care of your feet as you care for your face o Never go bare footed anywhere
  - o Before wearing foot wear always examine the inside o Avoid shoes that are tight or have rough seams
  - o Buy shoes in the evening
  - o Always wear cotton socks
  - o Socks should be well fitting and not too tight
  - o Never put foot on any heated object e.g. silencer of a motor cycle
- Do not smoke and avoid tobacco products
- In case of anything unusual go to your doctor and NEVER TRY SELF MEDICATION
- Keep the wound covered

Method: As we are working in a Govt. hospital there is no dearth of patients. Our daily OPD is 250-300 patients. As per our estimate and as per the hospital records almost 40% patients of >40 yrs are diabetic. During three years we examined 2000 diabetics (We have twice a week OPD). All the patients were examined for the following parameters -

1. Height
2. Weight
3. Skin fold thickness
4. Waist : Hip ratio
5. FBS, PP_2BS & HbA1C, Serum Creatinin, Lipid Profile, Urine Albumin (microalbuminuria)
6. ECG, X-Ray Chest
7. Presence of Neuropathy
8. Peripheral Pulses
9. Joint position & Vibration sense
10. Retinopathy

All the patients who came to the Medical OPD and those who were admitted in any ward in the hospital were also screened for the presence of any complication with special reference to the diabetic foot. Those who were found to have presence of diabetic foot of any grade were given appropriate advice. Wherever surgical help was needed our surgical colleagues were of much help to us. Foot wear advice are given to all the patients and those who need special foot wear a local person has been contacted.

We have started seeing the sensation of the entire diabetic patient both in the OPD and indoor patients. Our Surgical colleagues have also started referring the entire diabetic patient who go accidentally to them and the patients with early diabetic foot to us.

To educate people special slide shows are arranged at the OPD. A series of Diabetic Camps were also organized to detect diabetes and the presence of its complications. Special emphasis was put on examining the feet for Diabetic Foot. Public lectures were also taken by me and Endocrinologist called from other cities. The profile of patients examined by us is given below.

Total no of patients 2000 Pt's. With Diabetic Foot (DF) 1000 (50.00% Of Total)

Grade 0	700	70.00% (Of DF)
Grade 1	156	15.06%
Grade 2	85	08.50%
Grade 3	28	02.80%
Grade 4	28	02.80%
Grade 5	03	00.30%

Table III

S. No.	Pt. with DF Male	Pt. with DF Female	Pt. Without DF Male	Pt. Without DF Female
Age	38.5 (20-65)	42.6 (35-68)	37.0 (32-55)	40.2 (35-68)
Sex	687	313	579	421
Height	5'1"	5'5"	5'1"	5'5"
Weight	53 Kg.(30-85)	42Kg.(34-68)	54Kg.(30-90)	41Kg.(30-65)
FBS	160.8mg/dl	180.7mg/dl	118.6mg/dl	124.4mg/dl
PP_2BS	187.5mg/dl	186.0mg/dl	218.5mg/dl	232.5mg/dl
HbA1C	8.7	8.8	7.0	7.3
S. Creatinin	1.6	1.3	1.3	1.3
S. Cholesterol	187mg/dl	200mg/dl	178mg/dl	192mg/dl
S. Trig.	190mg/dl	185mg/dl	195mg/dl	180mg/dl
S. HDL	35mg/dl	39mg/dl	36mg/dl	40mg/dl
Urine Alb.	Micro. to +	Micro. to +	NIL - +	Nil - +
Retinopathy	32%	29%	31%	29%
Absent JVPS	90%	88%	NIL	NIL
Absent dorsalis	98%	99%	2%	NIL
A/B Index	<.7	<.7	>.9	>.9
ECG IHD	45%	35%	44%	30%

Recommendation:

- Frequent interaction with Surgeons and Orthopedic
- Training of all the Physicians and Residents in the Hospital
- Meticulous approach for the early diagnosis and aggressive treatment
- A scheduled Programme for prevention
- Teaching of patients
- Training of family physicians for the need for early diagnosis and treatment of diabetic foot
- Teaching of patients to recognize earliest problems of foot
- Teaching of family members regarding the tight control of diabetes, role of diet and early consultation with the doctor whenever the patient complains of any abnormal symptom in the feet.

With the above measures we hope to give patients a better care and prevent amputations and improve the quality of life.

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