Preoperative preparation of Diabetic patient

Outline

- Introduction – Definition
  - Epidemiology
  - classification
- Common indications of surgery in DM
- Pre operative evaluation
- General principles of preop management of DM patient
- Pre operative optimisation
- Specific preoperative treatment
- Conclusion

Introduction

Diabetes mellitus

- Is a metabolic disorder resulting from an (absolute or relative) insulin deficiency or resistance to insulin.
- Affects about 5% of the population
- 50% of diabetes present for surgery in their lifetime

Classification	
Type I	Absolute insulin deficiency secondary to immune-mediated or idiopathic
Type II	Adult onset secondary to resistance/relative deficiency
Type III	Specific types of diabetes mellitus secondary to genetic defects
Type IV	Gestational

90% of which are type 2

- The **stress** of surgery/ anaesthesia results in metabolic disturbance that alter glucose homeostasis, and persistent hyperglycemia
- Result in;
  - Depressed immunity
  - Impaired wound healing
  - Endothelial dysfunction = IHD, CVA
  - Diabetic crises

- The current high standard of surgical and anaesthetic technology make the surgical outcome in diabetics comparable to that in non-diabetics

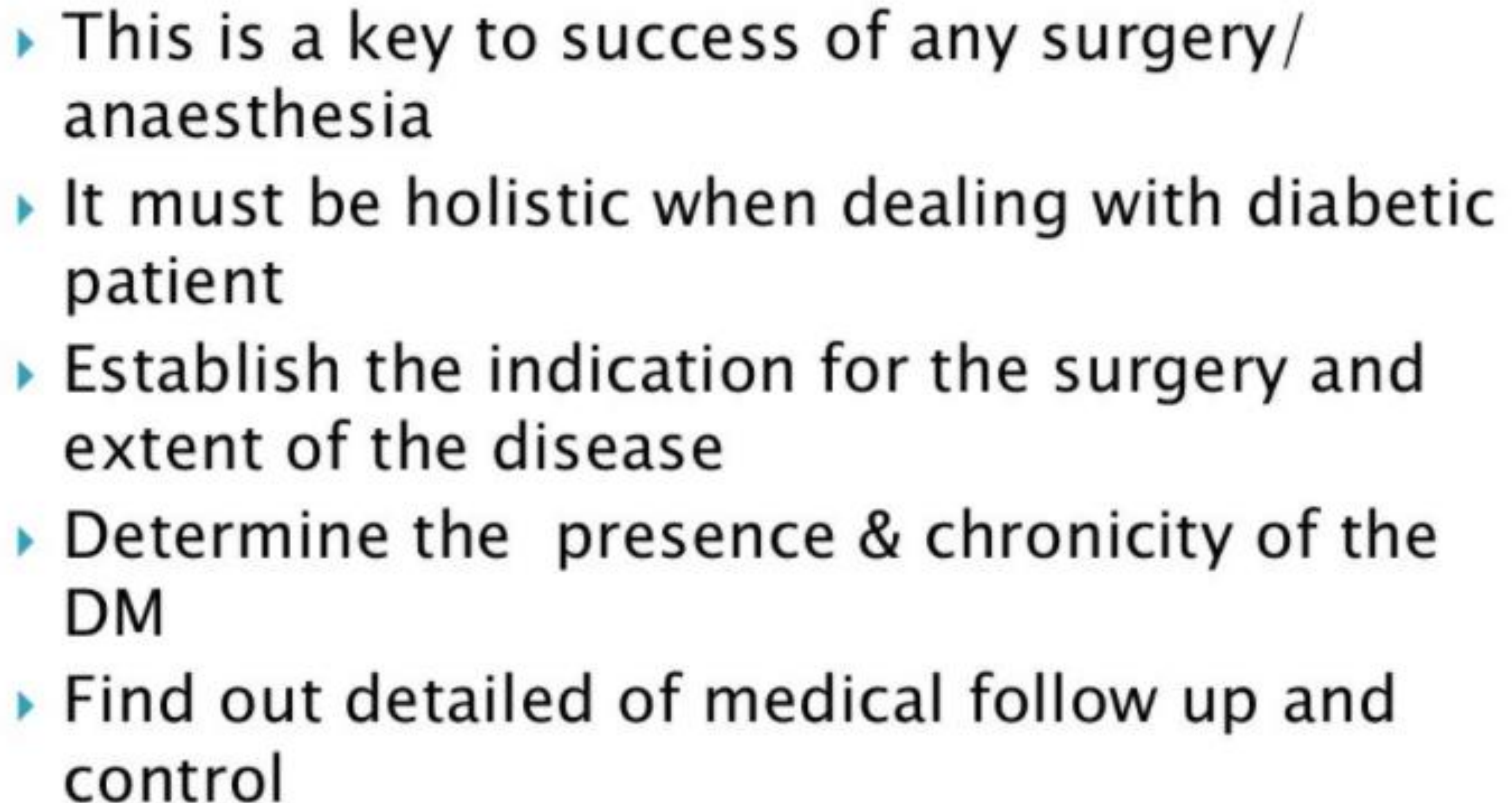
Common indications of surgery

DIABETIC RELATED

- Infections
  - Skin boils , abscesses and fistulae
  - Tuberculosis
- Angiopathy- gangrene (e.g DM foot)
- Ischaemic heart disease
- Eye conditions; Retinopathies and cataracts
- Renal; ESRD

