Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust

Peri-operative Glucose Control

Is it Important?

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Do Peri-Operative High Glucose Levels Cause Harm?

- High peri-operative glucose or HbA1c has been related to adverse outcomes following
  - spinal surgery
  - vascular surgery
  - colorectal surgery
  - cardiac surgery
  - trauma

Walid MS et al J Hosp Med 2010;5:E10-E14
O'Sullivan CJ et al Eur J Vasc Endovasc Surg 2006;32:188-197
Gustafsson UO et al Br J Surg 2009;96:1358-1364
McConnell YJ et al J Gastrointest Surg 2011;13:508-515
Halkos ME et al Ann Thorac Surg 2008;86:1431-1437
Kreutziger J et al J Trauma 2009;67:704-8

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Excess Mean Length of Stay in Diabetes Inpatients Aged 18 – 60 Years

269,265 Diabetes Discharges and 4,411,593 Matched Controls

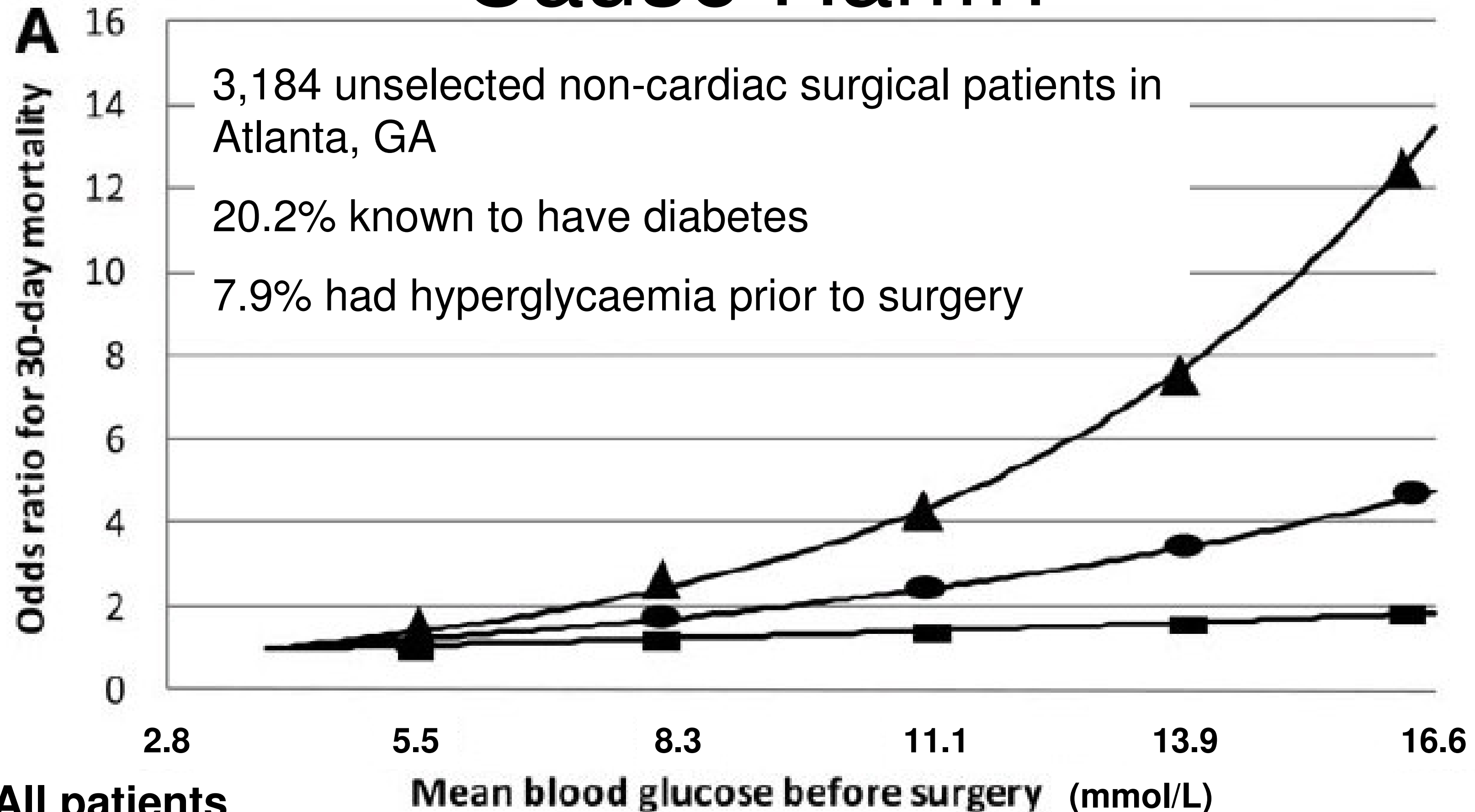
	Mean LOS (days)			Excess LOS (days)		n		
	E10	E11	C	E10	E11	E10	E11	C
Surg.	5.4 (0.1)	5.1 (0.1)	4.2 (0.2)	1.2	0.9	18,032	32,135	1,501,453
T &O	4.8 (0.1)	5.3 (0.2)	4.6 (0.1)	0.2	0.7	8,178	12,203	885,606
GM	4.8 (0.2)	5.4 (0.2)	4.4 (0.1)	0.4	1.0	70,988	82,446	1,709,553
Card.	4.2 (0.1)	4.2 (0.1)	3.8 (0.1)	0.4	0.4	5,307	15,009	229,784
MFE	4.8 (0.2)	5.6 (0.2)	4.7 (0.1)	0.1	0.1	2,444	4,549	85,197

