REVIEW ARTICLE

SURGICAL COMPLICATONS OF DIABETES MELLITUS

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ABSTRACT: Diabetes mellitus or simply diabetes is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin or the Untreated diabetes can cause many complications.

All forms of diabetes have been treatable since insulin became available in 1922 and type 2 diabetes may be controlled by medications.

KEY WORDS: Insulin, debridement, gangrene, amputations, Fournier's gangrene, disarticulation, extracellular matrix, keratinocytes, fibroblasts, angiogenesis.

INTRODUCTION: Knowledge of diabetes is important because of its high prevalence. It has been estimated that there are more than two hundred million diabetics in the world. In recent years in India, diabetes & surgical complications of diabetes is becoming more common .The complications are usually common in the age group of 40- 60 years. Both male & female are equally affected. Complications are more among the people of lower socio economic class because of negligence, poverty & illiteracy.

After discovery of insulin in 1922 by "Frederick Banting" and "Charles Herbert", an era of proper management of surgical complications of diabetes has been achieved.

The mortality rate of surgical complications of diabetes which used to be as high as 64% in pre insulin era is brought down to 1% after advent of insulin and surgery has been made safe there by.

Majority of surgery performed in diabetes are required for the treatment of gangrene of the part involved and infections. These procedures include debridements, slough excision, amputations, and incision & drainage.

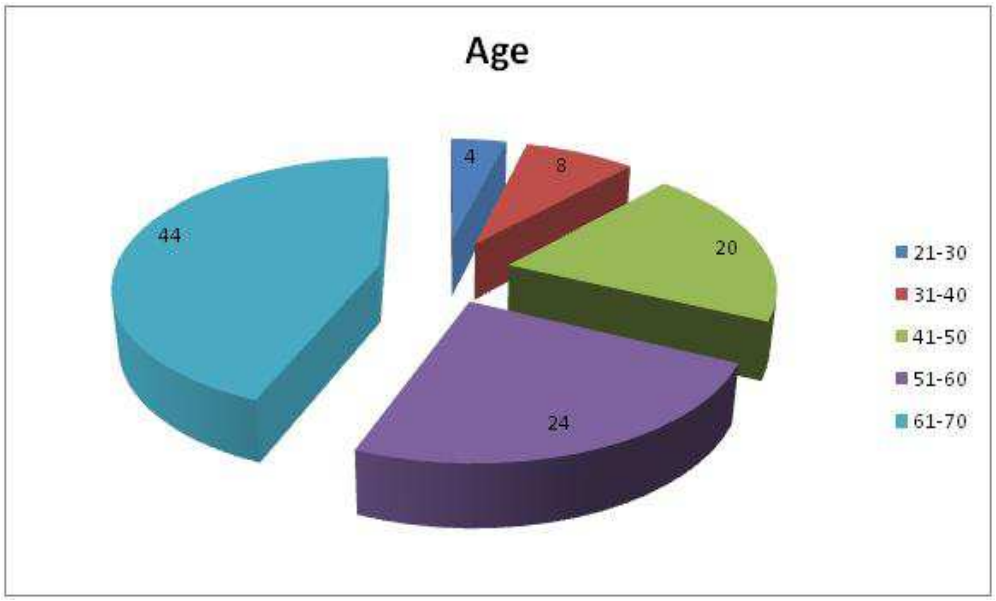
MATERIALS AND METHODS: This clinical study of surgical complications and treatment of diabetes is based on study of cases admitted and treated (from Jan 2010 to Dec 2012) in SIMS-Mc Gann teaching hospital, Shimoga.

The age, sex of each patient was noted .The profession and socio economic status were also noted. Previous history of having suffered from any wounds, gangrenes, ulcer, boils are noted .Any other arterial or venous disorders associated with diabetes are noted. Apart from routine blood, urine investigations for the presence of ketone bodies, sugar; special investigations like arterial / venous Doppler studies, X- ray of the part, culture and sensitivity of the secretions were also done.

DISCUSSION: Total number of cases studied was 25 cases for a period of 2 year from Jan 2010 to Dec 2012.

AGE INCIDENCE: Among the 25 cases studied, the youngest patient was 30 years and oldest was 70 years; the average being 60 years.