OTHER surgical conditions

PREOPERATIVE ASSESSMENT



- Thorough systemic review with attention to the following detail;

A- Autonomic neurophathy

- Present in up to 40% of type 1 diabetics
- features include

  gastroparesis

  gustatory sweating

  nocturnal diarrhoea.

  postural hypotension

Assess heart rate variability with deep breath

Normal > 15 bpm

Neuropathy is likely if < 10 bpm

B – Cardiovascular system

- Diabetics are more prone to;
  - ischaemic heart disease (eg MI)
  - hypertension
  - peripheral vascular disease
  - cerebrovascular disease
  - cardiomyopathy

C – Respiratory system

Diabetics are more prone to respiratory infections and might also have abnormal spirometry

D – Gastrointestinal tract

Gastroparesis is characterised by a delay in gastric emptying without any gastric outlet obstruction. Increased gastric contents increase the risk of aspiration

- E- Airway

Glycosylation of collagen in the cervical and temporo-mandibular joints can cause difficulty in intubation

- F- Renal

Diabetes is one of the commonest causes of ESRF

Watch out for features of uraemia

- G- Immune system

Diabetics are prone to all types of infection. Indeed an infection might actually worsen diabetic control

- Other Hx; surgery, anaesthesia, blood tx, drug hx

Investigations

1- Blood glucose

RBS, FBS and 2hrs PG

WHO guidelines	Glucose concentration (mmol/l)	
	Plasma Venous	Whole Blood Venous
Diabetes Mellitus Fasting *or* 2hrs post load/ "Random"	 ≥ 7.0 ≥ 11.1	 ≥ 6.1 ≥ 10.0

2- Glycated Hb (HbA_{1c})