E10 = Type 1 diabetes E11 = Type 2 diabetes c = controls

English Hospitals, 4 consecutive years of discharges 2000-2004

Sampson MJ et al Diabetes Research & Clinical Practice 2007;77(1):92-98

Do High Admission Glucose Levels Cause Harm?



All patients

Patients with diabetes

Patients without diabetes

Frisch A et al Diabetes Care 2010;33(8):1783-1788

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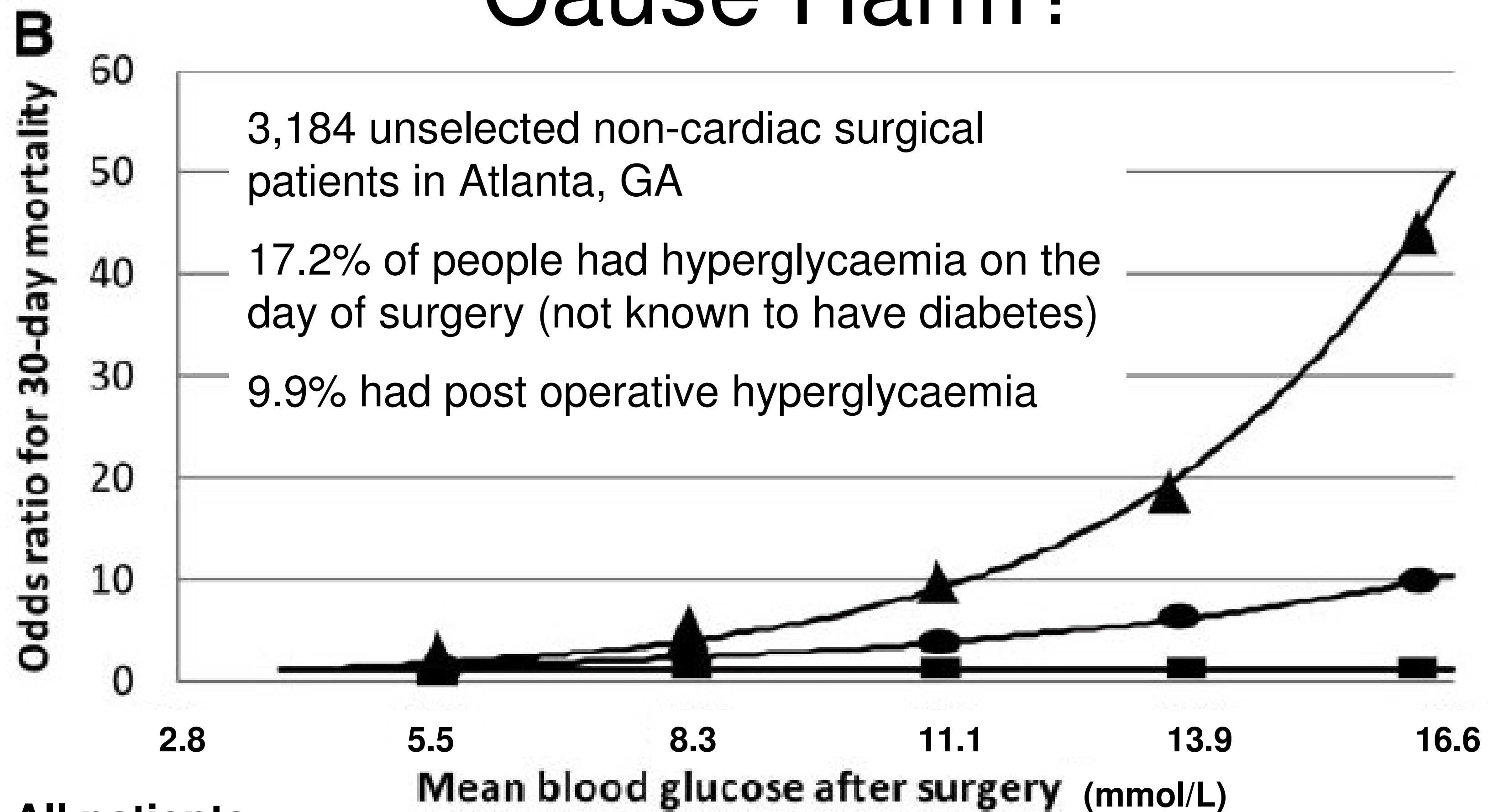
Do High Admission Glucose Levels Cause Harm?



