

Role of JIPMER Proforma in Diabetic Foot Management

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Diabetes mellitus is a chronic disease which is a burden not only physically, but also socially and financially. One of the common presentation of diabetic patient to the hospital is with diabetic foot infections. Various proformas are in use for the assessment of such patients. Guidelines are provided for effective management. We would like to give our experience of use of a proforma compiled by JIPMER plastic surgery department.

Keywords: *Diabetes mellitus, Proforma, Diabetic foot infections*

Introduction

Diabetes mellitus is, the leading cause of mortality, morbidity in the world. The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014. The global prevalence of diabetes mellitus among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014^[1]. Diabetic foot infections are the most common skeletal and soft-tissue infections in patients with diabetes. The estimated lifetime risk of a person with diabetes mellitus developing a foot ulcer is 15% to 25%, with an annual incidence of 3% to 10%^[2].

Ascending infection in patients with diabetes will have grave consequences. Hence, complete assessment and prompt management are essential for reducing morbidity and mortality. The comprehensive assessment of diabetic foot infection is critical and important for appropriate treatment.

We have devised a proforma for patients with diabetic foot infections which will help in the complete assessment and treatment of these patients.

Materials and methods

The JIPMER diabetic foot proforma that has three components. Part A consists of history, clinical examination and investigations. After the complete assessment, based on the treatment planned template for consent for various procedures useful for a general surgeon and plastic and reconstructive surgeon is added in the proforma. Part B has the checklist to be followed by the surgeon on the day of the planned surgery. Part C has the information to be given in the discharge summary and follow-up [Figure 1-8]. Five plastic surgery residents used the proforma, and their feedback was taken according to the feedback proforma (Figure 9).

Results

All the doctors recommend (Table 1) the proforma as a part of a regular assessment of the patient. They would also like to recommend the same to their colleagues.

Question	Resident 1	Resident 2	Resident 3	Resident 4	Resident 5
Does proforma help in recording all findings	Yes	Yes	Yes	Yes	No
Does proforma help in follow up of patient	Yes	No	Yes	Yes	Yes
Do you find proforma useful for counselling the patient	No	Yes	Yes	Yes	Yes
Is the Consent of the proforma helpful	Yes	Yes	Yes	Yes	Yes
Do you think the proforma helps in medicolegal cases	Yes	Yes	Yes	Yes	Yes
Is the pre-operative checklist helpful	Yes	Yes	No	Yes	Yes

Will you recommend this proforma to other surgeons	Yes	Yes	Yes	Yes	Yes
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Table 1. Reply to the feedback form

DIABETIC FOOT PROFORMA

This proforma is a compendium to guide and provide systematic approach to a patient of diabetic foot.

This proforma is divided into three parts.

Part –A includes details to be documented by physician/surgeon about patient before starting treatment/surgery.

Part-B includes protocol to be followed by physician/surgeon according to his/her plan of treatment/surgery.

Part –C includes details to be documented by physician/surgeon at the time of discharge and follow-up.

PART – A

Part –A includes details to be documented by physician/surgeon about patient before starting treatment/surgery. This includes patient's demographics, points to be asked in history, findings to be noted during head to toe examination; systemic examination & local examination, footwear assessment, documentation, investigations, classification, risk stratification, specialist consultations and consent for clinical photograph/video recording/investigations/treatment/surgery.

Patient Demographics

Name: Age: Gender: M/F/T Hospital ID:

Address:

Occupation:

Socio-economic status:

Identification Mark:

History'

Chief Complaints

History of Present Illness

Past History

Treatment History

Family History

Personal History

**Refer Standard Text Book of History Taking*

Figure 1.

