



# ANZHF

Australian & New Zealand Hip Fracture Registry

## **Title: Time to Surgery – What’s the rush?**

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Te Whatu Ora Waitemata

# Talk content



- Demographics
- Hip fracture facts
- Evidence
- Time to surgery and reasons delay
- Case example

# Demographics Information



- 1 Jan 2018 – 31 Dec 2020 – 9432 patients with hip fracture in NZ
- 22 hospitals in NZ – contributed ANZHFR
- Average age: 82.8 yrs old
- 70% female
- 71.4% living at home
- Average time to surgery: 34.6 hours



## **QUALITY STATEMENT 4**

### Timing of surgery

A patient presenting to hospital with a hip fracture, or sustaining a hip fracture while in hospital, receives surgery on the day of or the day after, where clinically indicated and surgery is preferred by the patient.

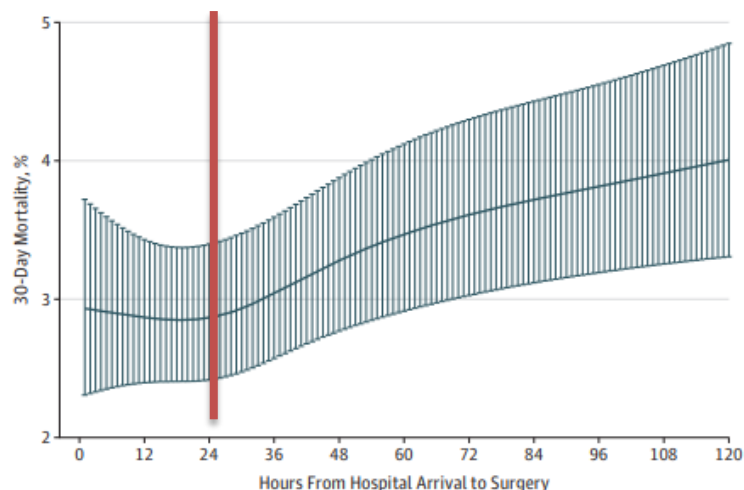
# Association Between Wait Time and 30-Day Mortality in Adults Undergoing Hip Fracture Surgery

Daniel Pincus, MD; Bheeshma Ravi, MD, PhD; David Wasserstein, MD, MSc; Anjie Huang, MSc; J. Michael Paterson, MSc; Avery B. Nathens, MD, MPH, PhD; Hans J. Kreder, MD, MPH; Richard J. Jenkinson, MD, MSc; Walter P. Wodchis, PhD

Wait Time and 30-Day Mortality in Adults Undergoing Hip Fracture Surgery

Original Investigation Research

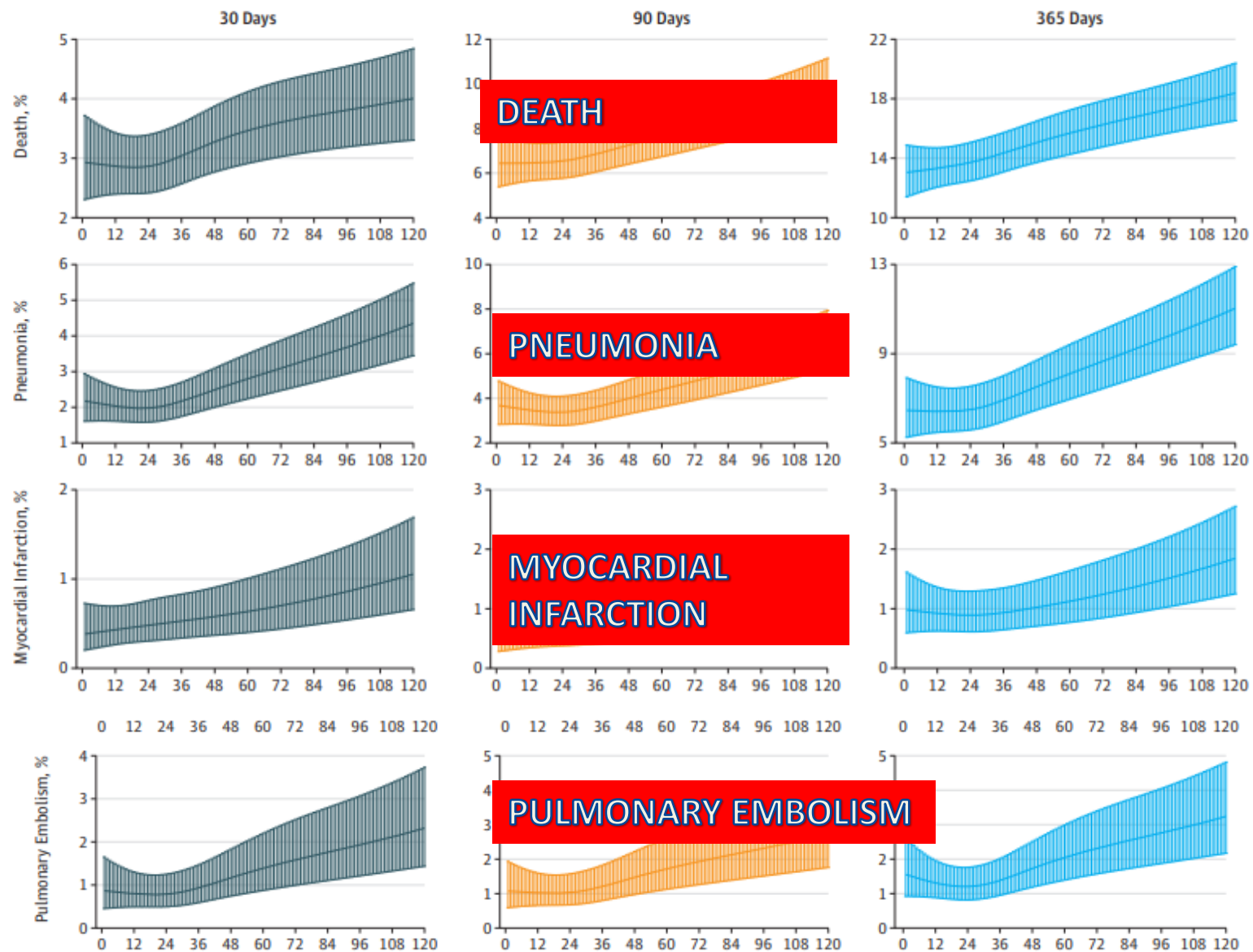
Figure 1. Probability of the Primary Outcome According to Wait Times for Surgery as a Continuous Variable