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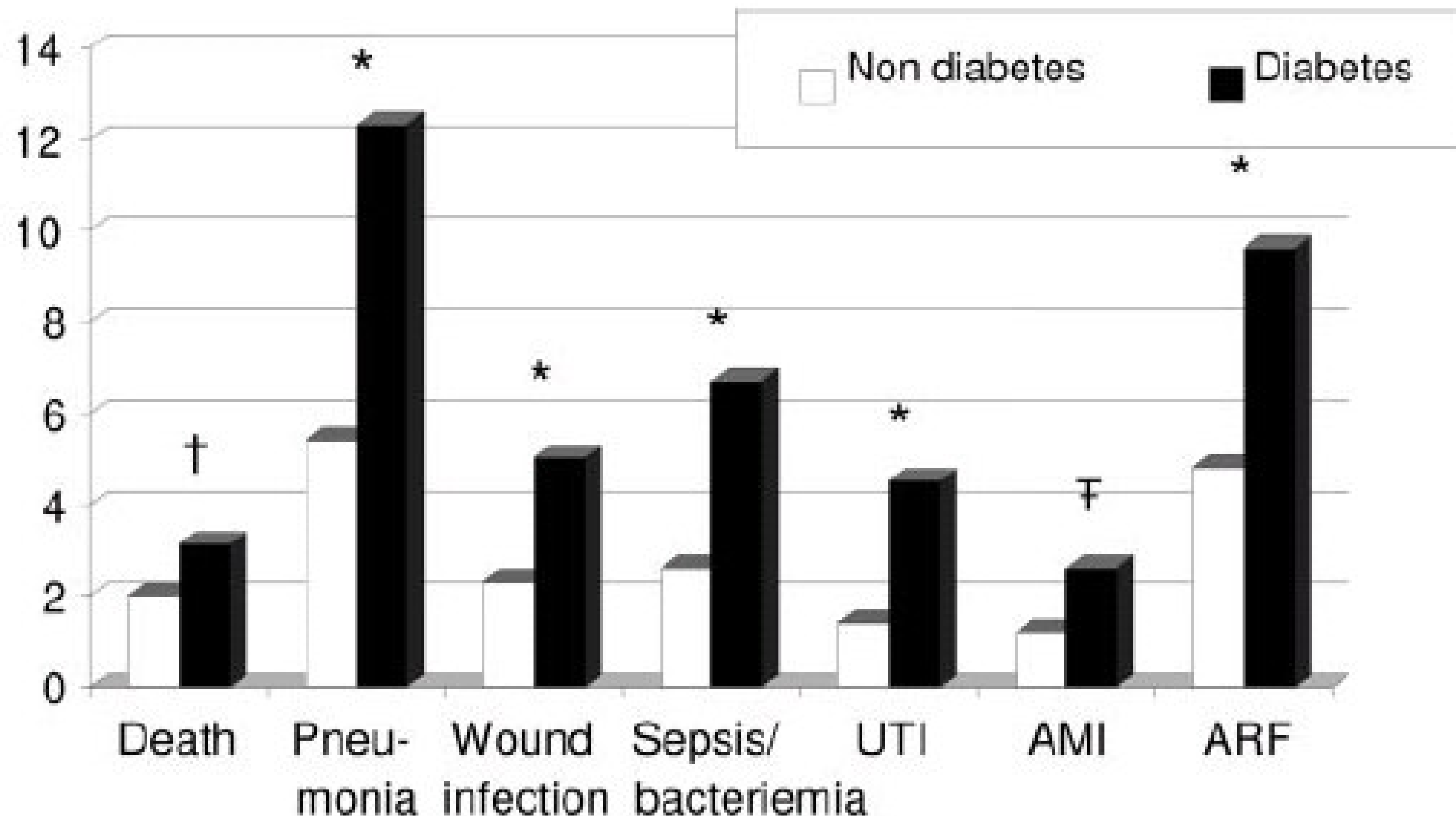