Examination*

Vital signs

Basal Metabolic Index (BMI)

Head to toe examination

Systemic examination

- Cardiovascular system
- Peripheral vascular system
- Respiratory System
- Central Nervous System
- Peripheral Nervous System (important findings like loss of sensation, pressure points, etc should be documented diagrammatically)
- Musculoskeletal system (including Deformity & Gait assessment)
- Abdomen examination
- Ophthalmic Examination

Local Examination

- Inspection
- Palpation
- Percussion
- Auscultation

Foot Wear Assessment

**Refer Standard Text Book of Examination*

Documentation

Clinical Photographs

Video Recording

Bates-Jensen Wound Assessment Tool (BJWAT)

Triangle of Wound Assessment (TOWA)

Investigations

Blood Tests:

- Hemoglobin (Hb)
- Total Leucocyte Count (TLC)
- Differential Leucocyte Count (DLC)
- Peripheral smear
- Bleeding Time (BT)/Clotting Time (CT)/ Prothrombin Time (PT)/ International Normalised Ratio (INR)

Figure 2.

- Blood Urea (BU)
 - Serum Creatinine (SCr)
 - Serum Electrolytes (SE)
 - HbA1C
 - Fasting and post prandial blood sugar (FBS/PPBS)
 - Glucose Tolerance Test (GTT)
 - Serum Bilirubin
 - Serum Total Protein/ Serum Albumin
 - Liver Enzymes
 - Lipid profile (HDL/LDL/VLDL/Serum cholesterol/Serum Triglycerides)
 - Serum Lactate
 - C-Reactive Protein (CRP)
 - Erythrocyte Sedimentation Rate (ESR)
 - Arterial Blood Gas Analysis (ABG)
 - Pro-calcitonin
 - Blood culture
 - Blood grouping and Rh typing
 - Thyroid Function tests (T3/T4/TSH/ TPO antibodies)
- Urine Tests*
- Urine routine and microscopy
 - Urine for glucose, albumin & ketones
 - Urine culture
- Microbiological Tests*
- Wound tissue culture
- Pathological Tests*
- Biospy of tissue/ bone
- Cardiovascular Tests*
- ECG
 - ECHO
 - Ankle-Brachial Pressure Index (ABPI)
 - Toe Brachial Index (TBI)
 - Transcutaneous oximetry
 - Pulse oximetry
- Radiological Tests*
- X-ray chest
 - X-ray foot/limb
 - Ultrasonography limb & abdomen
 - Colour Doppler of limb
 - Plethysmography
 - Thermography
 - DEXA scan

Figure 3.

- Podiascan
 - Bone scan
 - CT
 - MRI
 - CT/MR angiography
 - SPECT-CT
 - PET scan
- Ophthalmological Tests:*
- Visual acuity
 - Direct and indirect ophthalmoscopy
 - Perimetry
- Neurological Tests:*
- Nerve conduction study (NCS)
 - Electromyography (EMG)
- Dermatological Tests:*
- Skin smear
 - Videodermatoscopy
- Classification**
- Wagner's Classification
- IDSA Classification
- YRB Classification (based on colour coding)
- Risk stratification**
- According to International Working Group on the Diabetic Foot (IWGDF) Guidelines
- Consultations:**
- Physician
 - Endocrinologist
 - Cardiologist
 - Nephrologist
 - Ophthalmologist
 - Neurologist
 - Intensivist
 - Dermatologist
 - Nutritionist
 - General surgeon
 - Orthopaedician
 - Podiatrist
 - Orthotist
 - Prosthetist

Figure 4.

- Physiotherapist
- Psychiatrist / Counsellor
- Medical Social Worker

Consents***I. Consent for Clinical Photograph/ Video Recording**

I/We (Patient/ Attendant), _____ / _____ (Relation with patient) hereby give consent for clinical photograph/video recording. I/We have been explained in the language I/We understand by the doctor on duty the purpose of taking the clinical photographs/video recording is to keep the record/document the findings before starting the treatment/surgery and to see the progress & response of the treatment/surgery. I/We, _____ have also been explained that the Photographs/Video Recording taken may be used for the purpose of publication/continued medical education/research purpose without revealing the identity.

II. Consent for Investigations

This consent will be taken and explained by the Radiologist/Microbiologist/ Pathologist, etc.

III. Consent for Medical Treatment

This consent will be taken and explained by Medical Specialists (Physician / Endocrinologist / Cardiologist / Nephrologist, etc.)

IV. Consent for Anaesthesia

This consent will be taken and explained by Anaesthetists.