Probabilities (95% CIs) models used restricted cubic splines adjusting for age, sex, calendar year, income quintile, rurality, transfer from any health care institution, Deyo-Charlson score, history of frailty, diabetes, heart failure, chronic obstructive pulmonary disease, myocardial infarction, or hypertension, fracture and surgery type, Injury Severity Score, surgeon volume and experience, hospital volume and type, and surgery duration. Analysis

conducted among 41 186 of 42 230 patients. C statistic was 0.756. Variance inflation factors were 4 or less for included variable included, indicating an absence of collinearity. Probabilities of the primary outcome according to wait-times for surgery are presented for patients with average fracture, physician, and hospital system characteristics in the cohort.

Figure 2. Probability of the Primary, Secondary, and Negative Tracer Outcomes (Involving Hardware Removal and Hip Dislocation)



# Pathophysiology – hip fracture

- 1L blood lost from proximal femur fracture
- Pre operation fasting and nutritional supplementation
  - Increased catabolism (20% - 70%)
  - Hypoglycemia
  - Immunosuppression

# Medical complications – hip fracture

Complications	Prevalence (%)
Delirium	13.5% - 33%
PE	1.4%-7.5%
DVT	27%
Pneumonia	7%
MI or heart failure	35% - 42%
UTI / retention	12%-61%
AKI	11%
Anaemia	24 %- 44%
Skin pressure damage	7% - 9%

Carpintero P, Caeiro JR, Carpintero R, Morales A, Silva S, Mesa M. Complications of hip fractures: A review. World J Orthop. 2014 Sep 18;5(4):402-11



