



DIABETES MELLITUS AND ANAESTHESIA

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قسم تقنيات التخدير

4th Stage

المرحلة الرابعة

محاضرة رقم

نظري

Lecture No. 9

Theoretical

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INTRODUCTION

- Diabetes is a condition where the cells of the body cannot metabolise sugar properly, due to a total or relative lack of insulin

Table 1. Classification of diabetes mellitus

	Insulin Dependent (IDDM) (Type I)	Non-Insulin Dependent (NIDDM) (Type II)
Age of onset	Infancy to twenties	Sixties onwards, occasionally younger
pathology	Pancreas unable to produce insulin (autoimmune disorder)	Body unable to use insulin properly
treatment	Insulin	Diet and oral hypoglycaemics

PREOPERATIVE ASSESSMENT

- 1-vital sign =hypertension (autonomic neuropathy)
- 2-ECG =IHD
- 3-RFT _GUE =UTI +albumin urea
- 4-chest x ray
- 5-premedication =H2 antagonist &metoclopramide
- 6-assesment of airway =risk of difficult intubation (diabetic cheiroarthropathy) thickening of soft tissue around ligament and joint



ANAESTHETIC MANAGEMENT:

- **Timing:**

- Diabetic patients should be placed first on the operating list.

- **Hydration:**

- Glucose in the urine (glycosuria) causes a diuresis which makes the patient dehydrated and even more susceptible to hypotension. Check for dehydration and start an intravenous fluid infusion.

- **Medication:**

- All medications should be continued up until surgery. Surgery causes a stress response which will change the patient's insulin requirements.

- **General Measures for all diabetics:**

- ☐ Measure random sugar preoperatively
- ☐ 4 hourly for IDDM ☐ 8 hourly for NIDDM
- Test urine 8 hourly for ketones and sugar ☐ Place first on operating list
- ☐ Aim for a blood glucose of 6 - 10mmol/l

MINOR SURGERY REGIMEN

- **1- Non-insulin Dependent Diabetics (NIDDM)**

- **❖ Preoperatively:**

- Random blood sugar on admission
- • < 10mmol/l Normal medication until day of operation
- • > 10mmol/l Follow as for **MAJOR SURGERY REGIMEN**

- **❖ Day of operation:**

- • Omit oral hypoglycaemics
- • Blood glucose
- ✓ 1 hour preoperatively and at least once during op (hourly if operation > 1 hour long)
- ✓ postoperatively 2 hourly until eating then 8 hourly

- **❖ Postoperatively**

- Restart oral hypoglycaemics with first meal

2- Insulin dependent Diabetics (IDDM)

This regime is only suitable for patients whose random sugar is 180 mg /dl on admission.

❖ Preoperatively:

- Normal medication

❖ Day of operation

- No breakfast, no insulin, place first on list.
- Blood glucose- 1 hour preoperatively and at least once during op (hourly if operation > 1 hour long)
- postoperatively 2 hourly until eating then 4 hourly

❖ Postoperatively

- Restart normal S/C insulin regime with first meal

MAJOR SURGERY REGIMEN

- All insulin dependent and non-insulin dependent who are poorly controlled (blood glucose >180 mg /dl)
- Many NIDDM become insulin dependent during major surgery and will need managing as such. Regular glucose measurements will detect this.
- Normal medication until day of operation

❖ Day of operation:

- Omit oral hypoglycaemics and normal subcutaneous (S/C) insulin
- Blood glucose
 - ✓ check blood sugar(and potassium) 1 hour preoperatively then 2 hourly from start of infusion at least once during operation (hourly if operation > 1 hour long)
 - ✓ at least once in recovery area
 - ✓ 2 hourly post operatively

Regimen 1 - no infusion pump available

Start intravenous infusion of 5 or 10 % dextrose (500 ml bags) over 4 - 6 hours and add Insulin and Potassium Chloride (KCl) to each 500 ml bag as below. Change bag according to blood sugar level readings:-

Blood glucose (mmol/l)	Soluble insulin (units) to be added to bag	Blood potassium (mmol/l)	KCl (mmol) to be added to bag
< 4	No insulin		
4 - 6	5	<3	20
6 - 10	10	3-5	10
10 - 20	15	> 5	none
> 20	5		

If blood potassium level not available, add 10 mmol KCl

Postoperatively

- *Non-insulin dependent* -Stop infusion and restart oral hypoglycaemics when eating and drinking

- *Insulin dependent*

- ✓ Stop infusion when eating and drinking

- ✓ Calculate the total daily dose (units) of insulin the patient was taking preoperatively

- ✓ Give this as S/C Soluble insulin, divided into 3 - 4 doses in 24 hours

- ✓ This may need to be adjusted up or down until blood sugar levels stable.

- ✓ Once stable restart normal regime

Regime 2 - for use with infusion pumps

The insulin and dextrose infusions are given via separate infusion pumps. This allows better control than regimen 1, but care is needed to ensure the separate lines do not become blocked, or that one infusion runs out leaving the other infusing alone.

Insulin infusion - 50 units insulin made up to 50 ml with saline (i.e. concentration is 1 unit per ml)

Blood glucose (mmol / l)	Insulin infused at (units / hour)
< 5	0
5.1 - 10	1
10.1 - 15	2
15.1 - 20	3
> 20	6

If it is proving difficult to reduce the blood sugar level, then consider increasing the rate of insulin for each glucose level or also giving a bolus of soluble insulin of 3 - 5 units.

- Patients normally on higher doses of insulin will need higher rates of insulin infusion.
- Dextrose infusion - 5 or 10 % dextrose infused at 100 ml per hour. Add 10 mmol KCl to each 500 ml of solution.
- Post op - follow instructions as in regimen 1.