V. Consent for Surgery {Debridement-Surgical or Non-Surgical (Honey, Larvae, Chemicals, LASER, Radiofrequency, Hydrojet etc.)}

I/We (Patient/ Attendant), _____ / _____ (Relation with patient) hereby give consent for Debridement with/without anaesthesia. In case it is done under anaesthesia, I/We will be explained by anaesthetist the details about anaesthesia. I/We have been explained in the language I/We understand by the doctor on duty the meaning and purpose of Debridement. I/ We understand the loss due to removal of tissue which is non-viable / unhealthy / infected. Further, such debridement may be required in future also. Such debridement may be done with/without tourniquet and I/We have been explained the benefits and risks of use of tourniquet. Following debridement if any vital structures like tendons/nerves/blood vessels/bone etc., get exposed then debridement may be combined with other secondary procedures like Negative Pressure Wound Therapy (NPWT), Skin substitutes, Skin Grafting, Flap surgery, etc.

I/ We have been explained, in post operative period, I / She (he) will be kept in Intensive Care Unit (ICU) or Critical Care Unit (CCU) till fully recovered from anaesthesia. During stay in ICU/CCU, I/ She (he) may require (depending on underlying co-morbidities) monitoring and ventilator support.

VI. Consent for Skin Grafting

I/We (Patient/ Attendant), _____ / _____ (Relation with patient) hereby give consent for Skin Grafting under anaesthesia. I/We will be explained by anaesthetist the details about anaesthesia. I/We have been explained in the language I/We understand by the doctor on duty the meaning, purpose and complications

Figure 5.

associated with Skin Grafting like Graft loss (partial/complete), hypo/hyperpigmentation, hypertrophic scarring/ keloid formation, contracture etc. I/We have been explained about the secondary problems which may develop at the donor site like pain, itching, hypo/hyperpigmentation, hypertrophic scarring, keloid formation, contour deformity etc.

I/ We have been explained, in post-operative period, I / She (he) will be kept in Intensive Care Unit (ICU) or Critical Care Unit (CCU) till fully recovered from anaesthesia. During stay in ICU/CCU, I/ She (he) may require (depending on underlying co-morbidities) monitoring and ventilator support.

VII. *Consent for Flap Surgery (Non-microvascular)*

I/We (Patient/ Attendant), _____ / _____ (Relation with patient) hereby give consent for flap surgery (Non-microvascular) under anaesthesia. I/We will be explained by anaesthetist the details about anaesthesia. I/We have been explained in the language I/We understand by the doctor on duty the meaning, purpose and complications associated with Flap surgery (Non-microvascular) like flap loss (partial/complete), temporary or permanent loss of sensation over the flap, contour deformity etc.

I/We have been explained that it may be combined with other secondary procedure like harvesting of nerve graft, tendon graft, bone graft, skin graft, tendon transfer, neurolysis, tenolysis, capsulotomy, etc. I/ We have been explained that in case tendon, bone, nerve or skin grafting is done, then there is a possibility of reduced strength at the donor site of tendon harvested, gait/contour deformity at donor site of tendon/bone grafting and reduced sensations over the area supplied by the donor nerve. I/We have been explained about the secondary problems which may develop at the donor site with/without skin grafting (like pain, itching, hypo/hyperpigmentation, hypertrophic scarring, keloid formation, contour deformity etc.). I/We have been explained the meaning and purpose of other procedures which may be required like flap delay, flap division etc.

I/We have been explained in case of partial or complete loss of flap, I/ She (he) may require skin grafting and/or another non – microvascular flap surgery.

I/ We have been explained, in post-operative period, I / She (he) will be kept in Intensive Care Unit (ICU) or Critical Care Unit (CCU) till fully recovered from anaesthesia. During stay in ICU/CCU, I/ She (he) may require (depending on underlying co-morbidities) monitoring and ventilator support.

