NICE National Institute for Health and Care Excellence

Professional Expert Questionnaire

Technology/Procedure name & indication: **IP1822 - Coronary sinus stent insertion for refractory angina**

Your information

Name:	Jonathan M Hill
Job title:	Consultant Cardiologist
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Professional organisation or society membership/affiliation:	General Medical Council, British Cardiovascular intervention society
Nominated/ratified by (if applicable):	Unknown
Registration number (e.g. GMC, NMC, HCPC)	3685576

How NICE will use this information: the advice and views given in this questionnaire will form part of the information used by NICE and its advisory committees to develop guidance or a medtech innovation briefing on this procedure/technology. Information may be disclosed to third parties in accordance with the Freedom of Information Act 2000 and the Data Protection Act 2018, complying with data sharing guidance issued by the Information Commissioner's Office. Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Your name, job title, organisation and your responses, along with your declared interests will also be published online on the NICE website as part of the process of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

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x☐ I give my consent for the information in this questionnaire to be used and may be published on the NICE website as outlined above. If consent is NOT given, please state reasons below:

Click here to enter text.

Please answer the following questions as fully as possible to provide further information about the procedure/technology and/or your experience.

Please note that questions 10 and 11 are applicable to the Medical Technologies Evaluation Programme (MTEP). We are requesting you to complete these sections as future guidance may also be produced under their work programme.

1	Please describe your level of experience with the procedure/technology, for example: Are you familiar with the procedure/technology?	Most experienced coronary sinus reducer implanter in UK. Have proctored and trained multiple other consultants. Involved as PI for COSIRA study in UK and also for REDUCER registry. Very familiar with the technology. Have helped iterate and further develop the implantation procedure
	Have you used it or are you currently using it? – Do you know how widely this procedure/technology is used in the NHS or what is the likely speed of uptake? – Is this procedure/technology performed/used by clinicians in specialities other than your own? – If your specialty is involved in patient selection or referral to another specialty for this	Not widely used. Roll out has been slow since the COSIRA study was published. Ongoing data collection for REDUCER registry. Not currently being used by other specialities

	procedure/technology, please indicate your experience with it.	
2	– Please indicate your research experience relating to this procedure (please choose one or more if relevant):	I have done clinical research on this procedure involving patients or healthy volunteers. I have published this research. I am co-applicant of successful grants for soon to be recruiting studies.. Other (please comment)
3	How innovative is this procedure/technology, compared to the current standard of care? Is it a minor variation or a novel approach/concept/design? Which of the following best describes the procedure (please choose one):	The first in a new class of procedure.
4	Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care?	It has the potential for both Currenlty used as an addition to existing standard care. In a research context its' use can be explored as an alternative to current treatments eg CTO PCI

Current management

5	Please describe the current standard of care that is used in the NHS.	Complex PCI including CTO angioplasty is the standard of care for revascularisation for complex coronary artery disease in patients not amenable to coronary artery bypass surgery

6	Are you aware of any other competing or alternative procedure/technology available to the NHS which have a similar function/mode of action to this? If so, how do these differ from the procedure/technology described in the briefing?	No directly competing technology

Potential patient benefits and impact on the health system

7	What do you consider to be the potential benefits to patients from using this procedure/technology?	Safer than some higher risk PCI procedures eg retrograde CTO PCI. Effective in up to 80% of patients treated
8	Are there any groups of patients who would particularly benefit from using this procedure/technology?	Patients who have been completely revascularized by conventional means eg PCI , CTO PCI, CABG who have diffuse distal disease refractory to medical therapy
9	Does this procedure/technology have the potential to change the current pathway or clinical outcomes to benefit the healthcare system? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?	Yes. Shorter safer procedures producing comparable symptomatic benefit Could reduce rehospitalisation
10 - MTEP	Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the procedure/technology likely to cost more or less than current standard care, or about the same? (in terms of staff, equipment, care setting etc)	It is likely to cost the same compared to a conventional stent, however the cath lab time is shorter and the equipment used the same. Can be delivered as a day case procedure
11 - MTEP	What do you consider to be the resource impact from adopting this procedure/technology (is it likely to cost more or less than standard care, or about same-in terms of staff, equipment, and care setting)?	Less cath lab resource utilisation
12	What clinical facilities (or changes to existing facilities) are needed to do this procedure/technology safely?	A cath lab with conventional equipment. No additional specialist equipment required.

