PHA-6020Y

Patient centred medicine from bench to bedside

CVS – Clinical Workshop 7 – ANSWERS

ATRIAL FIBRILLATION

Learning Outcomes

By the end of this workshop you will be able to:

- Describe the therapeutic options for the treatment of atrial fibrillation in line with NICE guidance
- Utilise the CHA_2DS_2 - VASc and ORBIT score to advise on the use of anticoagulation
- Identify pharmaceutical problems associated with the treatment of individual patients with atrial fibrillation
- Identify the therapeutic and toxic monitoring parameters for the drug used in the treatment of atrial fibrillation

Pre-workshop tasks:

- In advance of this workshop please complete **CASE 1** – you will be asked to feedback these in your groups during the workshop

Resources

- On Bb:
  - Screencasts: Arrhythmias
  - NICE Guidelines: Atrial Fibrillation (https://www.nice.org.uk/guidance/ng196)
  - Stroke TBL
- In workshop document:
  - CHA_2DS_2-VASc stroke risk score (available on-line at: https://www.mdcalc.com/cha2ds2-vasc-score-atrial-fibrillation-stroke-risk)
  - ORBIT score for bleeding (available on-line at: https://www.mdcalc.com/orbit-bleeding-risk-score-atrial-fibrillation)

(all accessed 24/11/23)

CASE 1 TO BE COMPLETED IN ADVANCE OF WORKSHOP

CASE 1

Mr GH, 68yr old man admitted via his GP with a 2-week history of “racing heart beat”, increasing angina and dizziness.

PMH: HT, stable angina

OE: Ventricular rate 130 bpm, irregular

Diagnosis: uncontrolled AF causing exacerbation of angina

Drug history:

Aspirin75mg od
Perindopril 4mg od
Amlodipine 10mg od – recently increased from 5mg od
GTN prn

NKDA

1. According to NICE guidelines, what is the first line drug treatment for someone with a ventricular rate of 130bpm?

Standard beta-blocker e.g. bisoprolol 2.5mg od & titrate according to response

2. What are the complications of AF?

Thromboembolism - Stasis of blood within atria predisposes to cerebral and systemic thromboembolism. Sluggish atrial blood flow also allows partial activation of the clotting cascade. AF increases risk of stroke 5 fold, 25% of all ischaemic strokes are caused by underlying AF

Heart failure

Exacerbation of angina – Mr GH

3. Using the CHA_2DS_2VASc and ORBIT score decide whether Mr GH should be considered for anticoagulation. What would you recommend?
   (When calculating the ORBIT score assume Mr GH's blood tests are normal)

CHA_2DS_2VASc:

Aged 65–74 years (1 point) + hypertension (1 point) + angina (vascular disease) (1 point) = **3 points**

ORBIT:

Treatment with antiplatelet = **1 point**

NICE recommends anyone with CHA_2DS_2VASc of 2 or more (1 or more if male) should be considered for anticoagulation (with assessment of bleeding risk using ORBIT)

Mr GH should be considered for anticoagulation e.g. DOAC

4. After an increase in dose and optimisation of Mr GH's first line treatment he still has a ventricular rate of 100bpm – what are the second-line recommendations for the treatment of his AF and how should Mr GH's therapy be adjusted?

If monotherapy does not work, consider combination therapy with 2 from:

- Beta-blockers
- Diltiazem
- Digoxin

(digoxin only appropriate for monotherapy if sedentary but can be used for add on therapy)

Suggest add in diltiazem (and therefore stop amlodipine – also a CCB but not rate limiting)

5. Mr GH's consultant decides to refer him for DCCV. What is DCCV and what drug therapy needs to be considered?

Direct current cardioversion

- application of controlled electric shock across chest wall
- override disordered conduction
- allow SA node to regain control of HR
- patient briefly anaesthetised

Procedure is thrombogenic – need to be anticoagulated before procedure and for 3 weeks before and 4 weeks after (if not planned admission anticoagulated with Low Molecular weight heparin)

NICE recommend consideration of amiodarone therapy starting 4 weeks before and continuing for up to 12 months to maintain sinus rhythm – may not be used if already on other rate/rhythm control therapy

CHA_2DS_2-VASc stroke risk score

The CHA_2DS_2-VASc stroke risk score estimates the risk of stroke in people with non-valvular atrial fibrillation on a point scale of 1–9, using the following risk factors:

- aged 65–74 years (1 point)
- aged 75 years or older (2 points)
- female (1 point)
- congestive heart failure (1 point)
- hypertension (1 point)
- diabetes (1 point)
- stroke, transient ischaemic attack or thromboembolism (2 points)
- vascular disease – previous myocardial infarction, peripheral arterial disease, aortic plaque (1 point).