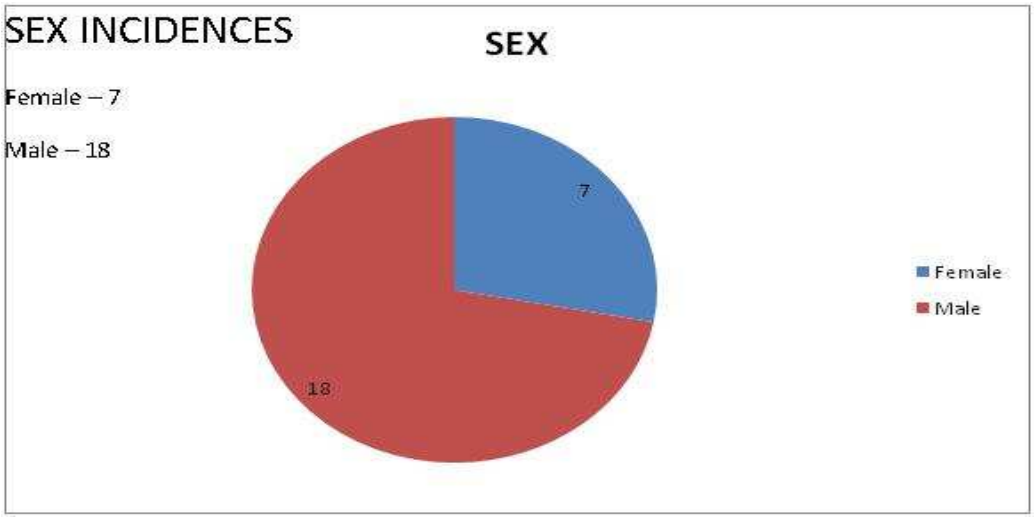
AGE IN YEARS	No. OF PATIENTS	PERCENTAGE
0-10	-	-
11-20	-	-
21-30	1	4%
31-40	2	8%
41-50	5	20 %
51-60	6	24 %
61-70	11	44%



SEX INCIDENCES:

Female – 7

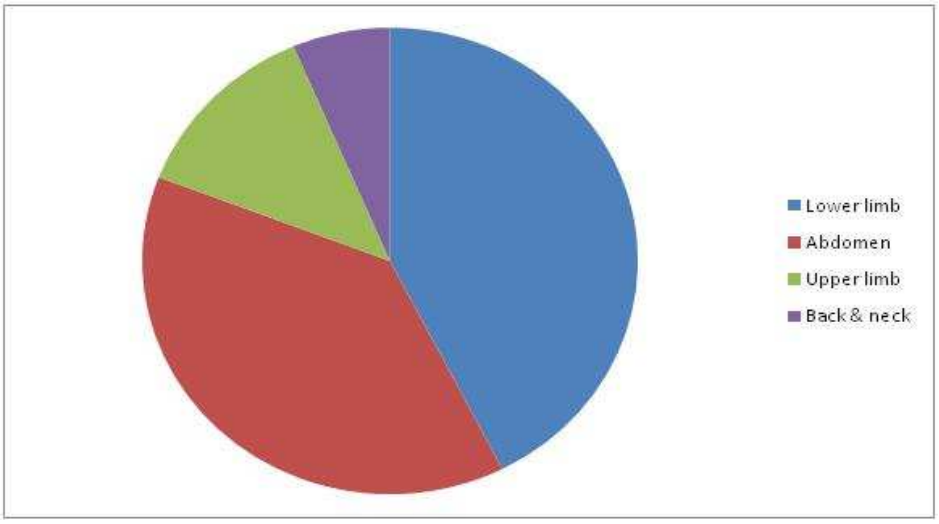
Male – 18



In this study of 25 cases, majority (60%) of the patients were belonging to middle or upper class and above 40 % low income group.

INCIDENCE OF INVOLVEMENT OF THE PARTS OF BODY

LESIONS	NO. OF PATIENTS	PERCENTAGE
Lower limbs	16	26.6 %
Abdomen	6	24 %
Upper limb	2	8 %
Back & neck	1	4 %



In this study group of 25 patients, 21 patients had septic lesions (84 %) and ischemic lesions were 4 (16 %).

The Diabetic foot ulcer is a major complication of DM, and probably the major component of diabetic foot. It occurs in 15% of all patients with Diabetes and precedes 84% of all lower leg amputations. The major pathology observed is due to the development of macro and micro vascular

complications, including failure of wound healing process. Wound healing is a 'make-up' phenomenon for the portion of tissue that gets destroyed in any open or closed injury to the skin. DM is one such metabolic disorder that impedes normal steps of wound healing process by prolonged inflammatory phase in diabetic wounds, which causes delay in the formation of mature granulation tissue and a parallel reduction in wound tensile strength.

No therapy is completely perfect in non healing chronic diabetic ulcer as each type suffers from its own disadvantages. Moist wound therapy is known to promote fibroblast and keratinocyte proliferation and migration, collagen synthesis, early angiogenesis and wound contraction. At present there are various categories of moist dressings available such as adhesive backing film, silicone coated foam, hydrogels, hydrocolloids etc. Unfortunately, all moist dressings cause fluid retention, most of them require secondary dressing and hence are not the best choice for exudative wounds. New therapies in development are also promising such as platelet rich fibrin wound patch therapy, which is often simple effective in chronic diabetic foot ulcer.

The treatment in foot ulcer in diabetes requires multidisciplinary assessment usually by diabetic specialists and surgeons. Treatment consists of appropriate bandages, antibiotics (against staphylococcus, streptococcus and anaerobe strains), debridement and platelet-rich fibrin therapies, arterial re-vascularization.

In this study of 25 patients, distribution of the type of surgical complications are listed below.

