1. Introduction

This document sets out the University Hospitals of Leicester (UHL) NHS Trusts Policy and Procedures for the nurse led clinic for the assessment and management guidelines for the patients who had TAVI procedure.

The rationale for a Nurse-led clinic is to allocate a dedicated time slot for the patient to be seen by a Nurse Specialist with in-depth knowledge of TAVI procedure and related complications to avoid waiting in a consultant –led clinic. This may reduce pressure on the cardiology Service, allowing for patients to be reviewed by an expert nurse specialist. The nurse led service will be either via clinic attendance at the cardiology outpatient department in Glenfield hospital and/or via a nurse led telephone clinic.

This nurse led clinic will enable to review the adult post TAVI patients who require review in clinic to help achieve the following objectives:

- Assess the patient in a timely manner, preferably with in a 6-12 weeks' timescale, identifying specific needs or problems that need to be assessed.
- Implement and evaluate the effectiveness of TAVI care by providing patient education or support as necessary prior to transfer of care to primary referral or cardiology clinic at UHL.
- Free up TAVI consultant clinic appointments.

2. Scope

This document applies to all Nurse Specialists within the cardiology department who have the knowledge, skills and competency required to undertake the Nurse Led follow-up clinic for post TAVI patients under the care of The University Hospitals of Leicester NHS Trust.

This document applied to the UHL TAVI consultants, nursing and administrative services, in particularly TAVI/Structural cardiac interventional team, UHL cardiology outpatient staffs and post TAVI patients.

3. Recommendations, Standards and Procedural Statements

Procedure / Process for post TAVI/Structural Cardiac Interventional Nurse Specialist Led follow-up Clinic	
No.	**Process for the Nurse-Led TAVI Follow-up clinic**
	1.1 Clinic inclusion criteria and profile • The TAVI/Structural cardiac intervention consultants and nurse specialists are responsible for identifying patients post TAVI with stable conditions to be reviewed in the nurse led TAVI clinic which include: Stable echocardiogram post TAVI procedure such as stable left ventricular function (no deterioration on echo post implant), raised pulmonary artery pressures and no other significant valve dysfunction detected. • Appointments are arranged individually by cardiology administrative team only. • The nurse led review takes place in cardiology outpatient department in the Glenfield hospital only.

1.2 Preparation for the clinic

- The clinic will run on Monday and Tuesday afternoons between 13:40 and 16:00 for patients being seen by face to face and telephone calls. Face to face and telephone consultations are listed under clinic code TAVINUR and this code is exclusively for this group of patients.
- The post TAVI echocardiogram, TAVI procedure log and patients post TAVI clinical status must be checked before discharge from hospital to make sure patients are suitable for nurse led discharge.
- Check whether there are any technical unresolved concerns from the TAVI procedure.
- Check consultant's instructions for ongoing treatment plans. e.g. anticoagulation or antiplatelet treatment.
- Assess objectives for the review, especially the need for echocardiogram during clinic or prior/post review.

1.3 Clinic procedure

Patients are assessed for the nurse led TAVI outpatient clinic and the following must be performed:

- Prior to review the general outpatient clinic standard of ECG and clinical observations to include blood pressure, pulse, temperature, oxygen saturations, height, weight and respiratory rate will be recorded.
- Reference to consultant operation log regarding anticoagulation/ antiplatelet stop/ continuation date will be discussed with the patient.
- Document any ongoing medical problems and refer to TAVI consultant or general practitioner or other members of the multidisciplinary team as appropriate.
- Examine the patient as per standard nurse led discharge guidance (Appendix A).
- Assess for potential post TAVI complications (Appendix C).
- Document consultation as per trust policy.
- Identify any changes in the patient's physical, psychological and social condition and refer to consultant operator as appropriate. Document action plan in the letter as appropriate.
- Check the patients understanding of the management plan, including any ongoing symptoms and their understanding of longer term care of the TAVI valve.
- Agree follow up plan or discharge to referrer if no further follow up to be performed in the TAVI clinic.

1.4 Follow-up plan, documentation and outcomes of clinic

- Report any concerns or changes to the patient condition to the TAVI operator.
- Any investigations such as follow-up ECHO, ECG or 24 hour tape will be requested from the clinic if needed after the discussion with the TAVI consultants.
- Document a summary of clinic review, actions and follow-up plan in the patients' medical note and a letter is dictated to the patient and GP.
- Clinic letter to be typed and a copy of this clinic letter are then filed at the back of the patient's medical notes by the cardiology administrative team.

1.5 Non-attendance policy

	• Patient to be rebooked automatically or contacted by telephone and an agreeable alternative appointment offered. • If a second appointment missed discharge back to GP and primary referrer by letter.

4. Education and Training

TAVI/Structural intervention nurse Specialist and TAVI/Structural consultants.

It is the responsibility of the nurse to ensure they regularly update their knowledge and skills in line with continuing professional development.