<7% Good control

>9% poor control

3- U,E & Cr

4- CXR

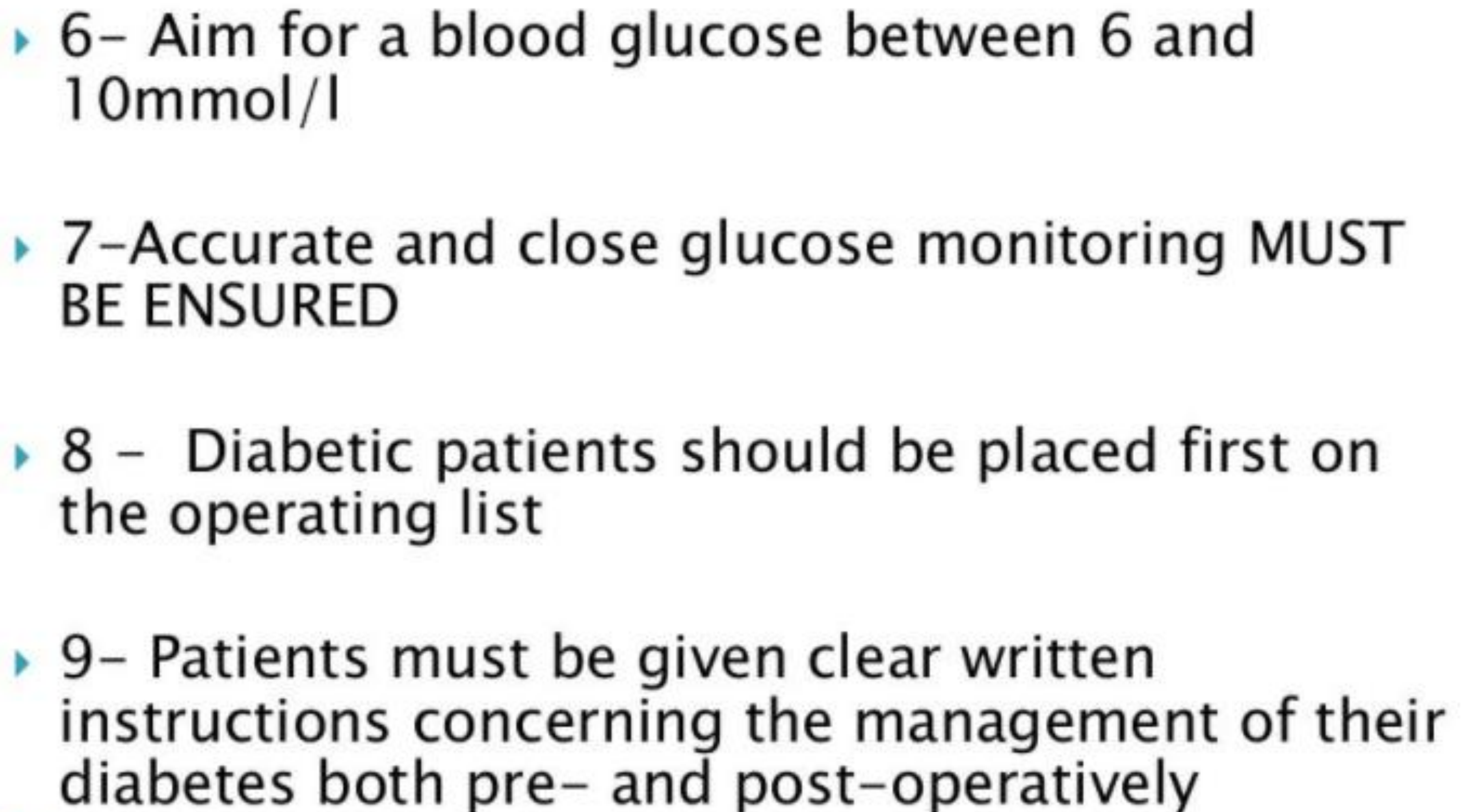
6- ECG

Risk assessment

- Anaeasthetic risk assessment must be established and documented
- Presence of pressure sore and potential PN site at risk should be noted

General principles for pre op preparation of DM patient

- 1- Perioperative management of DM patient is MULTIDISPLINARY
- 2- Diabetes should be well controlled prior to elective surgery
- 3- Avoid hypoglycaemia (under 4mmol/l)
- 4- Avoid severe hyperglycaemia (over 14mmol/l)
- 5- Type 1 diabetics need insulin to prevent ketogenesis and metabolic derangement


Gen. principles cont.
6- Aim for a blood glucose between 6 and 10mmol/l
7-Accurate and close glucose monitoring MUST BE ENSURED
8 - Diabetic patients should be placed first on the operating list
9- Patients must be given clear written instructions concerning the management of their diabetes both pre- and post-operatively

Gen. principles cont.

- 10- Periop management should be individualized base on;
- Type of DM
- Pre operative Treatment
- Metabolic status
- Presence of complication: cardiac, renal, autonomic
- Surgery:
  - Type: emergency or elective
  - Minor or major procedure
  - Type of anesthesia GA or regional

Pre op. optimization

- Ensure good hydration
- Correct electrolyte abnormality
- Stop long acting OHG (eg chlorpropamide) 48- 72hrs before surgery
- Stop long-acting insulin a day before surgery
- Convert to soluble insulin
- Check blood glucose early in the morning of surgery

- Give premedication
- Fast patient overnight
- Commence glucose/potassium/insulin(GKI) infusion
- G & M blood accordingly
- Obtain Intra-op antibiotics
- Obtain informed consent
- Catheterize patient going for major surgery

Specific pre-operative Rx

Patient on Dietary Control

Elective

- Treat as non-diabetic
- Check FBG b4 surgery
- Intra-op BG 2hrly
- Return to usual diet as soon as possible

Emergency

- Check BG b4 surgery
- 1- 2hrly BG till return to oral intake
- Insulin may be required depending on BG level
- Return to usual diet b4 discharge

Oral Hypoglycemic Controlled

Elective

- Admit 2days b4 surgery
- Stabilize on soluble insulin
- Omit insulin on day of operation
- Insulin infusion, to continue till oral intake resumes
- 1- 2hrly BG
- Change to usual OHG b4 discharge
- If minor surgery monitor BG

Emergency

- Commence insulin infusion on admission
- Continue as elective

Patient on Insulin

Elective

- Admit 48hrs b4 surgery
- Change long/ interm. Acting to soluble insulin
- Omit morning dose
- Insulin infusion, to continue till oral intake resumes
- 1- 2hrly BG
- Change to usual insulin b4 discharge

Emergency

- Commence insulin infusion on admission
- Continue as elective

Diabetic crisis

- Patient with DKA or HHS usually have gross volume deficit, electrolyte derangement and acid base imbalance.
- Active resuscitation is must be done b4 surgery
- GKI or sliding scale should be commenced immediately
- 1hrly BG

Insulin Infusion Regimens

1- No Glucose No Insulin Regime

2- Glucose 5g/h and Insulin 1iu/h via infusion pumps

3- Alberti regime:

- 500ml of 10% dextrose + 10iu of soluble insulin + 10mmol of KCl to run at 125ml/hr
- 500ml of 5% dextrose + 5iu of soluble insulin, 5mmol of Kcl

4- Sliding scale

Plasma glucose (mmol/L)	Insulin infusion rate (iu/hr)
<4.0	No insulin
4.1 - 7.0	1
7.1 - 9.0	1.5
9.1 - 11.0	2
11.1 - 17.0	3
17.1 - 28.0	4
>28.0	6

5- The Biostator regime

- Computerised instrument
- It continously display blood glucose
- It maintains normal blood glucose levels by infusing either 5% glucose or insulin

Conclusion

Diabetes Mellitus is associated with increased requirement of surgical procedure, increase post operative morbidity and mortality But with Good peri operative management the outcome is comparable to Normal individuals.

Thus meticulous pre operative evaluation and treatment is key to the success of surgery in diabetic patient

thanks

For Watching