ORBIT Bleeding Risk Score

The ORBIT score predicts the risk of bleeding and is recommended to be taken into account when offering anticoagulation. The ORBIT score estimates the risk of bleeding on a point scale of 1– 7, using the following risk factors:

- Hb <13g/dL for males and <12g/dL for females, or haematocrit <40% for males and <36% for females (2 points)
- Age >74 years (1 point)
- Any history of GI bleeding, intracranial bleeding, or haemorrhagic stroke (2 points)
- eGFR <60 mL/min/1.73 m^2 (1 point)
- Treatment with antiplatelet agents (1 point)

Interpretation:

ORBIT Score	Risk group	Bleeds per 100 patient-years
0-2	Low	2.4
3	Medium	4.7
4-7	High	8.1

CASE 2

You have a new patient on your ward, Mrs LM. Her medical notes, blood tests and drug chart are below:

	Patient:	Mrs LM
	Hospital number:	2672345
	DoB:	11.11.1942
	Address:	5 Rose Close, Flatplace
PC:	uncontrolled AF	
HPC:	Admitted via GP with uncontrolled AF (picked up when attended surgery for 'flu jab)	
PMH:	AF (2 years) Hyperthyroidism (4 years) Hypertension (5 years) LVF (HFrEF) (1 year) Type 2 DM – diet controlled (5 years)	
DH:	Warfarin variable dose according to INR (patient unable tell you her normal dose as it keeps changing each week) Bisoprolol 10mg od Diltiazem XL 240mg od Ramipril 5mg on Carbimazole 5mg od Furosemide 40mg om (patient admits to not taking this when she goes out for the day)	
OE:	Patient feels well but anxious about being in hospital	
	BP:	150/100 mmHg
	Pulse:	120 BPM, irregular
SH:	Retired, lives with husband	
Alcohol:	1-2 units/week	
Smoking status:	Non-smoker	
Diagnosis:	Uncontrolled AF	

Plan:
Two previous admissions with uncontrolled AF and underwent DCCV on both admissions, but both were unsuccessful - duty consultant does not wish to attempt any further procedures => for drug management – start amiodarone and digoxin

J Findlay Bleep 467

Her blood test results on admission were as follows:

Norfolk and Norwich University Hospital NHS Trust **PATHOLOGY DEPARTMENT**		Consultant/GP: Dr T Thomas		PATIENT LOCATION *PATH*
Patient Name: Mrs LM			NHS No:	
Hosp no: 2672345		Sex: F	Age: 81 Yr	Pathology
Patient Address:				
Lab Episode No:	5432		Date/Time Collection: Today	
Address for Report: Norfolk & Norwich University Hospital Colney Lane Norwich NORF NR4 7UY				

HAEMATOLOGY Collection LAB No Today 2696	**Wbc** 6.5 (4.0-11.0 10^9/L)	**Hb** 14.7 (13.0-18.0 g/dL)	**Plt** 288 (150 - 400 X 10^9/L)	**MCV** 91 (80-100 fL)	**INR** 1.8

BIOCHEMISTRY

Collection LAB No
Today 2696

TSH **0.2*** (0.35-5.0 mU/L)	**Free T4** **40*** (9-24 pmol/L)	**Sodium** 134 (134-145 umol/L)	**Potassium** 4.7 (3.6-5.00 umol/L)	**Urea** 6.7 (1.7-7.1 umol/L)	**Creatinine** 122 (55-125 umol/L)

Bilirubin 16 (0 - 22 umol/L)	**AST** 38 (0 - 50 U/L)	**GGT** 35 (0 - 60 U/L)	**ALP** 100 (38 - 126 U/L)	**Albumin** 35 (35 - 50 g/L)	**eGFR** 89 (>90ml/min ml/min/ 1.73^2)	

Additional information: Mrs LM's INR is 1.8 on admission and her TTR (time in therapeutic range) from her GP records is calculated to be 50%.

TTR (Time in therapeutic range):

Indication of how well controlled patient's INR is over a defined period of time – does not differentiate between being over or under target

Various means of calculating:

- Percent of Visits in Range (Traditional Method)

This looks at how many visits had INR results in range, and divides by the total number of visits. If the patient has had 8 visits, and 6 had readings within their therapeutic range, then the patient is considered in range 75% of the time.