13	Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?	Yes the procedure needs on site teaching with a trained operator/proctor for the first 5-10 cases.

Safety and efficacy of the procedure/technology

14	What are the potential harms of the procedure/technology? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence: Adverse events reported in the literature (if possible, please cite literature) Anecdotal adverse events (known from experience) Theoretical adverse events	Generally safe. Low complication rate. Complications associated with venous puncture into internal jugular. Coronary sinus dissection can occur which is usually a benign phenomemon. Occasional pain may be experienced by instrumenting coronary sinus but very unusual
15	Please list the key efficacy outcomes for this procedure/technology?	Reduced angina frequency
16	Please list any uncertainties or concerns about the efficacy and safety of this procedure/?	Not possible to predict who will respons. About 20% of people are non responders.
17	Is there controversy, or important uncertainty, about any aspect of the procedure/technology?	Yes the mechanism of action is still disputed.
18	If it is safe and efficacious, in your opinion, will this procedure be carried out in (please choose one):	Fewer than 10 specialist centres in the UK. These centres should have complimentary expertise in all aspects of complex coronary artery disease management eg high volume expertise in left main stem intervention, complex CTO treatment including retrograde and antegrade dissection re-entry. This technology should not be utilised by operators who cannot deliver CTO/complex PCI services

Abstracts and ongoing studies

19	Please list any abstracts or conference proceedings that you are aware of that have been recently presented / published on this procedure/technology (this can include your own work). Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important.	None.
20	Are there any major trials or registries of this procedure/technology currently in progress? If so, please list.	REDUCER registry. Trials due to start at Brompton and Hammersmith (BHF funded)

Other considerations

21	Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?	Approximatley 1 in 1000 to 1 in 50 patients undergoing percutaneous revascularisation procedures.
22	Are there any issues with the usability or practical aspects of the procedure/technology?	Yes – it is a little tricky to implant and requires some training in how to intubate the coronary sinus but otherwise it relatively straightforward.

23	Are you aware of any issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS?	No
24	Is there any research that you feel would be needed to address uncertainties in the evidence base?	Yes, working out who is a non responder prior to implantation. Also establishing efficacy in both epicardial and microvascular disease.
25	Please suggest potential audit criteria for this procedure/technology. If known, please describe: − Beneficial outcome measures. These should include short- and long-term clinical outcomes, quality-of-life measures and patient-related outcomes. Please suggest the most appropriate method of measurement for each and the timescales over which these should be measured. − Adverse outcome measures. These should include early and late complications. Please state the post procedure timescales over which these should be measured:	Beneficial outcome measures: QOL is the most important outcome including angina scoring and frequency Recurrent symptoms

Further comments

26	Please add any further comments on your particular experiences or knowledge of the procedure/technology,	The technology is effective in approximately 80%v patients I have treated.

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Declarations of interests

Please state any potential conflicts of interest relevant to the procedure/technology (or competitor technologies) on which you are providing advice, or any involvements in disputes or complaints, in the previous **12 months** or likely to exist in the future. Please use the NICE policy on declaring and managing interests as a guide when declaring any interests. Further advice can be obtained from the NICE team.

Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Direct - financial	Research support, Speaker Fees, Proctoring fees, Honoraria from Neovasc and Aquilant	**>5 years ago**	**continues**
Choose an item.			
Choose an item.			

x☐ I confirm that the information provided above is complete and correct. I acknowledge that any changes in these declarations during the course of my work with NICE, must be notified to NICE as soon as practicable and no later than 28 days after the interest arises. I am aware that if I do not make full, accurate and timely declarations then my advice may be excluded from being considered by the NICE committee.

Please note, all declarations of interest will be made publicly available on the NICE website.

