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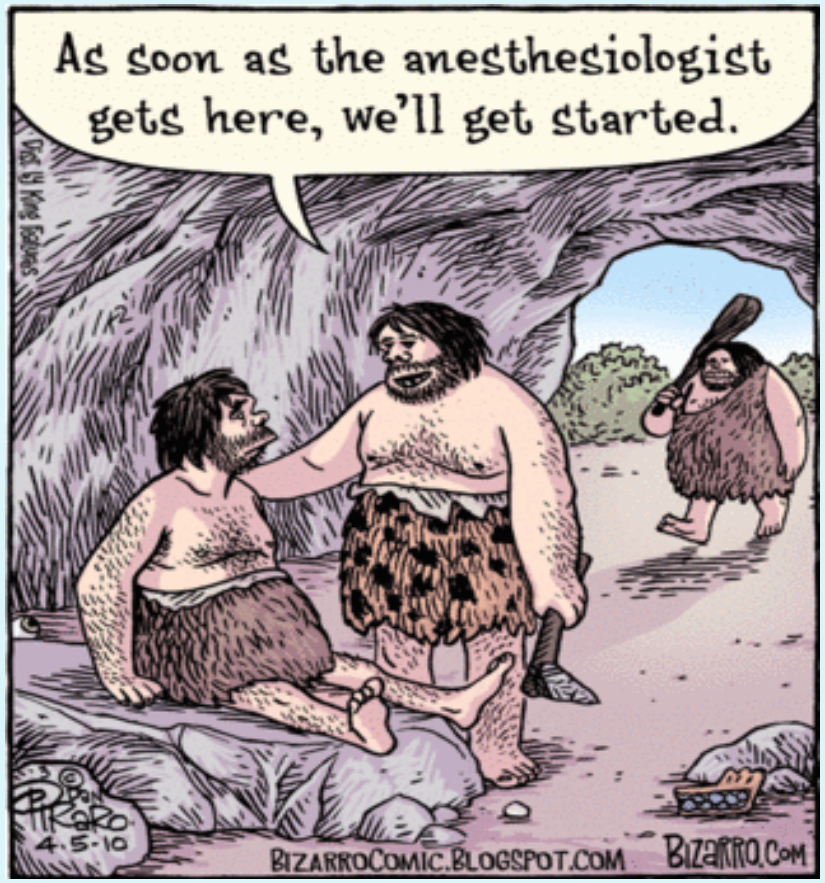
Saturday, June 10, 2017 (Room 8)

8:30 - 9:25 WS #96: Optimising Patients for Surgery - Defining and Reducing Risk

9:35 - 10:30 WS #108: Optimising Patients for Surgery - Defining and Reducing Risk (Repeated)

Optimising patients for surgery: Defining and reducing risk



Nicola Broadbent
Specialist Anaesthetist Auckland DHB
Perioperative medicine SIG ANZCA

Topics

I have selected

- Topics that may assist in risk discussion in the GP surgery

OR

- That have impact on timing of elective surgery

Topics

- Surgical risk calculator (NSQIP)
- Hypertension and surgery
- Recommended delays for elective surgery
  - Post stroke
  - Post MI or stent placement
- Perioperative aspirin

Urgency of surgery

- Emergency
  - <6 hrs
- Urgent

Minimal/restricted optimisation available

- Time-sensitive
  - A short delay to allow for evaluation and changes in management
  - Usually <6 weeks
- Elective