- Percent of Days in Range (Rosendaal Method)

This is more complex calculation, as it looks at the amount of time between visits to determine how long the patient might have been within their therapeutic range. If a patient has a therapeutic range of 2.0 - 3.0, and on May 1st tested at 2.5, then tested 3.5 on May 31st, then we can estimate how many days were in range. Since there were 30 days between tests, you assume that the patient slowly moved from 2.5 to 3.5 over those 30 days, so around May 15th, the patient was probably over 3.0, and therefore was out of range. Therefore, we estimate that 15 days were in range, and 15 days were out of range (within the 30 day time period), which means the patient is within range 50% of the time.

- On-line calculator used

UEA Training Prescription Chart

Number of drug charts in use: 1

Date	Surname	Forename	Sex	D/O/B	Hosptial No.	Weight (kg)	Height (cm)	Surface Area (m^2)	SAM?
Day 1	M	L	F	11/11/1942	2672345	Estimate / Actual			Yes / No

Ward/ward change:	Cardio	**Patient address:**	**5 Rose Close,Flatplace**
Consultant(s)	Dr T Thomas		

DRUG SENSITIVITIES/ALLERGIES MUST BE ENTERED. If no allergies/sensitivites you must write 'NKDA' and sign and date.

Medicine/Substance	Description of allergy/sensitivity	Signature	Date

PRE-MEDICATION AND ONCE ONLY DRUGS

Pharm	Date	Drug (approved name)	Dose	Directions/ route/ other	Time to be given	Signature	Administered by	
							Initials	Date
	Day 1	Digoxin	500mcg	PO	09,00	J Findlay	KU	Day 1
	Day 1	Digoxin	500mcg	PO	15,00	J Findlay		

Thromboprophylaxis Risk Assessment

Drug thromboprophyaxis recommended					
Drug thromboprophlaxis NOT recommende	X				

Prescribing

- Write clearly in black, indelible ink.
- Use approved drug names.
- All prescriptions must be signed and dated.
- If a drug is to be intentionally omitted by a prescriber or pharmacist, indicate this with an 'X' in the drug administration box.
- If a drug is being stopped, or a dose altered, draw a line through the whole prescription, sign and date.
- Doctors to re-write charts as required. Start dates should be transferred to new chart. Include cross-reference to drugs on other charts.

Drug omissions

If a drug is omitted, one of the below codes must be entered into the drug administration box.

1. Nil by mouth
2. Not required
3. Patient refused
4. Drug unavailable
5. Vomiting/nausea
6. Patient off ward
7. No IV access
9. Contra-indicated
8. Other - reason must be recorded in notes

Self administration of medicines (SAM)

If a patient is suitable for SAM they can initial in the relevant drug administration box or a nurse can write 'SAM' in the box.

Prescribers

Signature	Dr J Findlay
Bleep no.	467
Print name	Doctor J Findlay
Signature	
Bleep no.	
Print name	
Signature	
Bleep no.	
Print name	
Signature	
Bleep no.	
Print name	
Signature	
Bleep no.	
Print name	

Pharmacy codes

Pharm: Signature confirms checked/date

TTO ✔ = from locker; **H** = at home; **R** = relabel; ★ = new supply at discharge

Supply: S = ward stock; **T** = dispensing, see date and quantity; **P** = POD, see date and quantity

REGULAR MEDICINES 1

CHECK PAGE 1 FOR ALLERGY STATUS

Date →			Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Tick box to indicate time of admission or add other times ↓												
1. Drug (approved name) **Warfarin**	Start date: Day 1	End date										
Dose: As per INR	Route: Po	Frequency: OD										
Indication	Pharm check	06:00										
		08:00										
		12:00										
		14:00										
		18:00	✓									
		22:00										
Prescriber's signature: J Findlay	Supply	00:00										
2. Drug (approved name) **Bisoprolol**	Start date: Day 1	End date										
Dose: 10mg	Route: Po	Frequency: OD	✓	KU								
Indication	Pharm check											
Prescriber's signature: J Findlay	Supply											
3. Drug (approved name) **Diltiazem XL**	Start date: Day 1	End date										
Dose: 240mg	Route: Po	Frequency: OD	✓	KU								
Indication	Pharm check											
Prescriber's signature: J Findlay	Supply											
4. Drug (approved name) **Ramipril**	Start date: Day 1	End date										
Dose: 5mg	Route: Po	Frequency: ON										
Indication	Pharm check											
		22:00	✓									
Prescriber's signature: J Findlay	Supply	00:00										
5. Drug (approved name) **Carbimazole**	Start date: Day 1	End date										
Dose: 5mg	Route: Po	Frequency: OD	✓	KU								
Indication	Pharm check											
Prescriber's signature: J Findlay	Supply											