Print name:	**Jonathan Hill**
Dated:	**15/3/21**

NICE National Institute for Health and Care Excellence

Professional Expert Questionnaire

Technology/Procedure name & indication: IP1822 - Coronary sinus stent insertion for refractory angina

Your information

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Nominated/ratified by (if applicable):	Click here to enter text.
Registration number (e.g. GMC, NMC, HCPC)	Click here to enter text. **4121686**

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Please answer the following questions as fully as possible to provide further information about the procedure/technology and/or your experience.

Please note that questions 10 and 11 are applicable to the Medical Technologies Evaluation Programme (MTEP). We are requesting you to complete these sections as future guidance may also be produced under their work programme.

1	Please describe your level of experience with the procedure/technology, for example: Are you familiar with the procedure/technology?	We run a national refractory angina centre based at Bradford Teaching Hospitals Trust. We participated in the COSIRA trial as a recruiting and implanting centre. Since 2013 we have implanted 42 reducers in patients with refractory angina. I identify patients for the procedure and the reducer is implanted by my colleague Dr Lindsay. I am extremely familiar with the technology and the implanting procedure. As a service we follow up all of our patients who have had the reducer implanted and still have contact with the patients who had reducers implanted in 2013.
	Have you used it or are you currently using it? – Do you know how widely this procedure/technology is used in the NHS or what is the likely speed of uptake? –	We are still using the reducer though 2020 saw our implantation rate fall due to the covid pandemic. The reducer is not widely used throughout the NHS though I cannot tell you exactly how many implanting centres there now are. I suspect it is no more than 10. It is not a technically difficult procedure to perform and does not require any complex equipment. A period of training would be required in terms of learning the implanting technique-this presumably would be performed by the existing implanting centres.
	– Is this procedure/technology performed/used by clinicians in specialities other than your own?	Not to my knowledge
	– If your specialty is involved in patient selection or referral to another	No. We are a regional implanting centre for the reducer. We therefore select patients and implant the device.

	specialty for this procedure/technology, please indicate your experience with it.	
2	– Please indicate your research experience relating to this procedure (please choose one or more if relevant):	**I have done bibliographic research on this procedure.** I have done research on this procedure in laboratory settings (e.g. device-related research). ***I have done clinical research on this procedure involving patients or healthy volunteers (Recruiting and implanting centre for the COSIRA trial and named as a contributing author on the paper).*** ***I have published this research. (Recruiting and implanting centre for COSIRA trial and named as a contributing author on the paper)*** I have had no involvement in research on this procedure. Other (please comment)
3	How innovative is this procedure/technology, compared to the current standard of care? Is it a minor variation or a novel approach/concept/design? Which of the following best describes the procedure (please choose one):	The reducer is a novel approach to helping patients with no revascularisation options via either PCI or CABG. The novelty lies in the location and nature of the stent deployed (a waisted stent in the coronary sinus as opposed to a stent designed to increase luminal diameter of an epicardial artery) Established practice and no longer new. A minor variation on an existing procedure, which is unlikely to alter the procedure's safety and efficacy. Definitely novel and of uncertain safety and efficacy. The first in a new class of procedure. This is difficult to answer. The reducer is in practice "just" another percutaneous intervention in

		terms of its technique. It is standard practice in our refractory angina centre to implant it in appropriate patients. It is clearly not an established procedure at a national level. We have had no significant safety issues with the reducer to date and in terms of its efficacy there is an improvement in patient's symptom control in the order of 10-20% (one CCS class) in my experience in the majority of patients.
4	Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care?	It is used as an adjunct to existing therapy medical therapy and as an alternative to PCI or CABG in selected cases.

Current management

5	Please describe the current standard of care that is used in the NHS.	Current standard care for refractory angina is through a combination of optimal medical therapy, (PCI or surgery where feasible/desirable) coupled to pragmatic rehabilitation. Additionally therapies that target pain modulation such as TENS and Stellate Ganglion Block may also be employed. Enhanced external counter pulsation (EECP) is an additional therapy that may be employed in selected patients.
6	Are you aware of any other competing or alternative procedure/technology available to the NHS which have a similar function/mode of action to this? If so, how do these differ from the procedure/technology described in the briefing?	EECP, possibly. EECP aims to improve the symptoms of angina through a course of therapy delivered over 35 one hour sessions. Its actual mechanism of action is not fully understood and may involve enhanced collateralisation, which is different from the physiological effect of the reducer on myocardial blood flow.