# Time to surgery -2021

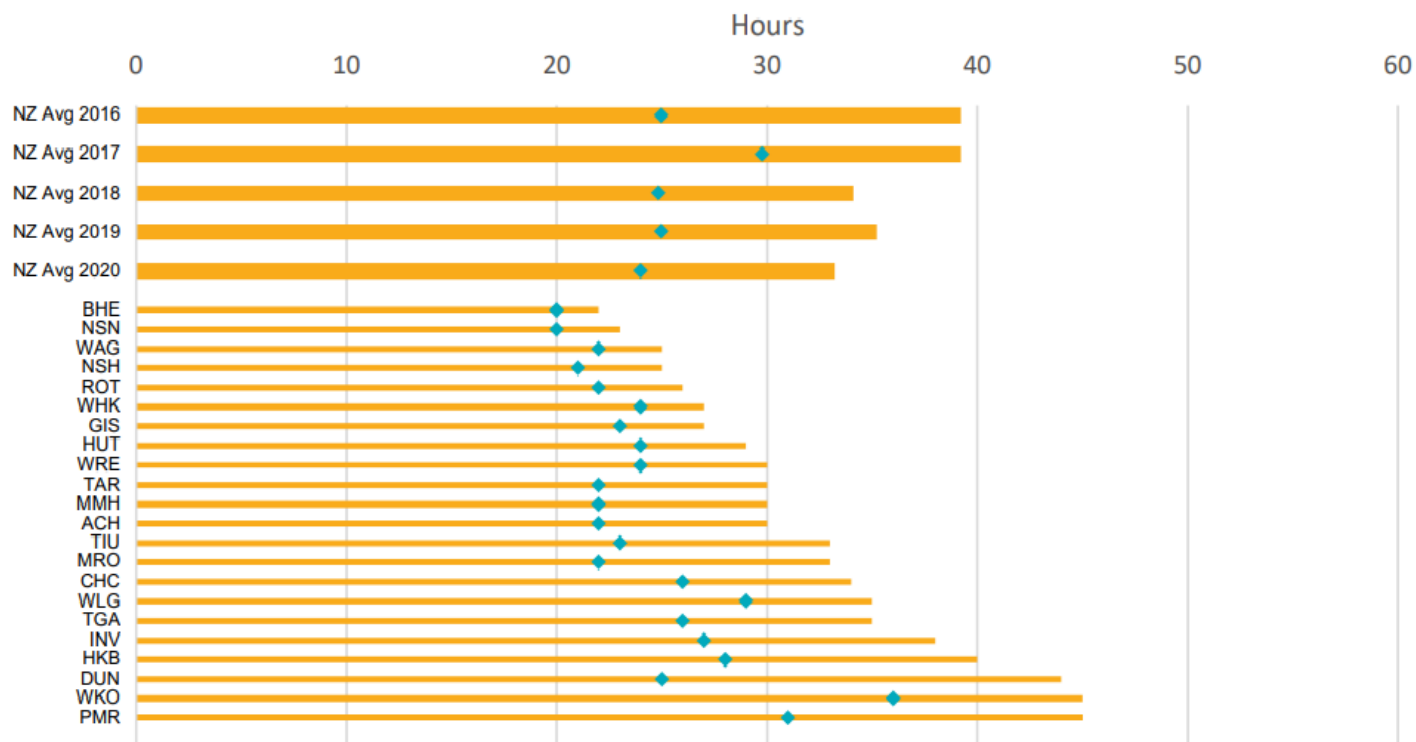


**FIGURE 20** Average time to surgery excluding transferred patients



Median time :  
24 hrs

Average time:  
33 hrs



• ANZHFR 2021 Annual Report

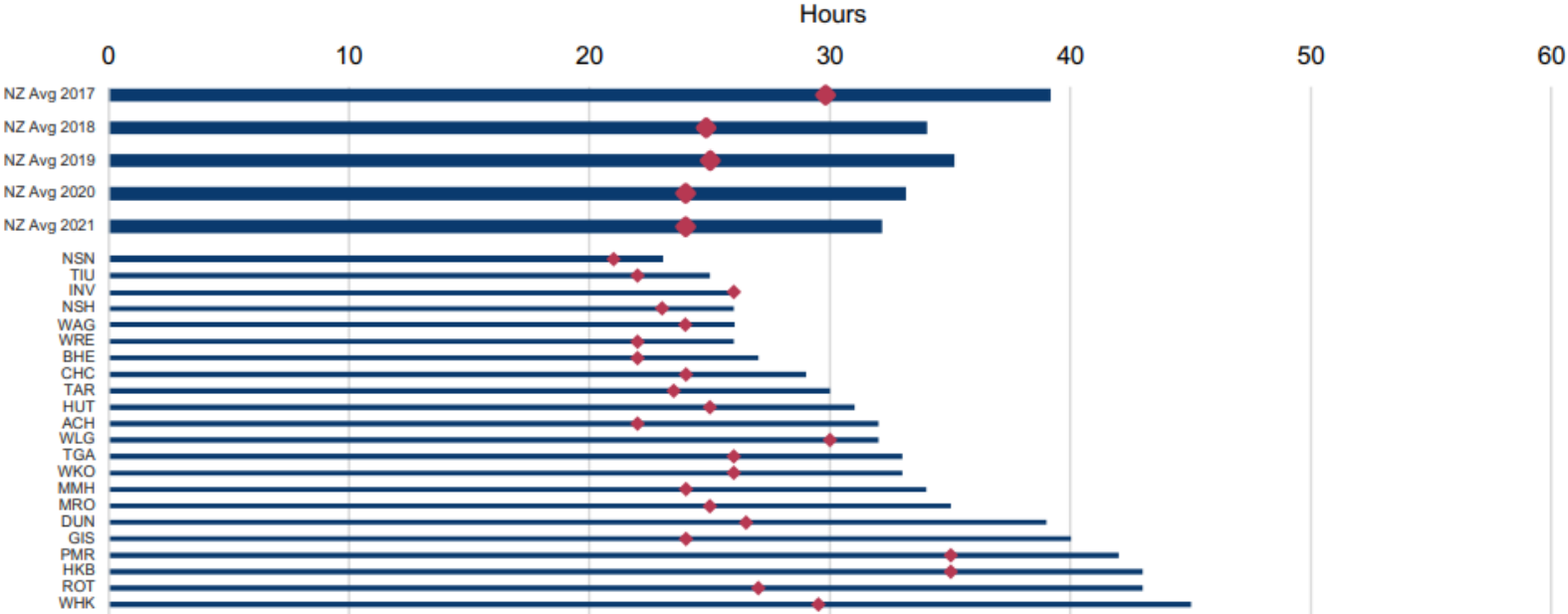
# Time to surgery -2022



**FIGURE 23** Average time to surgery excluding transferred patients

Median time :  
24 hrs

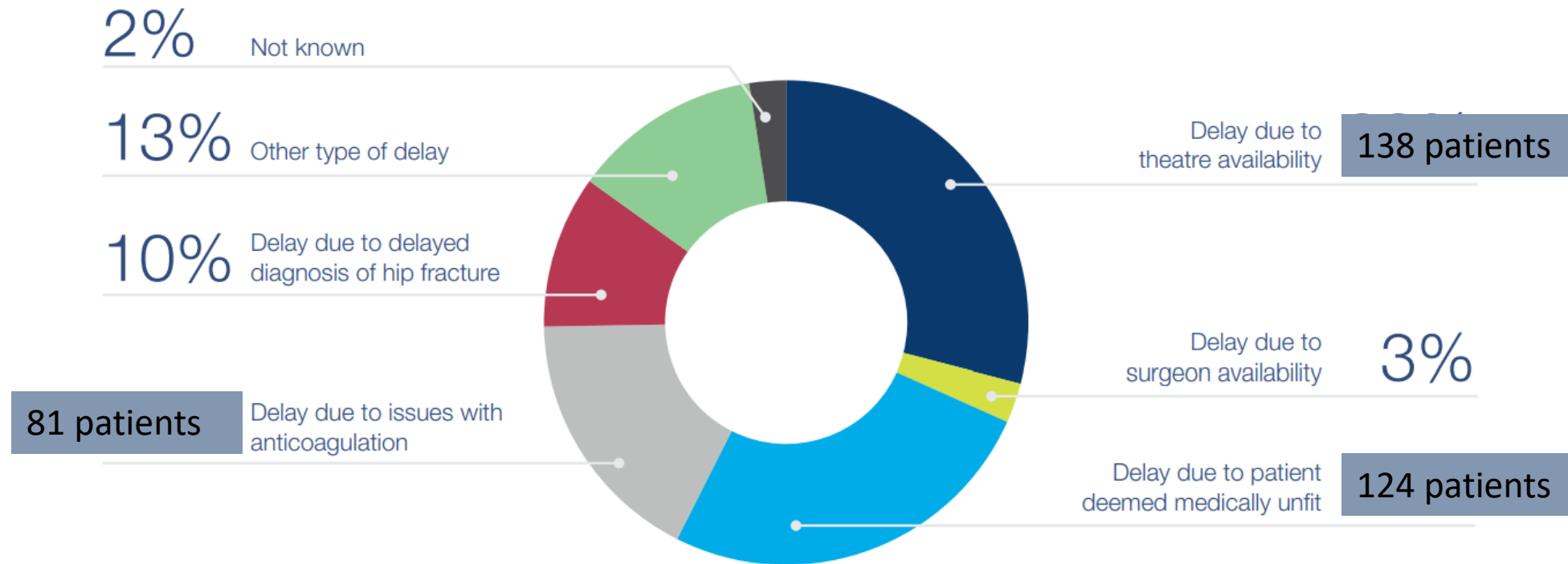
Average time:  
32 hrs



• ANZHFR 2022 Annual Report

# Reason for delay > 48 hrs

**FIGURE 27** Reason for delay > 48 hrs for New Zealand



# Reason for delay > 48 hrs

- Delay due to theatre availability
  - Data
  - Management involvement
  - Model of care
  - OG involved in pre op

# Reason for delay > 48 hrs

- Medically unfit ( 48 hrs)
  - Definition of medically unfit – reversible unfitness
  - Waiting for further investigations - ? Echo
  - Further delay – risk vs benefit

# Reason for delay > 48 hrs

- Antiplatelets and anticoagulants

Antiplatelets	Anticoagulants
Aspirin	Vitamin K antagonist – warfarin
Clopidogrel	DOACs
Ticagrelor	- Dabigatran (direct thrombin inhibitor)
DAPT – aspirin + clopidogrel	- Rivaroxaban (Factor Xa inhibitor)
DAPT – aspirin + ticagrelor	- Apixaban (Factor Xa inhibitor)

