Clinical Protocol

INTRACORONARY ACETYLCHOLINE FOR DIAGNOSIS OF EPICARDIAL AND MICROVASCULAR SPASM

SETTING	Cardiology Catheter Laboratory (Cardiac Suite)
FOR STAFF	All staff involved in the administration of Acetylcholine in Adult Cardiology Catheter Labs
PATIENTS	Adult patients undergoing microvascular physiology assessment

Background

For a significant proportion of patients, no obstructive coronary artery disease is found during invasive coronary angiography. Within this group of patients there are those who may have microvascular angina and/or vasospastic angina. Owing to its short half-life, acetylcholine (ACh) can be applied directly to the coronary arteries where its effects on coronary vasculature can be observed within the Cath Lab.

The aim of this document is to provide guidance on the preparation of ACh stock solutions and administration of ACh within the Cath Lab for assessment of coronary endothelial function.

This guideline is for use in adult cardiology catheter labs only.

Presentation of medicine	Acetylcholine Chloride 20mg Powder for Ophthalmic Solution (Miochol-E)
Preparation & Administration	Dilute before administration. The recommended diluent is sodium chloride 0.9%. Reconstitute 20mg of Acetylcholine Powder for Ophthalmic Solution with the solvent provided as directed in the Summary of Product Characteristics (SPC). Add the 2mL of reconstituted solution to 500mL of sodium chloride 0.9%, making a 40microgram/mL **stock solution**. Draw up 22.5mL of **stock solution** into a 50 mL Luer-Lock syringe and then make up to 50mL with sodium chloride (0.9%). This creates an 18 micrograms/mL ACh solution. Label this solution 3. Using a wet to wet technique, connect the sterile line directly to the guide catheter. Using the 3-way taps, connect the ACh syringes to the line, ensuring that no bubbles are introduced.
Dose	**Please use the intracoronary acetylcholine prescription chart on the DMS**

	<u>For coronary vasospasm testing</u> 5.5mL of 18micrograms/mL ACh solution (Solution 3) should be injected into the **LCA** over 20 seconds. If the **right coronary artery (RCA)** is to be used instead, inject 2.75mL of 18micrograms/mL ACh solution (Solution 3) over 20 seconds.
Flushing	**Do not flush the vascular access device.** Once testing has finished, a syringe should be connected to the guide catheter which can be used to aspirate any ACh remaining in the catheter. This is to prevent an accidental bolus of ACh being administered.
Patient monitoring	Administration of Acetylcholine may cause bradycardia and/or heart block. Sinus rhythm can often be restored by asking the patient to cough. Bradyarrhythmias may be managed by slowing the rate of infusion however; if they persist they may be reversed with atropine. Intracoronary Acetylcholine may also lead to the development of transient atrial tachyarrhythmias which should normally revert back to normal sinus rhythm within seconds. If they persist for longer then patients should be managed in line with standard ALS tachycardia guidelines. If coronary vasospasm is induced, it should be promptly reversed through administration of intracoronary nitrates.
Cautions and contraindications	Adverse effects include: • Bradycardia • Arrhythmias • Hypotension • Flushing and sweating
Other comments	• This is an off-label indication for acetylcholine. • Once reconstituted, the solution should be clear and colourless • The solution should be mixed just before use as aqueous solutions of ACh are unstable • Each vial is single use only; any unused solution should be discarded.

REFERENCES	Miochol-E, 20mg, Powder and Solvent for Intraocular Irrigation. Electronic Medicines Compendium (EMC); accesed on 15/12/2021 via https://www.medicines.org.uk/emc/product/4795 Assessing Coronary Microvascular Function in Patients with Non-Obstructive Coronary Artery Disease. NIHR- BHF Cardiovascular Partnership. D. Perera, A. Chiribiri, C. Berry, V.Ferreira, S.Hoole et al. Version 1.6, June 2020.

	Stratified Medical Therapy Using Invasive Coronary Function Testing in Angina, The CorMicA Trial, Journal of the American College of Cardiology. T J.Ford, B.Stanley, R.Good, P.Rocchiccioli, M.McEntegart et al. Version 72, Issue 23, pg 2841-2855, December 2018. Perera D, Berry C, Hoole SP, et al. Invasive coronary physiology in patients with angina and non-obstructive coronary artery disease: a consensus document from the coronary microvascular dysfunction workstream of the British Heart Foundation/National Institute for Health Research Partnership. Heart Published Online First: 22 March 2022. doi: 10.1136/heartjnl-2021-320718
RELATED DOCUMENTS AND PAGES	Intracoronary Acetylcholine Prescription Chart
AUTHORISING BODY	Cardiac Suite Interventional Steering Group (Drs Wells, Nabais and Sinha) Drugs & Therapeutic Committee
SAFETY	Acetylcholine is unstable and particularly prone to hydrolysis leading to breakdown into choline and acetic acid, this will be time and temperature dependent. Once the solution is prepared it should be used immediately. Due to acetylcholine's effect on cardiac conduction, continuous ECG monitoring should take place throughout the procedure. Acetylcholine can temporarily interrupt cardiac conduction. Atropine 1 mg should be readily available. Intracoronary nitrates should be readily available to relieve coronary spasm. Acetylcholine will be administered by interventional consultant cardiologists and cardiology registrars under the supervision of a consultant interventional cardiologist
QUERIES AND CONTACT	Cardiac Suite Interventional Steering Group (Drs Wells, Nabais and Sinha)