Potential patient benefits and impact on the health system

7	What do you consider to be the potential benefits to patients from using this procedure/technology?	An improvement in angina control through a low risk day case procedure for patients who otherwise do not have a revascularisation option via conventional PCI or CABG despite being on optimal medical therapy
8	Are there any groups of patients who would particularly benefit from using this procedure/technology?	Patients with ongoing angina with evidence of ischaemia who do not have a revascularisation option via either conventional PCI or CABG despite being on optimal medical therapy.
9	Does this procedure/technology have the potential to change the current pathway or clinical outcomes to benefit the healthcare system? Could it lead, for example, to improved outcomes, fewer hospital visits or less invasive treatment?	Yes. It should be viewed in the same light as conventional PCI for the control of angina all be it in a more select group of patients. Yes. This is my experience to date in the majority of patients that I have treated.
10 - MTEP	Considering the care pathway as a whole, including initial capital and possible future costs avoided, is the procedure/technology likely to cost more or less than current standard care, or about the same? (in terms of staff, equipment, care setting etc)	I suspect it will cost approximately the same as a routine PCI procedure (this is roughly our experience to date)
11 - MTEP	What do you consider to be the resource impact from adopting this procedure/technology (is it likely to cost more or less than standard care, or about same-in terms of staff, equipment, and care setting)?	I suspect it will cost the same as or similar to a routine PCI procedure (this is roughly our experience to date) and no additional investment in terms of equipment is required.
12	What clinical facilities (or changes to existing facilities) are needed to do this procedure/technology safely?	None
13	Is any specific training needed in order to	A period of training / mentoring would be required for the implanting interventionalist but

	use the procedure/technology with respect to efficacy or safety?	experience has shown that this is brief eg 3 to 5 cases depending on the skill of the operator.

Safety and efficacy of the procedure/technology

14	What are the potential harms of the procedure/technology? Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence: Adverse events reported in the literature (if possible, please cite literature) Anecdotal adverse events (known from experience) Theoretical adverse events	Damage to the coronary sinus and the standard risks associated with PCI in general. We have not experienced any significant events to date. We have however reported a small number of adverse events to the Reducer 1 registry. Coronary sinus dissection, Reducer migration and Coronary Sinus perforation have been reported. Aa above plus complete coronary sinus occlusion or coronary sinus thrombosis in the longer term (to my knowledge this has not occurred in any patient to date who has received a reducer according to Neovasc-the parent company)
15	Please list the key efficacy outcomes for this procedure/technology?	Improvement in angina class
16	Please list any uncertainties or concerns about the efficacy and safety of this procedure/?	None that I am aware of to date.
17	Is there controversy, or important uncertainty, about any aspect of the procedure/technology?	Not that I am aware
18	If it is safe and efficacious, in your opinion, will this procedure be carried out in (please choose one):	In my opinion it is a safe and efficacious procedure in selected patients It can be carried out in most or all district general hospitals with a PCI lab.