VIII. *Consent for Flap Surgery (Microvascular)*

I/We (Patient/ Attendant), _____ / _____ (Relation with patient) hereby give consent for flap surgery (Microvascular) under anaesthesia. I/We will be explained by anaesthetist the details about anaesthesia. I/We have been explained in the language I/We understand by the doctor on duty the meaning, purpose and complications associated with Flap surgery (Microvascular) like re-exploration surgery, flap loss (partial/complete), temporary or permanent loss of sensation over the flap, contour deformity etc. I/We have been explained that it may be combined with other secondary procedure like harvesting of vein graft, artery graft, nerve graft, tendon graft, bone graft, skin graft, tendon transfer, neurolysis, tenolysis, capsulotomy, etc. I/ We have been explained that in case tendon, bone, nerve or skin grafting is done, then there is a possibility of reduced strength at the donor site of

Figure 6.

tendon harvested, gait/contour deformity at donor site of bone grafting and reduced sensations over the area supplied by the donor nerve. I/We have been explained about the secondary problems which may develop at the donor site like pain, itching, hyper/hypopigmentation, hyper/hypohidrosis, keloid formation, contour deformity etc.

I/We have been explained in case of partial or complete loss of flap, I/ He/She may require skin grafting and/or another microvascular or non – microvascular flap surgery.

I/ We have been explained, in post-operative period, I / She (he) will be kept in Intensive Care Unit (ICU) or Critical Care Unit (CCU) till fully recovered from anaesthesia. During stay in ICU/CCU, I/ She (he) may require (depending on underlying co-morbidities) monitoring and ventilator support.

IX. Consent for Joint Reconstruction, Tarsal Tunnel Release, Amputation etc.
This consent will be taken and explained by Orthopaedician / Podiatrist.

*If possible & facility available, all consents may be video recorded.

PART B

Part-B includes protocol to be followed by physician/surgeon according to his/her plan of treatment/surgery.

Medical treatment protocol will be explained by Physician/Specialist.

Surgeon should follow the following protocol before, during & after surgery:

1. Night before the surgery encourage for shower bath.
2. No Hair clipping at the site of surgery / private parts.
3. Ensure drug (antibiotic/local anaesthetic, etc.) sensitivity is done.
4. Follow Physician / Endocrinologist / Anaesthetist advice for glycaemic control.
5. Ensure patient safety while transporting to Operation theatre.
6. In pre-operative room ensure patient identification, site marking and necessary consents.
7. If possible, ensure availability of attendant / relative during operative time.
8. If blood transfusion is planned during or immediate post operative period, ensure availability of whole blood / components in blood bank and consent for blood transfusion is taken before transfusion.
9. Ensure availability of Intensive Care Unit (ICU) / Critical Care Unit (CCU) and Ventilator and Monitoring systems.
10. Ensure availability of pathologist if frozen section biopsy is planned.
11. Ensure the qualified anaesthetist / assistant / nurse is assisting the qualified surgeon.
12. Ensure availability of all equipment like magnifying loupe, microscope and microvascular equipment, tourniquet, instruments for reconstructive surgery (Skin grafting handle, Electric dermatome, Mesher, Radiofrequency machine, Centrifugation machine, Low Level LASER machine, Bipolar cautery, Nerve / Tendon and Bone equipment, etc.)
13. Ensure one dose of recommended antibiotic is administered at the time of induction/ intubation.

Figure 7.

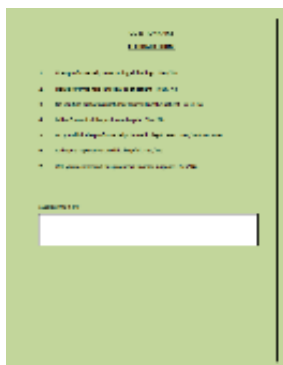
14. Follow WHO checklist before starting the procedure.
15. All the intra-operative findings should be documented in the operative note. If possible intra-operative findings should be photographed / video recorded. If required, findings may be explained to the attendant and relative to decide the definitive reconstructive surgery.
16. All anaesthetists' notes including their name, qualification and details should be enclosed carefully with the surgeon's operative notes.
17. Name with qualification of the assisting nurse/ assistant should be mentioned in the operative note.
18. Surgery should be performed as per the consent taken. Any deviation from planned surgery needs prior consent from attendant / relative.
19. All operative steps including blood loss, gauze count, etc should be mentioned in the OT note carefully along with diagrammatic representation of the procedure done.
20. Any intra operative complications like excessive blood loss, anaesthesia related complications, injury to vital structures, etc. should be mentioned in the OT note and ought to be explained to the attendant/relative in a language they understand in writing.
21. Attendant/ relative should be informed before starting the surgery and at the completion of surgery.
22. Patient should be transported to post operative recovery room/ICU/CCU safely.
23. In Post operative recovery room/ICU/CCU any untoward incidence should be documented and informed to the attendant/relative in writing.
24. If patient is critical then hourly note should be written by treating physician / surgeon.
25. Once patient is stable then he/she should be transported to the ward safely.
26. In ward any excessive swabage/bleeding/signs of infection, etc should be documented in patient Attendant Communication Form & informed to attendant/relative time to time.