Optimisation possible

Types of patients that present for surgery

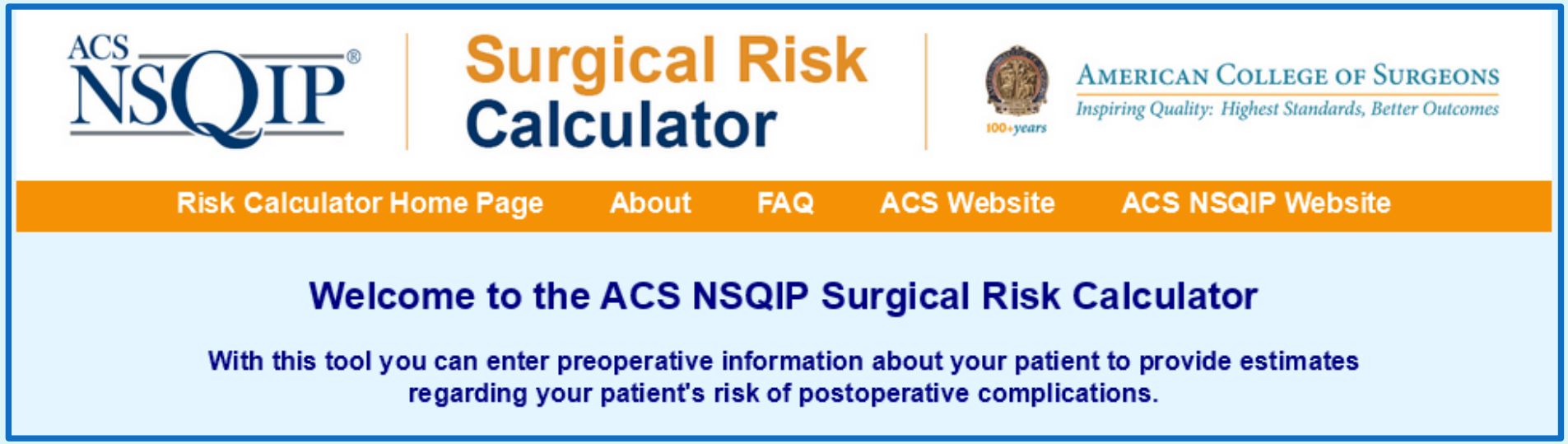
- Patients who seek an **improvement in quality of life**
  - e.g. Most elective orthopaedic operations
    - Joint replacements
    - Lumbar spine surgery

- Patients with a **disease that threatens their survival**
  - Cancer surgery
  - Vascular surgery
    - CEA, AAA
  - Cardiac surgery
    - Valve surgery or coronary revascularisation

SURGICAL RISK CALCULATION

Using a surgical risk tool

- Risk vs benefit
  - Can help inform the conversation
- YOU as the GP have the long term relationship with the patient
  - They are likely to ask your opinion
- A tool
  - Needs to be easily accessible
  - You should have most of the information needed to complete and generate a risk estimate



- Built using >1.4 million operations from hospitals participating in the National Safety and Quality Improvement Project from 2009-2012.
  - US-centric data

- Uses surgical operation code and 21 patient predictors
- Provides estimates of 30 day mortality and complications

- Freely accessible online
- **www.riskcalculator.facs.org**

Example patient : Mr B

- Recent admission to Older Peoples Health
  - reduced mobility and hip pain

- Orthopaedic surgeons reviewed him at the geriatricians request
  - X-ray shows significant osteoarthritis of left hip
  - They have **offered him a total hip joint replacement**

Background medical history

76 year old Caucasian Male

- **Type 2 diabetic** on insulin
- **BMI 45**
  - Wt. 122kg
  - Ht. 165cm
- **OSA** on CPAP
- Chronic **atrial fibrillation**
- **IHD**
  - Previous NSTEMI
- **Cardiomyopathy** with **LVEF 30-35%**
  - Previous difficult to control **cardiac failure**
  - On bumetanide
  - Biventricular **pacemaker** for resynchronisation
- Treated **hypertension**
- **Creatinine 169** mmol/L

On discussion

- Mr B claims he is miserable

- Can only mobilise around the house
- Wife assists him with bathing

- On oxycodone SR 20mg bd
- Pain wakes him at night

- He believes the THJR will transform his life
- He is “willing to take any risk” and appears to have lack of insight into his myriad of medical problems

Mr B and the surgical risk calculator

http://riskcalculator.facs.org

American College of Surgeons
Inspiring Quality: Highest Standards, Better Outcomes