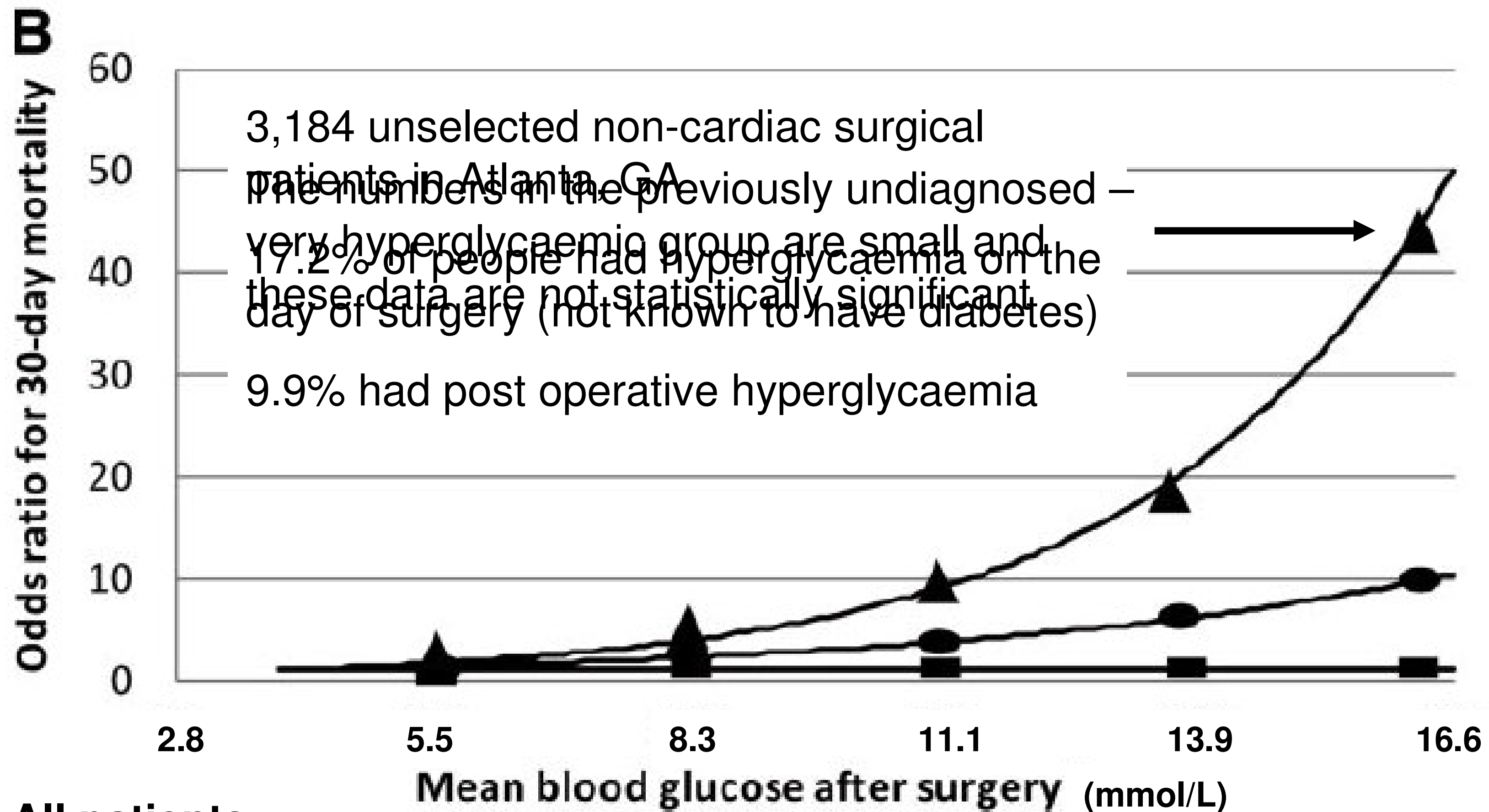
Do High Glucose Levels Cause Harm?