PART-C

Part -C includes details to be documented by physician/surgeon at the time of discharge and follow-up. The discharge summary (soft and hard copy) should include details of treatment/surgery/consultations/course in the hospital including any complications noted, rehabilitative measures given and condition at the time of discharge with treatment advice given by physician/specialists/dietician/physiotherapist/prosthetist-orthotist/surgeon and time of follow-up. Contact number of treating physician/surgeon should be mentioned in the discharge summary. If possible and facility available online consultations through Telemedicine Clinic may be provided. Emphasis should be given on the measures to prevent recurrence (Splint, Off Loading measures, Correct Foot wears, etc). During follow up the progress should be documented. Data Registry should be maintained for research and publications.

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Figure 8.



The image shows a feedback proforma form. It has a header with the text 'FEEDBACK FORM'. Below the header, there is a list of seven numbered questions:

1. Hospital staff are helpful, polite.
2. Doctor's attitude is satisfactory.
3. Doctor's knowledge is satisfactory.
4. Doctor's skill is satisfactory.
5. Doctor's explanation is satisfactory.
6. Doctor's advice is satisfactory.
7. Doctor's treatment is satisfactory.

 Below the list, there is a section labeled 'Comments' followed by a large white rectangular box for writing.

Figure 9. Feedback proforma

Discussion

Diabetes is a chronic disease. It occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin; then it leads to hyperglycaemia. Uncontrolled diabetes mellitus will lead to hyperglycaemia for longer duration resulting in end-organ damage. Diabetic foot infections, which are infections of the soft tissue or bone below the malleoli, are a common clinical problem ^[3] leading to hospitalisation.

It needs a multidisciplinary approach from multiple specialists like a general surgeon, orthopaedic surgeon, plastic surgeon, endocrinologist, orthotics etc for the appropriate management and to prevent recurrent infections.

A task force was formed by the American diabetes association (ADA) to give guidelines for the assessment of risk and the appropriate examination of diabetic foot infection patients^[4]. Diabetology associations from various countries including USA, UK, Canada^[5] have given guidelines that are followed in their regular clinical practice for the management and risk assessment. Most podiatrists use various charts and proformas to help in the assessment of the patients who present with foot infections and during follow-up,

However, there is no single proforma available to guide a physician or surgeon when a patient presents with a diabetic foot infection. We have tried to include all the problems encountered by a surgeon/plastic surgeon in diabetes foot management in our proforma for proper assessment and care.

Proforma based management helps not to miss any important finding or investigations. It also helps to maintain a checklist which can be a guide through the investigations and management. It also helps to keep track of the various treatment options and advice given at previous visits. However, it has to be used as a guide. It has to be individualised to each patient and the condition at which they present.

In government hospitals where there are various residents taking care of one patient, it helps to keep track of the stage of management.

Our proforma also gives the format of various consent forms, which can be individualised but has the advantage of forming a standard template. This may also help in medico-legal issues.

The checklist for the surgeon in the peri-operative period will ensure that all the standard protocols are followed, which helps both in effective patient care and streamlining of the support staff for increasing the efficiency.

It will help not only in the management of patients but also help in easier access to information in case the patient needs to be referred to another centre. It also helps in maintaining a data bank for future analysis and publications.

Conclusion

We applied JIPMER diabetic proforma in our patients and has helped in better overall management of our patients. However, we feel that even though it gives a checklist of the management of a diabetic patient, it needs to be individualised to each patient. Further use in a larger number of patients is required to validate its utility.

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