ACS NSQIP®

Surgical Risk Calculator

Risk Calculator Homepage | About | FAQ | ACS Website | ACS NSQIP Website

Enter Patient and Surgical Information

Procedure

27130 - Arthroplasty, acetabular and proximal femoral prosthetic replacement (total hip arthroplasty), with or without autograft or allograft

Clear

Begin by entering the procedure name or CPT code. One or more procedures will appear below the procedure box. You will need to click on the desired procedure to properly select it. You may also search using two words (or two partial words) by placing a '+' in between, for example: "cholecystectomy+cholangiography"

Reset All Selections

Are there other potential appropriate treatment options?

- ☐ Other Surgical Options
- ☐ Other Non-operative options
- ☑ None

Are there other potential appropriate treatment options? ☐ Other Surgical Options ☐ Other Non-operative options ☑ None

Please enter as much of the following information as you can to receive the best risk estimates.
A rough estimate will still be generated if you cannot provide all of the information below.

Age Group
75-84 years

Sex
Female

Functional Status
Independent

Emergency Case
No

ASA Class
Severe systemic disease

Steroid use for chronic condition
No

Ascites within 30 days prior to surgery
No

Systemic Sepsis within 48 hours prior to surgery
None

Ventilator Dependent
No

Disseminated Cancer
No

Diabetes
Insulin

Hypertension requiring medication
Yes

Congestive Heart Failure in 30 days prior to surgery
Yes

Dyspnea
With Moderate exertion

Current Smoker within 1 Year
No

History of Severe COPD
No

Dialysis
No

Acute Renal Failure
No

BMI Calculation:

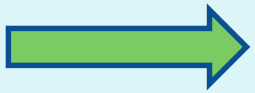
Height: 65 in / 165 cm

Weight: 271 lb / 122 kg

Procedure: 27130 - Arthroplasty, acetabular and proximal femoral prosthetic replacement (total hip arthroplasty), with or without autograft or allograft

Risk Factors: 75-84 years, ASA Severe systemic disease, Diabetes (Insulin), HTN, CHF, Dyspnea with moderate exertion, Class 3 Obese

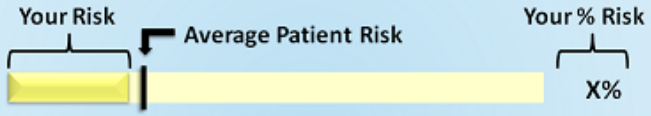
Change Patient Risk Factors



Outcomes	Your Risk	Average Risk	Chance of Outcome
Serious Complication	11.1%	3.7%	Above Average
Any Complication	12.8%	4.2%	Above Average
Pneumonia	0.9%	0.2%	Above Average
Cardiac Complication	1.7%	0.2%	Above Average
Surgical Site Infection	1.9%	1.0%	Above Average
Urinary Tract Infection	2.9%	0.8%	Above Average
Venous Thromboembolism	1.1%	0.5%	Above Average
Renal Failure	0.9%	0.1%	Above Average
Readmission	9.4%	3.0%	Above Average
Return to OR	2.4%	1.5%	Above Average
Death	1.0%	0.1%	Above Average
Discharge to Nursing or Rehab Facility	78.9%	18.0%	Above Average