Frisch A et al Diabetes Care 2010;33(8):1783-1788

An Admission



3,184 unselected non-cardiac surgical patients in Atlanta, GA

17.2% of people had hyperglycaemia on the day of surgery (not known to have diabetes)

9.9% had post operative hyperglycaemia

The numbers in the previously undiagnosed – very hyperglycaemic group are small and these data are not statistically significant

All patients

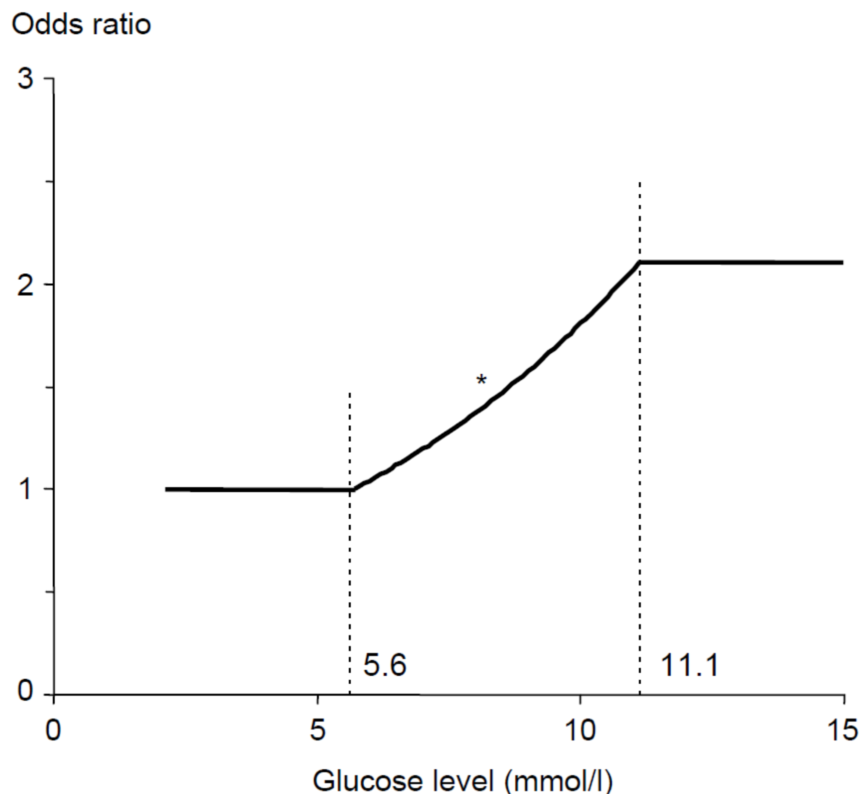
Patients with diabetes

Patients without diabetes

Frisch A et al Diabetes Care 2010;33(8):1783-1788

However…..

- Other data has confirmed the harm of high pre-operative glucose levels in non-cardiac, non vascular surgery



30 day mortality rates for 989 patients with diabetes – for each mmol/L increase in blood glucose, OR for mortality rose by 1.19 (CI 1.1 - 1.3)

Noorddij PG et al EJE 2007;156(1):137-142

Thus….

- Whilst there is data to show that poor glycaemic control is associated with poor outcomes
- There is no consistent data to show that improving control also improves outcomes

(A bit like diabetes care in general until the mid 1990's)

BMJ

BMJ 2013;346:f134 doi: 10.1136/bmj.f134 (Published 17 January 2013) Page 1 of 3

PRACTICE

UNCERTAINTIES

Should inpatient hyperglycaemia be treated?

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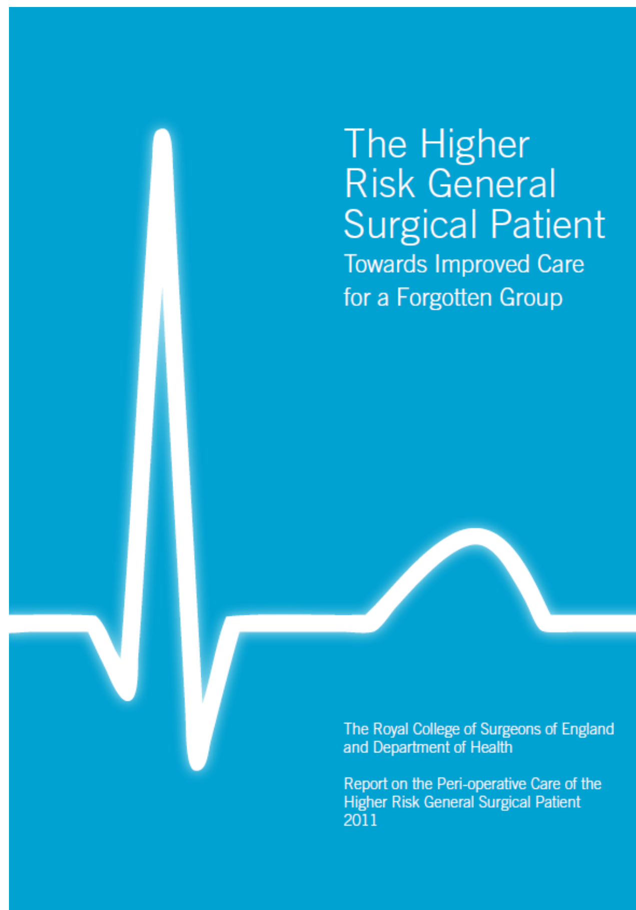
BMJ 2013;346:f134