# Pre operative management of antiplatelet

- Aspirin
  - Generally safe to proceed
- Clopidogrel
  - Recommend to withhold pre operatively

# Pre operative management of antiplatelet

## Clonidogrel and hip fractures, is it safe? A systematic review and meta-analysis



Christopher G. K. M. Soo<sup>1\*</sup>, Paul K. Della Torre<sup>2</sup>, Tristan J. Yolland<sup>3</sup> and Michael A. Shatwell<sup>1</sup>

### Abstract

**Background:** Femoral neck fractures in the elderly make up a large proportion of Orthopaedic surgical admissions each year. Operating on patients with clonidogrel poses a challenge because of the risk of bleeding and the difficulty deciding the optimal timing of surgery. The aim of this systematic review is to examine the published evidence to establish a set of guidelines for approaching neck of femur patients who are on clonidogrel.

**Methods:** All comparative studies with an intervention group and a control group were considered. Data on patient blood transfusion exposures, units transfused, haemoglobin concentration and drop in haemoglobin were extracted and pooled using the fixed effects model. Heterogeneity of the intervention effect was assessed with the  $I^2$  statistic.

**Results:** A total of 4219 studies were identified. After removal of duplicates and after exclusion criteria were applied, there were 14 studies to be included. All 14 were case series with controls. There was no significant heterogeneity amongst the studies. Pooled odds ratio for transfusion exposures was 1.24 (95 % confidence interval 0.91 to 1.71) however this was not statistically significant ( $p = 0.14$ ). No significant mean differences were found for other primary outcome measures.

**Conclusions:** On the available evidence, we recommend that these patients can be managed by normal protocols with early surgery. Operating early on patients on clonidogrel is safe and does not appear to confer any clinically significant bleeding risk. As reported in other studies, we believe clonidogrel, if possible, should not be withheld throughout the perioperative period due to increased risk of cardiovascular events associated with stopping clonidogrel. Care should be taken intraoperatively to minimise blood loss due to the increased potential for bleeding.

**Trial registration:** This systematic review and meta-analysis has been registered on Research Registry on July 16, 2015. The Review Registry Unique Identifying Number is: reviewregistry61.

**Keywords:** Orthopaedics, Clonidogrel, Anticoagulant, Surgical blood loss, Hip fracture



# Pre operative management of antiplatelet

## Antiplatelet Agents—Oral P<sub>2</sub>Y<sub>12</sub> Inhibitors

### Key differences between oral P<sub>2</sub>Y<sub>12</sub> receptor antagonists

Feature	Clopidogrel	Prasugrel	Ticagrelor
Reversible platelet inhibition	No	No	Yes
Loading dose	300-600 mg	60 mg	180 mg
Daily dose (wt >60 kg) <sup>a</sup>	75 mg	10 mg	90 mg twice daily
Increased risk of non-CABG major bleeding <sup>b</sup>	–	Yes	Yes
Increased risk of CABG-related major bleeding <sup>b</sup>	–	Yes	No
Safe for use in patients with history of CVA	Yes	No	Yes
Prodrug	Yes	Yes	No
Dyspnea and ventricular pauses	No	No	Yes

## Bleeding Risk

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# Pre operative management of anticoagulants

- Vitamin K antagonist – warfarin
  - Target INR < 1.5
  - If INR on arrival > 1.5g, give stat IV vitamin K 5mg
  - Recheck INR 6hrs, if INR > 1.5, further Vitamin K 5mg
  - Check INR at 0600
  - If INR < 1.5 – proceed
  - If INR > 1.5 – liaise with haem for prothrombinex

# Pre operative management of anticoagulants

- Dabigatran
  - Clarify the dose – 110mg po bd or 150mg bd
  - Document the timing of last dabigatran dose
  - If dTCT > 80 – fully anticoagulated
  - Check INR, aPTT and dTCT at 0600 (day of OT)
    - a) dTCT < 20 and aPTT < 40 – proceed with OT
    - b) dTCT < 80 and aPTT normal/slightly prolonged – safe to proceed, but if concerned, obtain dabigatran assay (aim < 40ng/ml)
    - c) dTCT > 80 and aPTT > 40 – for reversal with praxbind 2.5g

# Pre operative management of anticoagulants

- Rivaroxaban
  - Document timing of last rivaroxaban dose
  - Clarify the dose – 10mg / 15mg / 20mg
  - If INR  $\geq 1.2$  give 5 mg IV Vitamin K
  - At 0600 (day of OT) do the following:
    - If previous INR  $\geq 1.3$  check INR, APTT, Anti-Xa levels
      - Anti-Xa  $< 30\text{ng/ml}$  & INR  $< 1.3$  – safe for OT
      - Anti-Xa  $> 30\text{ng/ml}$ , regardless of INR, D/W Haematology SMO
    - If previous INR  $< 1.3$  check INR and APTT
      - If INR  $< 1.3$ , safe for OT
      - If INR  $\geq 1.3$ , review Anti-Xa as above

# Rivaroxaban App

## App Store Preview

Open the Mac App Store to buy and download apps.