Predicted Length of Hospital Stay: 5 days

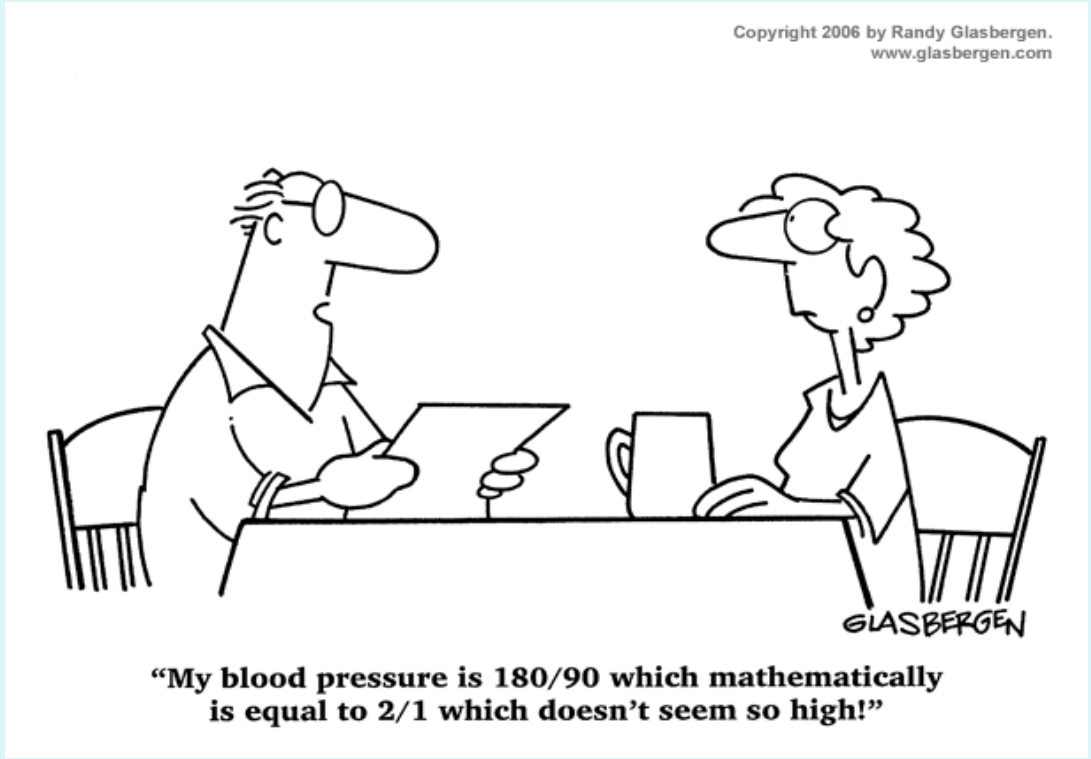
How to Interpret the Graph Above:



Surgeon Adjustment of Risks

This will need to be used infrequently, but surgeons may adjust the estimated risks if they feel the calculated risks are underestimated. This should only be done if the reason for the increased risks was NOT already entered into the risk calculator.

1 - No adjustment necessary



HYPERTENSION AND SURGERY

Hypertension and surgery

- Underlying reasons for treating perioperative hypertension
  - Long term prevention
  - Reduce exaggerated cardiovascular responses in anaesthesia and surgery and associated morbidity

- Recent British guidelines published Jan 2016
  - Association of Anaesthetists of Great Britain and Ireland (AAGBI) & British Hypertension Society(BHS)

British consensus guidelines

Undertook a review of evidence

- **No evidence** that patients with **Stage 1 or 2 hypertension** have increased perioperative risk
- Insufficient evidence in Stage 3 and 4 hypertension but potential increased risk of CVS and neurological complications

Table 1 Categorisation of the stages of hypertension.

Category	Systolic blood pressure; mmHg	Diastolic blood pressure; mmHg
Stage 1	140–159	90–99
Stage 2	160–179	100–109
Stage 3	180–209	110–119
Stage 4	≥ 210	≥ 120

No increased perioperative risk

Potential CVS increased perioperative risk

Patients with hypertension (controlled or uncontrolled) demonstrate a more labile haemodynamic profile than non-hypertensive counterparts

Hartle et al Anaesthesia 2016. 71: 326-337.