TYPE OF LESION	NO OF PATIENTS	PERCENTAGE
Ulcer	14	56 %
Abscess	5	20%
Gangrene	4	16 %
Cellulitis	2	8 %

Fournier's gangrene is a fulminant form of infective necrotizing fasciitis which has shown to have a predilection in the diabetics .It is a mixed infection caused by both aerobic & anaerobic bacterial flora .The nidus is usually in the genito urinary tract, lower G.I. tract or skin. Common sites of involvement are perineal, genital or peri anal regions.

It shows vast heterogeneity in clinical presentation, from insidious onset to rapid onset .it tends to be more common in elderly men. It starts with significant pain & swelling, with pronounced systemic signs. Crepitus is also a common feature. As the subcutaneous inflammation worsens, necrotic patches start appearing, and progress to extensive necrosis and sloughing of skin. It is a urological emergency requiring intravenous antibiotics and debridement of necrotic tissue. In addition to surgery and antibiotics, hyperbaric oxygen therapy may be useful and acts to inhibit the growth and kill the anaerobic bacteria. Unless aggressively treated, the patient can go to multi organ failure.

TREATMENT: Medical line of treatment was given to all the cases with insulin, depending upon the blood sugar levels (fasting & post prandial) and urine sugars. Appropriate antibiotics depending upon the culture & sensitivity of the pus from the lesions are given.

Supporting treatments like multivitamins, vaso dilators, sugar free protein suppliments were given. Wounds were dressed everyday with anti septic solutions or ointments. Minor operative procedures like incision & drainage, wound debridement were carried out in 20 patients.

- Adequate debridement is the first step in the evaluation of a foot ulcer. Debridement involved in the removal of all necrotic tissue and surrounding callus until healthy bleeding edge is revealed.
- Out of 4 diabetic gangrene patients, 2 patients required surgical debridement, wound care and anti biotic therapy. The other 2 patients underwent disarticulation which was performed for ischemic disease.
- 1 patient with Fournier's gangrene, after complete excision of scrotal skin and with supra pubic cystostomy, skin grafting was done.

CONCLUSIONS & RECOMMENDATIONS: Diabetic foot ulcer is a major complication of DM. So steps to prevent diabetic foot ulcers include frequent chiropody review, good foot hygiene, diabetic socks and shoes, as well as avoiding injury.

- Foot-care education combined with increased surveillance can reduce the incidence of serious foot lesions.
- Footwear.
- All major reviews recommend special footwear for patients with a prior ulcer or with foot deformities. One review added neuropathy as an indication for special footwear.

DM is one such metabolic disorder that impedes usual steps of wound healing, causing prolonged inflammatory phase in diabetic wound, which cause delay in the mature granulation tissue and reduction in the wound tensile strength.

Meticulous attention to foot care and proper management of foot injuries are key to prevent ulcer formation.

Risk of diabetic complications increase once HbA1C levels exceed 9 % and increase significantly above 12 %.

By routine monitoring of blood sugar levels, blood pressure and cholesterol, people with diabetes can help lower the risk of complications. Moreover lifestyle involving good diet, regular exercises, and no smoking also help to reduce the complications.

TABLE SHOWING TREATMENT INCIDENCES

MANAGEMENT	NO OF PATIENTS	PERCENTAGE
Slough excision	20	80 %
Disarticulation of toes	2	8%
Below knee amputation	1	4%
Incision & drainage	2	8%

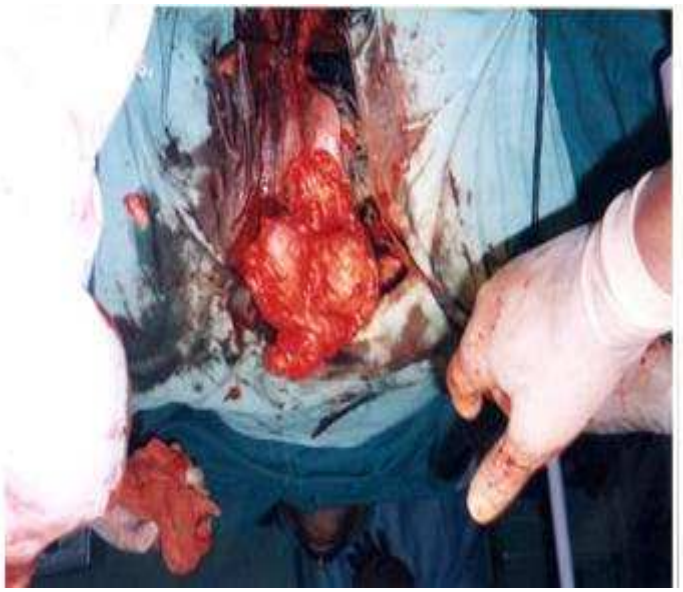
Gangrenous changes with slough seen in lower limb .

Post slough excision of diabetic ulcer foot and full thickness skin grafting done.

Post disarticulation of 3 toes of foot in a diabetic patient

Extensive diabetic ulcer of right forearm seen following a blister in an uncontrolled and neglected case of diabetes.

Case of Fournier's Gangrene involving scrotum and penis in a diabetic patient



Same case after extensive debridement of scrotal wall and skin over penis under SA.

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