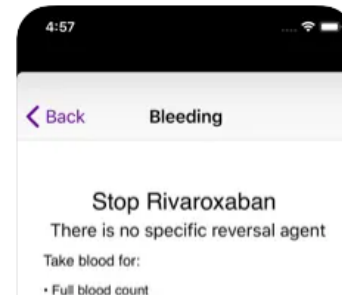
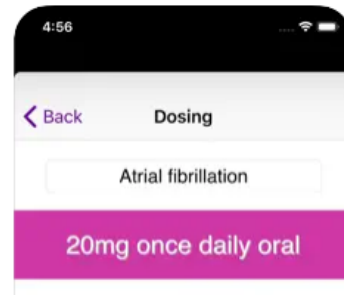
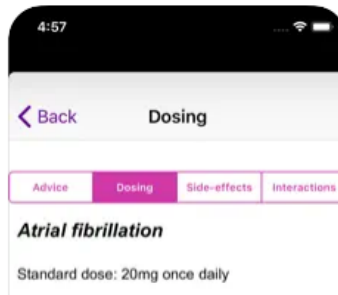
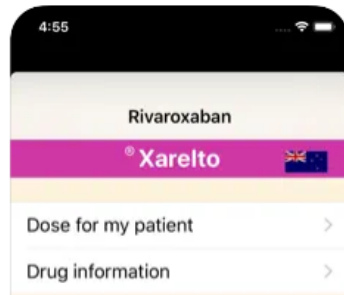
### Managing Rivaroxaban 17+

HealthObs Ltd

Designed for iPhone

Free

## iPhone Screenshots



# Case A



- Mrs A , 85 yr , fall in rest home , L) hip – shortened + ER (20/1/21)
  - 1) Previous TIA 2013
  - 2) Type 2 DM – HbA1c 52
  - 3) Hypertension
  - 4) Cognitive decline – noted by family