Perioperative hypotension

POISE trial Lancet 2008

Perioperative beta blockade in non cardiac surgery

>8000 pt with or at risk of atherosclerotic disease

Reduced risk of non fatal MI

BUT

Increased risk of stroke and death

Linked to hypotension

Due to this we may with-hold perioperative anti-hypertensives

- Hypotensive effect particularly pronounced with **ACE inhibitors** and **Angiotension 2 receptor** antagonists
- May need to be re-established after initial surgical recovery

	Adjusted odds ratio (95% CI)	Frequency of risk factor n (%)	PAR* (95% CI)
Death			
Preoperative independent predictors			
No use of statin in 24 h before surgery	1·73 (1·22–2·46)	5674 (67·9%)	33·7% (18·3–53·6)
Age ≥70 years	1·65 (1·20–2·26)	4387 (52·5%)	29·3% (16·2–47·0)
Emergent/urgent surgery	3·71 (2·68–5·14)	878 (10·5%)	24·4% (18·0–32·2)
Serum creatinine >175 μmol/L	2·67 (1·75–4·08)	401 (4·8%)	9·5% (5·4–16·0)
History of congestive heart failure	1·76 (1·14–2·72)	535 (6·4%)	6·0% (2·5–13·6)
Use of low-molecular-weight heparin in 24 h before surgery	1·74 (1·14–2·68)	556 (6·7%)	5·9% (2·4–13·8)
Intraoperative and postoperative predictors			
Clinically significant hypotension	4·97 (3·62–6·81)	1029 (12·3%)	37·3% (29·5–45·8)
Myocardial infarction without ischaemic symptoms	3·45 (2·20–5·41)	271 (3·3%)	10·6% (6·4–17·0)
Significant bleeding	1·67 (1·14–2·44)	553 (6·6%)	9·4% (4·3–19·5)
Stroke	18·97 (9·93–36·25)	60 (0·7%)	8·0% (5·0–12·5)
Clinically significant bradycardia	2·13 (1·37–3·32)	351 (4·2%)	7·9% (3·9–15·3)
Myocardial infarction with ischaemic symptoms	3·31 (1·78–6·15)	144 (1·7%)	4·2% (1·9–9·2)
Total explained	..	..	85·5% (78·8–90·4)
Stroke			
Preoperative independent predictors			
History of stroke or transient ischaemic attack	2·80 (1·66–4·73)	1759 (21·1%)	30·5% (17·1–48·2)
Use of clopidogrel or ticlopidine in 24 h before surgery	3·12 (1·43–6·77)	330 (4·0%)	9·1% (3·2–23·2)
Intraoperative and postoperative predictors			
Clinically significant hypotension	2·14 (1·15–3·96)	1029 (12·3%)	14·7% (5·2–35·4)
Significant bleeding	2·18 (1·06–4·49)	553 (6·6%)	10·1% (3·0–28·5)
New clinically significant atrial fibrillation	3·51 (1·45–8·52)	200 (2·4%)	6·9% (2·1–20·4)
Total explained	..	..	51·8% (37·1–66·2)

PAR=population attributable risk. *Proportion of all outcomes attributable to the relevant risk factor if causality were proven. We calculated PAR from a multivariate logisitic regression analysis and PAR estimates were calculated with IRAP (US National Cancer Institute, 2002).[1]

Table 5: **Independent predictors of death and stroke and their associated population attributable risks**

Recommendations

- Take BP measured in **primary care** as preoperative blood pressure
  - Clinic blood pressure may have white coat effect
  - GP should provide recent result when referring for surgery

  Accept for surgery
  - **Systolic <160 mmHg**
  - **Diastolic <100 mmHg**

- Clinic blood pressure should only be taken into account
  - If **no recent primary care measurement**
  - Systolic BP >180 or diastolic >110 should be delayed for GP assessment

- Anti-hypertensives may be stopped for a short time perioperatively
  - May be to be re-introduced after initial recovery in primary care

DELAYING SURGERY AFTER MEDICAL EVENTS

Stroke

- Recent evidence of increased risk of major cardiovascular complications for 6-9 months after a stroke
  - Further ischaemic stroke
  - Acute MI
  - Cardiovascular mortality

Recommend: DELAY 6-9 months for elective surgery

Original Investigation

Time Elapsed After Ischemic Stroke and Risk of Adverse Cardiovascular Events and Mortality Following Elective Noncardiac Surgery