Abstracts and ongoing studies

19	Please list any abstracts or conference proceedings that you are aware of that have been recently presented / published on this procedure/technology (this can include your own work). Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important.	Table 1: Clinical improvements after coronary sinus reducer implantation in currently available clinical studies | Authors	Type of study	Patients (n)	Endpoint	CCS score improvement	Other findings
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Banai et al. 2007[19]	First-in-man	15	Safety–feasibility	Mean reduction: -1.4	Reduction in ischaemia during dobutamine echocardiography and thallium single-photon emission computed tomography
Verheye et al. 2015[24]	Double-blind randomised sham-control trial	104	CCS class improvement (≥2 points)	Mean reduction: -1.1	Primary endpoint occurred in 35% of patients in the CRS-treated group versus 15% of the control group (p=0.02); CCS improvement of ≥1 class occurred in 71% versus 42% respectively (p=0.003). Significant improvement in SAQ score
Abawi et al. 2016[36]	Single-centre registry	23	Procedural safety	Any reduction in CCS class observed in 74% of patients	–
Giannini et al. 2018[37]	Single-centre registry	50	Safety/efficacy	Mean reduction: -1.3	Significant improvement in SAQ score and 6-minute walking test
Konigstein et al. 2018[38]	Single-centre registry	48	Clinical Improvement	Mean reduction: -1.4	Significant improvements in exercise capacity, 6-minute walking test distance, left ventricle ejection fraction under stress and wall motion score index
Giannini et al. 2018[39] (REDUCE study)	Multi-centre registry	141	CCS class and SAQ score improvement	Mean reduction: -1.4	Significant improvement in SAQ score and significant reduction in anti-angina drugs prescribed
Giannini et al. 2019[40]	Single-centre study	15	Perfusion parameters at CMR imaging	Any reduction in CCS class observed in 87% of patients	Significant improvement of myocardial perfusion parameters as investigated with CMR imaging
Zivelonghi et al. 2020[41]	Multi-centre registry	37	Oxygen kinetics at CPET	Mean reduction: -1.6	Significant improvement in effort tolerance (workload + 34%) and maximal oxygen uptake in cardiopulmonary exercise test
Giannini et al. 2017[42]	Multi-centre registry	8	CCS class and SAQ score improvement	Mean reduction: -1.5	Significant improvement in CCS class and SAQ score in patients with microvascular angina
Zivelonghi et al. 2020[43]	Multi-centre registry	205	CCS class improvement	Mean reduction: -1.2	Significantly greater CCS class improvement in patients with chronic total occlusions	 *CCS = Canadian Cardiovascular Society; CMR = cardiac magnetic resonance; CPET = cardiopulmonary exercise test; SAQ = Seattle Angina Questionnaire.*
20	Are there any major trials or registries of this procedure/technology currently in progress? If so, please list.	Reducer 1 registry was a multinational registry involving 300 odd patients. The findings of this registry have been published. I understand that here have been national registries performed in the Netherlands and Italy. I have not been made privy to the findings of these national registries.

Other considerations

21	Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?	It is generally accepted that around 5% of the population with angina will have refractory symptoms. Of these only a small proportion will be suitable for a reducer. In Bradford we see around 100 patients with refractory angina each year. On average we implant around 4 to 5 reducers annually.
22	Are there any issues with the usability or practical aspects of the procedure/technology?	Not especially
23	Are you aware of any issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS?	No
24	Is there any research that you feel would be needed to address uncertainties in the evidence base?	More data on the assessment of perfusion defects pre and post implantation would be helpful in understanding the mechanism of action in more detail but I do not think it is an essential requirement as proof of efficacy. Gianni et al 2019 is the only published data that I have seen to date on this area.
25	Please suggest potential audit criteria for this procedure/technology. If known, please describe: − Beneficial outcome measures. These should include short- and long-term clinical outcomes, quality-of-life measures and patient-related outcomes. Please suggest the most appropriate method of measurement for each and the timescales over which these should be measured. − Adverse outcome measures. These	Beneficial outcome measures: Assessment of angina frequency Assessment of GTN usage Assessment of exercise tolerance where feasible All assessed over a 1 yr time frame

	should include early and late complications. Please state the post procedure timescales over which these should be measured:	Adverse outcome measures: MACE event rates as per standard PCI reporting. Reducer displacement (acute at time of implantation)

Further comments

26	Please add any further comments on your particular experiences or knowledge of the procedure/technology,	I think the reducer is a useful adjunctive therapy in selected patients with refractory angina where there is evidence of ischaemia in the anterior or lateral wall (as per the Cosira trial) who are not suitable for revascularisation by either conventional PCI or CABG.

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Declarations of interests

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Type of interest *	Description of interest	Relevant dates	
		Interest arose	Interest ceased
Choose an item.	I have no conflicts of interest to declare		
Choose an item.			
Choose an item.			

X☐ I confirm that the information provided above is complete and correct. I acknowledge that any changes in these declarations during the course of my work with NICE, must be notified to NICE as soon as practicable and no later than 28 days after the interest arises. I am aware that if I do not make full, accurate and timely declarations then my advice may be excluded from being considered by the NICE committee.

Please note, all declarations of interest will be made publicly available on the NICE website.

Print name:	**P A Sainsbury**
Dated:	**17.3.2021**