The ITU Story

Study	Patients	Outcome
2001 Leuven (Surgical)	1548	Positive Van den Berghe G et al NEJM 2001;345:1359-1367
2006 Leuven (Medical)	1200	Neutral / Positive Van den Berghe G et al NEJM 2006;354:449-461
2008 VISEP (Septic)	537	Stopped early Brunkhorst FM et al NEJM 2008;358:125-139
2008 De la Rosa (General)	504	Neutral De La Rosa G et al Critical Care 2008;12:R120
2009 GluControl	1078	Stopped early / Neutral Preiser J-C et al Intensive Care Medicine 2009 35:1738-1748
2009 Leuven (PICU)	700	Positive Vlasselaers D et al Lancet 2009;373:547-556
2009/12 NICE-SUGAR	6104	Harmful (especially hypos) The NICE-SUGAR Study Investigators NEJM 2009;360:1283-1297 NEJM 2012;367:1108-1118
2012 Boston Children's	980	Neutral Agus MS et al NEJM 2012;367(13):1208-1219

Something Some of Your Surgical Colleagues May Have Seen



- Disappointingly, the word ‘diabetes’ appears only once, ‘hyperglycaemia’ and ‘glucose’ do not appear at all in this document

http://www.rcseng.ac.uk/publications/docs/higher-risk-surgical-patient/

Along Came This…..

Management of adults with diabetes undergoing surgery and elective procedures: improving standards

NHS

Diabetes

Supporting, Improving, Caring

http://www.diabetes.nhs.uk/areas_of_care/emergency_and_inpatient/perioperative_management

And This…..

Diabetes UK Position Statements and Care Recommendations

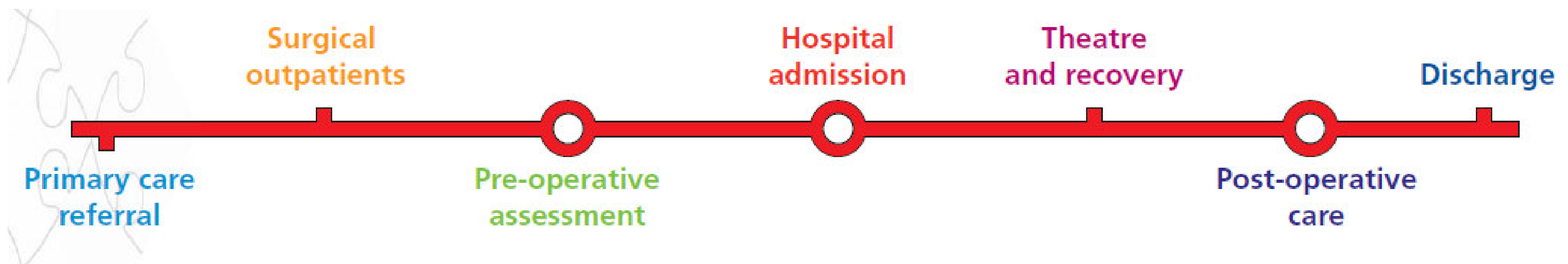
NHS Diabetes guideline for the perioperative management of the adult patient with diabetes*

K. Dhatariya[1], N. Levy[2], A. Kilvert[3], B. Watson[4], D. Cousins[5], D. Flanagan[6], L. Hilton[7], C. Jairam[8], K. Leyden[3], A. Lipp[1], D. Lobo[9], M. Sinclair-Hammersley[10] and G. Rayman[11] for the Joint British Diabetes Societies

Diabetic Medicine 2012;29(4):420-433

National Guidelines

- Document divided into sections:
  - Primary care
  - Surgical outpatients
  - Pre-operative assessment clinic
  - Hospital admission
  - Theatre and recovery
  - Post-operative care
  - Discharge