Mads E. Jørgensen, MB; Christian Torp-Pedersen, MD, DSc; Gunnar H. Gislason, MD, PhD; Per Føge Jensen, MD, PhD, MHM; Siv Mari Berger, MB; Christine Benn Christiansen, MD; Charlotte Overgaard, MSc, PhD; Michelle D. Schmiegelow, MD; Charlotte Andersson, MD, PhD

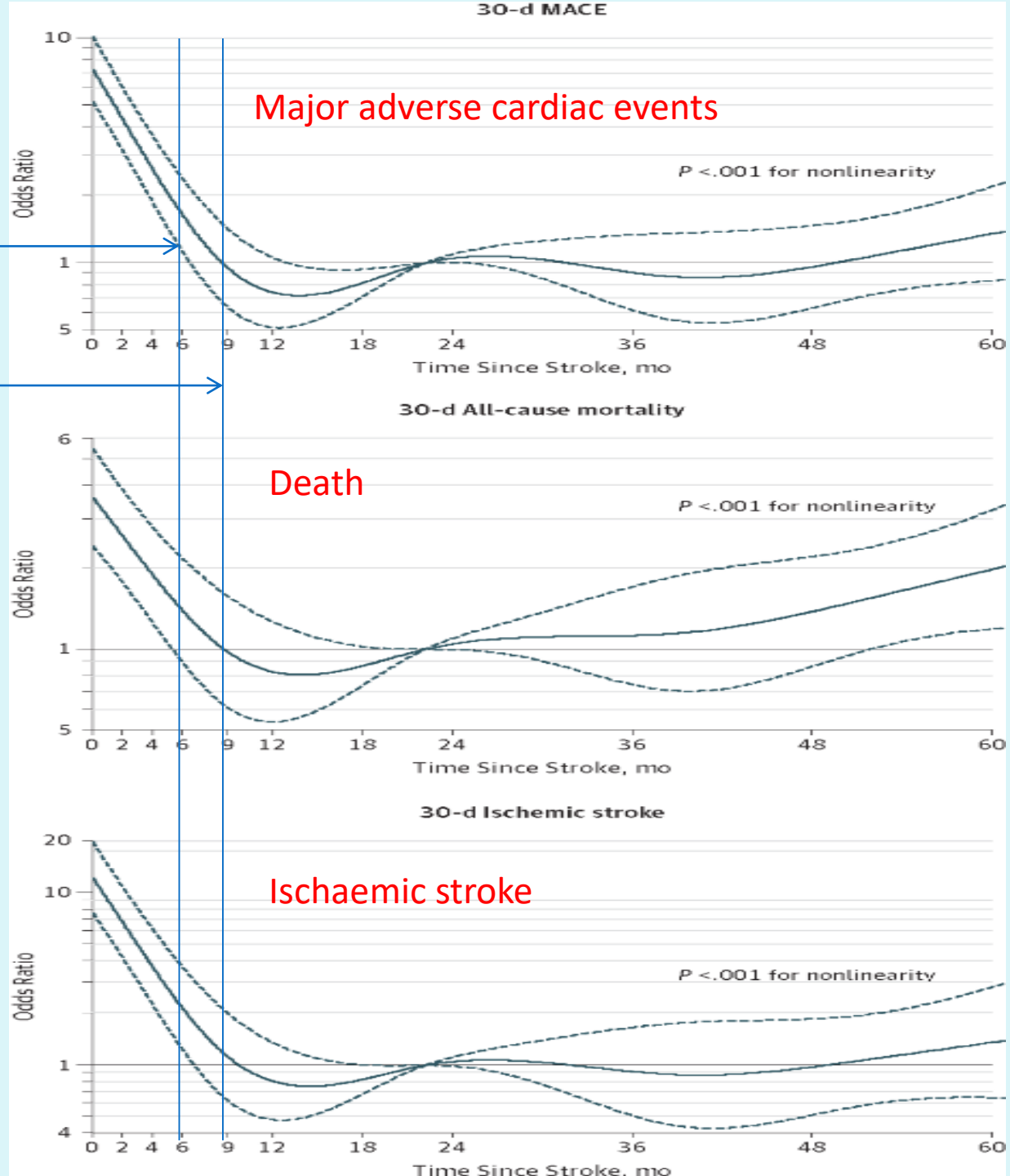
JAMA. 2014;312(3):269-277. doi:10.1001/jama.2014.8165