The nurse specialist needs to be an active member of the British cardiovascular intervention society and European Society of Cardiology, and be aware of current treatments and research.

5. Monitoring and Audit Criteria

All guidelines should include key performance indicators or audit criteria for auditing compliance,

if this template is being used for associated documents (such as procedures or processes) that support a Policy then this section is not required as all audit and monitoring arrangements will be documented in section 8 of the Policy.

Key Performance Indicator	Method of Assessment	Frequency	Lead

6. Legal Liability Guideline Statement

Guidelines or Procedures issued and approved by the Trust are considered to represent best practice. Staff may only exceptionally depart from any relevant Trust guidelines or Procedures and always only providing that such departure is confined to the specific needs of individual circumstances. In healthcare delivery such departure shall only be undertaken where, in the judgement of the responsible healthcare professional' it is fully appropriate and justifiable - such decision to be fully recorded in the patient's notes

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

7. Supporting Documents and Key References

Baumgartner, H., Falk, V and Bax, J.J et al (2017). ESC/EACTS Guidelines for the management of valvular heart disease. European Heart Journal 38 (36):2739-2791.

Mylotte,D., Andalib, A and Theriault-Lauzier, P et al (2015) Transcatheter heart valve failure: a systematic review. European Heart Journal 36(21): 1306-27.

Nishimura, R. A., Otto, C. M and Bonow, R.O et al (2014) AHA/ ACC Guidance for the management of patients with valvular heart disease: executive summary: a report of the American college of Cardiology/ American heart association task force on practice guidelines. Circulation 10: 129 (23): 2440-292.

Lahb, A., Naim, C and Bonis, M.D et al (2014) TAVR – associated prosthetic valve infective endocarditis: results of a large, multi-centred registry. Journal of the American College of Cardiology 64 (20): 2176 – 8.

8. Key Words

TAVI/Structural cardiac intervention, nurse led clinic, TAVI

This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

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Appendix A- Post-TAVI discharge guidance

- Patients are assessed for the nurse led TAVI discharge and the following must be performed:
- Clinical observations to include blood pressure, pulse, temperature, oxygen saturations and respiratory rate.
- ECG, any changes to pre procedure rhythm: Broad QRS, lengthening PR, new LBBB or RBBB
- Blood chemistry, haematology review, observing for any infection markers or worsening renal function.
- Reference to consultant operation log regarding anticoagulation/ antiplatelet stop/ continuation date will be discussed with the patient
- Assess for potential post TAVI complications, see appendix A.
- Medications and TTOs as per standard UHL protocol.

Appendix B- Clinic review

Examination to include the patient's physical, psychological and social condition

1. Aspects of the physical assessment/examination
    a. Cardiovascular, respiratory examination
        i. Heart and lung auscultation
        ii. Assess for peripheral, sacral, abdominal oedema

b. Check of groins and foot pulses, observing for vascular complications
c. Neurological as indicated and guided by medical team

2. Aspects of psychological assessment
   a. Check the patients understanding of the management plan, including any ongoing symptoms and their understanding of longer term care of the TAVI valve.

3. Aspects of social assessment
   a. Use of the Canadian frailty score (Appendix D).
   b. Referral to occupational therapy and physiotherapy, if required.

Appendix C- Potential complications Post-TAVI procedure

- Age
- Frailty
- Bleeding
- Vascular complications
- Infection
- Kidney or lung dysfunction
- Cerebrovascular problems
- Pre-existing conduction deficits.

Common Prosthetic complications include:

- Infective endocarditis risk factors: diabetes, chronic kidney disease, immunosuppression, poor oral hygiene, recurrent infections, suboptimal valve positioning
- Thrombosis: rare, coexisting prothrombotic conditions (cancers), incomplete expansion and / or apposition to the aortic wall. Native leaflets overhanging balloon expanding valves. Increased transvalvular gradients, leaflet thickening and direct visualisation of thrombotic formations. If any possibility, discuss with consultant for short term use of intensive oral anticoagulation until normalisation of gradients and leaflet mobility realised.
- Aortic regurgitation, in particular para-valvular
- Conduction defects.
- Late thromboembolisation (stroke) and prophylaxis. Ischaemic stroke may occur during or after TAVI, at 30 days to many months. The subacute and late episodes are mainly of thromboembolic origin which could arise from the stent of an implanted valve but more frequently from atrial fibrillation. A high aortic sclerotic burden, previous stroke, peripheral vascular disease and permanent atrial fibrillation all increase the risk of stroke.

Management Problems

- An elderly, frail population of patients will be seen in the nurse led post TAVI clinic and they are commonly associated with significant comorbidity. This can include lack of family support and poor compliance with therapy and outpatient appointment attendance. Additionally in these patients there may be lack of obtaining GP care if complications arise including increased hospital admission. The clinic should be vigilant to those and offer insight to GP to increase community support as indicated. Lack of insight and adjustment may lead of complications and deterioration of clinical condition and hospitalisation.

Appendix D

Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

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