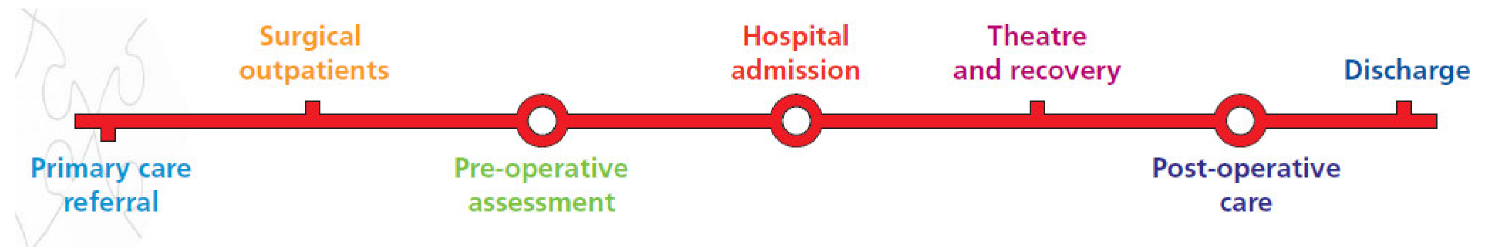


Aims and Responsibilities

- Each section is divided into these subheadings

Primary Care Responsibilities

- Duration and type of diabetes
- Place of usual diabetes care (primary or secondary)
- Other co-morbidities
- Treatment
  - for diabetes oral agents/ insulin doses and frequency
  - for other co-morbidities
- Complications
  - At risk foot
- Renal impairment
- Cardiac disease
- Relevant measures
- BMI
- BP
- HbA1c
- eGFR



Does Anyone Use The Guidelines?

- Recently collected data from 135 out of 180 DSU across England, Wales and Scotland
- 24% of all DSUs do not routinely manage patients with T1DM
- 44% and 28.8% do not have care pathways for managing T1DM and T2DM respectively
- 41% of all DSUs said that they use VRIII's, but only 13% reported using a GIK regimen if required

Modi A et al – Prize winning abstract presented at BADS 21/22 June 2012

Does Anyone Use The Guidelines?

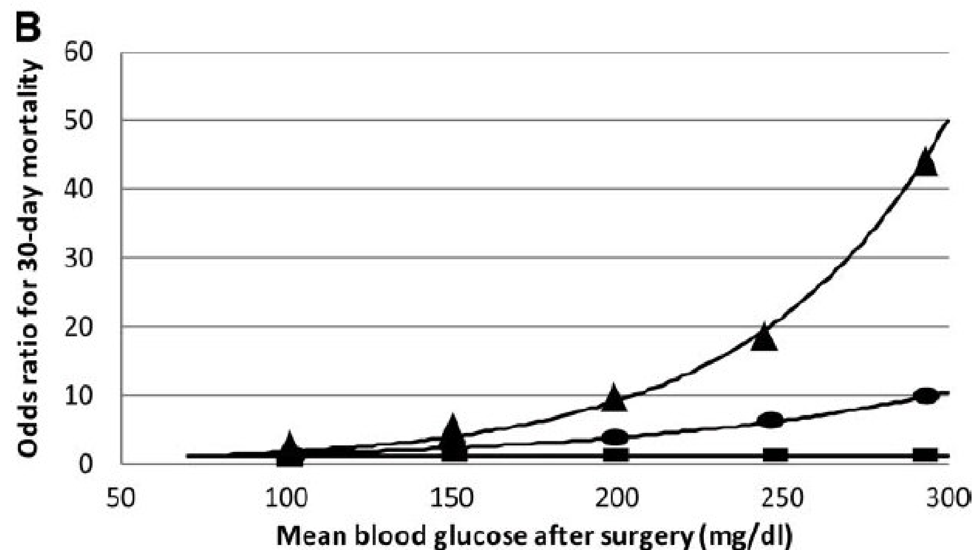
- Most units manage T2DM by minimally modifying the patients' usual regime, and 20% of all units do not alter the patient's diabetic regime at all apart from ensuring that they are scheduled first on the operating list
- 13 units reported having managed T2DM in their DSUs for a longer time period than that for T1DM

Modi A et al – Prize winning abstract presented at BADS 21/22 June 2012

Dexamethasone

Something to Mention to Your Surgical Colleagues

- If they knew that without them even TOUCHING the patient they could *potentially* reduce their peri-operative mortality by 40 fold, would they do that first?



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