- Danish national cohort study
- All patients >20 years of age undergoing non-cardiac surgery in Denmark from 2005-2011
  - 481 183 patients of whom 7137 had **suffered a prior stroke**

Time to surgery	Odds ratio	
< 3 months	14.23	(11.61-17.45)
3-6 months	4.85	(3.32 – 7.08)
6-12 months	3.04	(2.13 – 4.34)
>12 months	2.47	(2.07 – 2.95)

6 months

9 months



Jorgensen et al. JAMA 2014

Myocardial infarction

- We refer to the AHA/ACC 2014 perioperative guidelines
    - American Heart Association/American College of Cardiology

- **Risk of perioperative MI reduces with time elapsed from MI**
    - Risk modified by coronary intervention (CABG/stent)

- MI <6 months also at **increased risk for perioperative stroke**

If no coronary intervention
Recommend: DELAY 60 days for elective surgery

Delay after cardiac events

Stents are of most concern due to the **risk of in-stent thrombosis**

- Stopping anti-platelet drugs + pro-thrombotic risk of surgery
- Preference is to stop dual therapy but **continue on aspirin**

Coronary intervention	Recommended delay for elective surgery	
Nil but suffered MI	60 days	Increased risk of stroke for 6 months
Balloon angioplasty	14 days	
Bare metal stent	30 days	
Drug eluting stent	1 year Consider 6 months if risk benefit	If dual anti-platelet therapy must be stopped for surgery
CABG	Not specified	Usually 6 week stand-down

Perioperative aspirin

2 trials

POISE II 2014: Aspirin and clonidine in non cardiac surgery

5000 patients at risk of vascular complications undergoing non cardiac surgery received aspirin.

- Low dose perioperative aspirin did not reduce risk of non fatal MI or death
- Increased risk of bleeding for up to 7 days

ATACAS 2016: Aspirin and tranexamic acid in CABG

Subgroup of 1000 patients received aspirin prior to CABG

- No reduction in death, thrombotic complications or non fatal MI
- No increased risk of bleeding

What does this mean?

In NON CARDIAC surgery
Aspirin does not reduce death/non fatal MI
AND
Aspirin may increase bleeding

In CARDIAC surgery
Aspirin does not reduce death/non fatal MI
AND
Aspirin does not increase bleeding

OK to stop aspirin used for primary prevention

- Potential of increased bleeding with minimal benefit

Risk vs benefit in secondary prevention

- Consider stopping aspirin for secondary prevention if distant event especially if high bleeding risk surgery
- Continue aspirin for secondary prevention if possible IN
  - Coronary stents
  - Recent MI
  - Recent stroke

Take home messages

Hypertension
- **Primary care blood pressure** should be taken as preoperative BP
- No evidence of increased complications for stage 1 and 2 hypertension
- **Perioperative hypotension** is **bad** – may need to stop and re-establish anti-hypertensives

Stroke
- **Delay 6-9 months** to reduce risk of mortality and major cardiac adverse events

MI
- **Delay 60 days** if no coronary intervention to reduce MI risk
- Increased risk of stroke for 6 months

Stents
- **Continue aspirin if possible**
- **Delay 14 days** for balloon angioplasty
- **Delay 60 days** for bare metal stents
- **Delay 6-12 months** for drug eluting stents if surgery cannot proceed on dual antiplatelet therapy

Aspirin
- **Stop aspirin for primary prevention**
- **Risk vs benefit in secondary prevention**

Open access surgical risk calculator available for risk discussion
  - **www.riskcalculator.facs.org**