- MOCA 29/30 July 2020

# Case A



# Case A



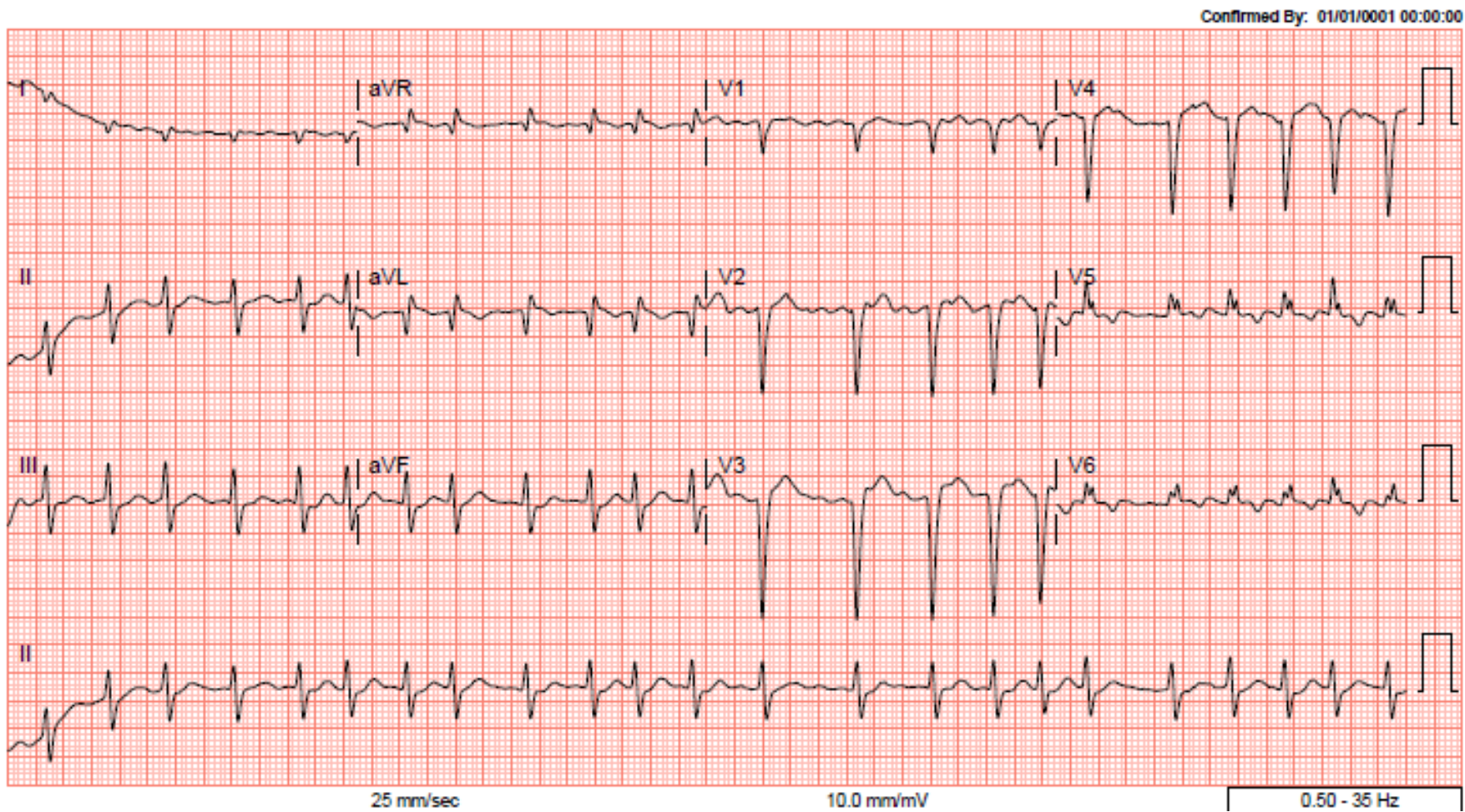
- Bloods

Haemoglobin	122	g/L	115-155
RBC	4.22	x E12/L	3.6-5.6
Haematocrit	0.38		0.35-0.46
Mean Cell Volume	89	fL	80-99
Mean Cell Haemoglobin	28.9	pg	27-33
RDW	14.6		11.5-15.0
RBC (nudeated)	0	x E9/L	
<b>Platelets</b>	<b>595</b>	<b>x E9/L H</b>	<b>150-400</b>
<b>WBC</b>	<b>24.1</b>	<b>x E9/L H</b>	<b>4.0-11.0</b>
<b>Neutrophils</b>	<b>19.5</b>	<b>x E9/L H</b>	<b>1.9-7.5</b>
<b>Basophils</b>	<b>0.2</b>	<b>x E9/L H</b>	<b>0-0.2</b>
Eosinophils	0.2	x E9/L	0-0.5
Monocytes	0.7	x E9/L	0.2-1.0
Lymphocytes	3.1	x E9/L	1.0-4.0
<b>Immature Granulocytes</b>	<b>0.2</b>	<b>x E9/L H</b>	<b>0.0-0.06</b>
Blood Film			

Sodium	136	mmol/L	135-145
Potassium	4.5	mmol/L	3.5-5.2
<b>Glucose</b>	<b>16.1</b>	<b>mmol/L H</b>	<b>3.0-11.0</b>
Creatinine	87	umol/L	45-90
Phosphate	1.34	mmol/L	0.70-1.50
Calcium	2.30	mmol/L	2.10-2.55
◆ Calcium (albumin adjusted)	2.35	mmol/L	2.10-2.55
Albumin	35	g/L	32-48
Protein	76	g/L	64-82
◆ Globulin plasma	41	g/L	25-41
Bilirubin	6	umol/L	<25
GGT	18	U/L	0-50
Alkaline Phosphatase	109	U/L	40-130
CK	89	U/L	30-180
CRP	<3	mg/L	0-5
ALT	18	U/L	<45
<b>Troponin I</b>	<b>352</b>	<b>ng/L H</b>	<b>0-40</b>
Glucose Comment			
◆ Authorised by			Siemens Dimension Vista