CHECK PAGE 1 FOR ALLERGY STATUS

REGULAR MEDICINES 2

CHECK PAGE 1 FOR ALLERGY STATUS

Tick box to indicate time of admission or add other times ↓	Date →	Day 1	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
6. Drug (approved name): Furosemide; Start date: Day 1; End date:	06:00										
	08:00	✓	KU								
Dose: 40mg; Route: Po; Frequency: OM	12:00										
	14:00										
Indication:	Pharm check:	18:00										
		22:00										
Prescriber's signature: J Findlay	Supply:	00:00										
7. Drug (approved name): Digoxin; Start date: Day 2; End date:		06:00										
		08:00	✓	X								
Dose: 125mcg; Route: Po; Frequency: OM		12:00										
		14:00										
Indication:	Pharm check:	18:00										
		22:00										
Prescriber's signature: J Findlay	Supply:	00:00										
8. Drug (approved name): Amiodarone; Start date: Day 1; End date:		06:00										
		08:00	✓	KU								
Dose: 200mg; Route: PO; Frequency: TDS 7 days		12:00										
		14:00	✓							X	X	X
Indication:	Pharm check:	18:00										
		22:00	✓									
Prescriber's signature: J Findlay	Supply:	00:00										
9. Drug (approved name):	Start date:	End date:	06:00										
			08:00										
Dose:	Route:	Frequency:	12:00										
			14:00										
Indication:	Pharm check:	18:00										
		22:00										
Prescriber's signature:	Supply:	00:00										
10. Drug (approved name):	Start date:	End date:	06:00										
			08:00										
Dose:	Route:	Frequency:	12:00										
			14:00										
Indication:	Pharm check:	18:00										
		22:00										
Prescriber's signature:	Supply:	00:00										

CHECK PAGE 1 FOR ALLERGY STATUS

AS REQUIRED DRUGS

CHECK PAGE 1 FOR ALLERGY STATUS

1. Drug (approved name)		Start date	Date											
Dose	Route	Max Frequency	Time											
Indication		Pharm check	Dose											
			Route											
Prescriber's signature		Supply	Given by											
2. Drug (approved name)		Start date	Date											
Dose	Route	Max Frequency	Time											
Indication		Pharm check	Dose											
			Route											
Prescriber's signature		Supply	Given by											
3. Drug (approved name)		Start date	Date											
Dose	Route	Max Frequency	Time											
Indication		Pharm check	Dose											
			Route											
Prescriber's signature		Supply	Given by											
4. Drug (approved name)		Start date	Date											
Dose	Route	Max Frequency	Time											
Indication		Pharm check	Dose											
			Route											
Prescriber's signature		Supply	Given by											
5. Drug (approved name)		Start date	Date											
Dose	Route	Max Frequency	Time											
Indication		Pharm check	Dose											
			Route											
Prescriber's signature		Supply	Giver by											

CHECK PAGE 1 FOR ALLERGY STATUS

1. Mrs LM is on warfarin for stroke prevention – calculate her CHA_2DS_2VASc and ORBIT score and comment on whether this therapy is appropriate.

CHA_2DS_2VASc:

Aged >75 years (2 points) + female (1 point) + heart failure (1 point) + HT (1 point) + DM (1 point) = **6 points**

ORBIT: >74 years = 1 **point**

Anticoagulant therapy therefore appropriate (but potentially not warfarin – unable to remember dosing regime, TTR 50% and DOACs first-line NICE guidelines)

2. Identify any actual and potential pharmaceutical care issues for your patient. Document the issue(s) and the action(s) in the following tables.
   Where you recommend the patient to start on any **NEW** medication, please also complete details of the monitoring parameters for the new drug, otherwise leave it blank.

   (the workshop template contains a standard number of boxes – this does **NOT** give any indication to the number of issues to be identified – could be more, could be less!!)