# Case A



# Case A



- 2<sup>nd</sup> troponin

**Troponin I**                      **1500 ng/L H 0-40**

Haemolysis Comment

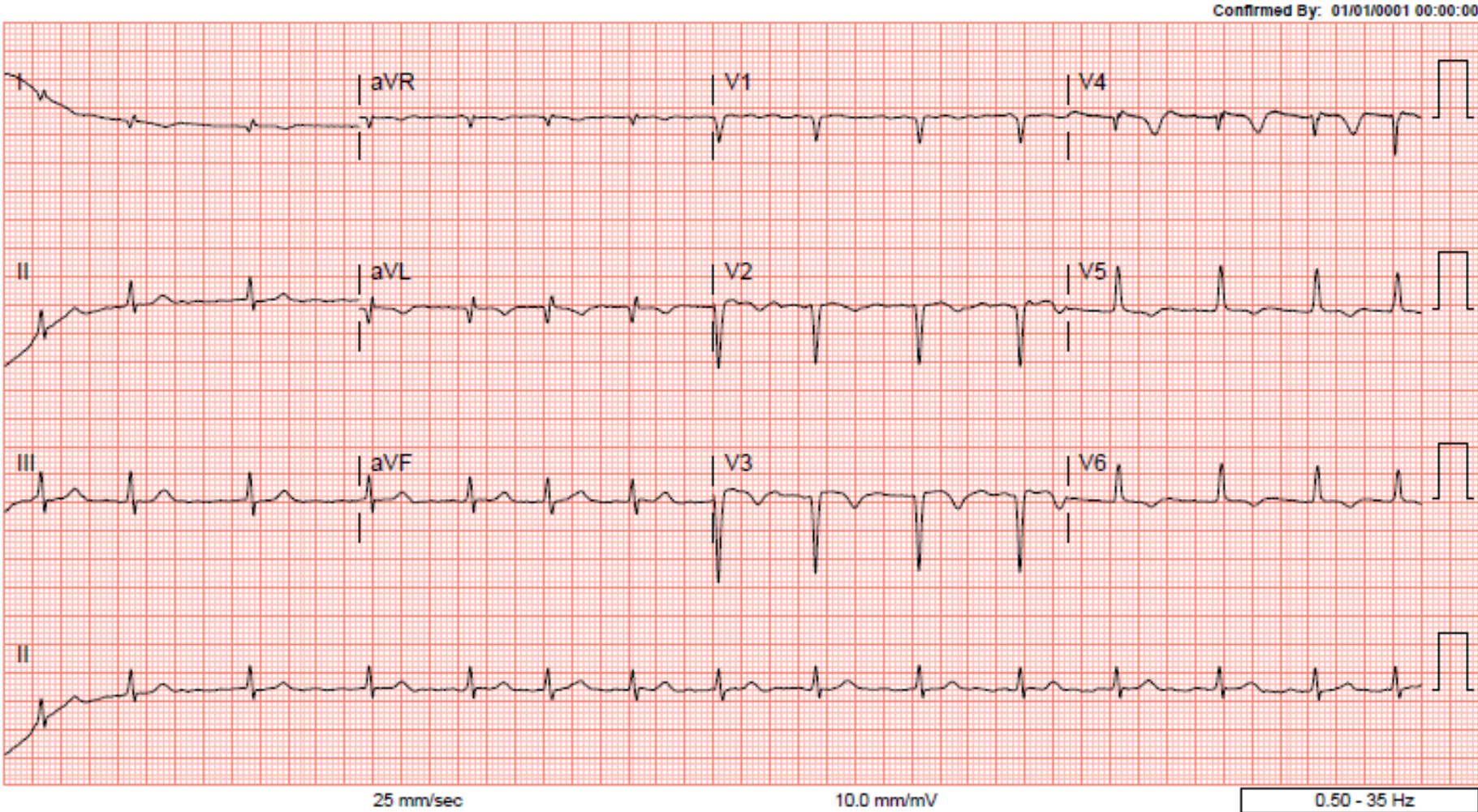


Authorised by

Siemens Dimension Vista

- IVF + metoprolol tartrate given

# Case A



# Case A



- Type 1 vs type 2 NSTEMI
  - ? Driven by AF or AF due to NSTEMI
  - Triple therapy or DAPT?
  - Echo?
  - Anaesthetic review ...

**MUST FIX THE HIP!!!**

# Case A



- Atrial fibrillation
  - Aim for rate < 100bpm for surgery
  - Use rate control med such as
    - a) Metoprolol
    - b) Digoxin
    - c) Diltiazem
    - d) Amiodarone





PERIOPERATIVE

TO BETA-BLOCK OR NOT?

THE DEBATE ON BETA-BLOCKADE IN PERIOPERATIVE CARE

- perioperative beta-blockade significantly reduced the risk of perioperative myocardial infarctions (HR 0.73; 95%CI 0.60-0.89) compared to placebo
- Patients treated with beta-blockers, however, also experienced significantly higher rates of stroke (HR 2.17; 95%CI 1.26-3.74) and death (HR 1.33; 95%CI 1.03-1.74)



P O I S E

TO BETA-BLOCK OR NOT?

THE DEBATE ON BETA-BLOCKADE IN PERIOPERATIVE CARE

- Outcome
  - On rate control meds – continue pre operatively till post operatively
  - Do not initiate any beta blockade – without indication

# Case A – what happened?

- Aspirin alone
- Femoral nerve cath management – analgesia
- Metoprolol CR (started and uptitration)
- Pre op echo – no report till 3 days later
- 2 L of blood loss intraoperatively (4 units of RBC)
- Haematoma ++
- DAPT on day 4 post op – once haemostasis secured and echo results RWMAAs with impaired LVEF



# Take home message

- Do better in getting patients to theatre
- Evidence vs Reality
- Pre operative managements – pain/ nutrition/ IVF/ pre op VTE
- Post operative managements – access to HDU – limited support
- Improvement of model of care
- DATA ! DATA! DATA !

Thank you for your attention



# Waitemata Ortho Dept