Issue	**Action required**
Allergy status not known	Check with patient and document on drug chart and in medical notes
Monitoring parameters	
Therapeutic	**Toxic**

Issue	**Action required**
TTR = 50% - demonstrates poor INR control	Consideration of change from warfarin to DOAC (check SPC for guidance on when to start DOAC when stopping warfarin e.g. apixaban – start when INR <2)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	**Action required**
Diltiazem contraindicated in heart failure	Advise Dr to stop (now commenced amiodarone and digoxin)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Bp not controlled at 150/100 (may resolve with control of AF) Additional optimisation of HF therapy (EBM dose 10mg/day), titrate towards 10mg	Monitor and if appropriate advise Dr to consider uptitration of Ramipril – to 7.5mg od then 10mg od as appropriate – target <150/90 (RF OK)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Low TSH and high free T4 indicating uncontrolled hyperthyroidism (? cause of uncontrolled AF)	Advise Dr to increase carbimazole to 10mg od & monitor response
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Amiodarone can cause abnormal TFTs (already got)	Monitor TFTs very closely – ideally would change amiodarone to alternative – discuss plan with prescriber and ensure risks have been considered. Limited choice as had other first-line treatment (Possibly consider sotalol – non-standard beta-blocker – both class II and class III effects – would stop bisoprolol and amiodarone)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Amiodarone interaction between amiodarone and digoxin causing increase in digoxin levels	If digoxin to continue then need to advise Dr to reduce dose of digoxin by 50% (possible that digoxin may be stopped once AF controlled with amiodarone)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Review need for statin therapy => increased CV risk (QRISK3>50%)	Discuss with Dr to commence atorvastatin 20mg on (primary prevention) – however also consider age
Monitoring parameters	
Therapeutic	**Toxic**
Lack of CV events, lipid profile	LFTs, myopathy, CK

Issue	Action required
Optimisation of HF treatment – add spironolactone as per NICE guidelines	Ask doctor to add in spironolactone 25mg om (From ESC guidelines: consider change to ARNI and addition of SGLT2I)
Monitoring parameters	
Therapeutic	**Toxic**
Improvement long-term in symptoms of heart failure	BP, Rf, K+, S/E: eg gynaecomastia

Issue	Action required
Lifestyle counselling	Counsel on diet, exercise, alcohol Ok (but check not exacerbating AF)
Monitoring parameters	
Therapeutic	**Toxic**

Issue	Action required
Counselling and education on drugs	All new drugs – counsel on indication, dose, frequency & side-effects SPECIFIC INFORMATION as appropriate eg amiodarone – phototoxicity, night glare, atorvastatin – take at night, muscle Address adherence issues (including furosemide)
Monitoring parameters	
Therapeutic	**Toxic**

3. What alternative non-pharmacological interventions are available to prevent thromboembolism in AF patients?

Left atrial appendage occlusion – left atrial appendage is a small muscular sac in the wall of left atrium (function not known) – 80-90% of all non-valvular strokes in AF patients occur as a result of blood clots formed in left atrial appendage.

Watchman device can be inserted to seal it off (parachute shaped, self-expanding device)

Will continue anticoagulants for up to 6 months after procedure

4. For each of the drugs that is prescribed for Mrs LM, complete the following tables to detail the indication and the therapeutic and toxic monitoring parameters:

Drug: Warfarin	**Indication:** Prevention of CVA
Monitoring parameters	
Therapeutic	**Toxic**
↓CVA, INR (target 2-3)	INR, signs of bleeding, Hb

Drug: Bisoprolol	**Indication:** AF, heart failure, (HT)
Monitoring parameters	
Therapeutic	**Toxic**
Apex pulse (aim for control down to 60bpm), improvement long-term in symptoms of heart failure, (bp <140/90), control of AF symptoms	BP, pulse S/E: e.g. fatigue, cold extremities

Drug: Diltiazem	**Indication:** AF, HT
Monitoring parameters	
Therapeutic	**Toxic**
Apex pulse (aim for control down to 60bpm), bp (<140/90), control of AF symptoms	Bp, pulse S/E: g.i., flushing

Drug: Ramipril	Indication: HT, heart failure
Monitoring parameters	
Therapeutic	Toxic
BP (<140/90), long-term symptoms of heart failure	BP, RF, K+, dry cough

Drug: Carbimazole	Indication: Hyperthyroidism
Monitoring parameters	
Therapeutic	Toxic
TFTs (TSH & Free T4), pulse	TFTs, WBC, signs of infection, RBC, signs of bruising/bleeding

Drug: Furosemide	Indication: Heart failure
Monitoring parameters	
Therapeutic	Toxic
Symptoms of heart failure e.g. SOB, weight	BP, RF, U&Es (K+, Na+), blood glucose

Drug: Amiodarone	Indication: AF
Monitoring parameters	
Therapeutic	Toxic
Apex pulse	TFTs (TSH & FT4), LFTs, lung function, S/E: skin, taste, eyes

Drug: Digoxin	Indication: AF, (HF)
Monitoring parameters	
Therapeutic	Toxic
Apex pulse, (improvement in symptoms of HF)	Pulse, RF, U&Es (K+, Ca^{2+}), levels, signs of toxicity e.g. N&V