

TRANSCATHETER AORTIC VALVE IMPLANTATION:
INSIGHTS FROM PATIENTS' PERI-PROCEDURE EXPERIENCES

by

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Abstract

Aortic stenosis is the most common valvular heart disease in the elderly population. When left untreated, 50% of patients die within two-years after the onset of symptoms. Transcatheter aortic valve implantation (TAVI) is an evolving new procedure that allows the heart valve to be replaced percutaneously without open-heart surgery. The recent transition to a minimalist procedure and the avoidance of general anaesthesia has further contributed to improving clinical outcomes; however, there is a gap in evidence on patients' perspectives of these recent changes to their peri-procedure care.

The purpose of this study was to explore patients' experiences of undergoing contemporary TAVI to help inform nursing and multidisciplinary practice. We used a prospective qualitative research design and interpretive description to generate knowledge and insights applicable to clinical practice. We recruited 15 participants (women = 5; mean age = 83 \pm 5.4) using purposeful sampling. Each participant was interviewed by telephone within one-week from discharge home from the hospital.

We identified an overarching theme of participants' shared desire to be a member on *their* Heart Team during their procedure. Participants sought to understand their role in relation to others, how to manage their complex wave of emotions, and how to make sense of the unfamiliar environment. The findings highlighted that there can be a disconnect between the intent to provide patient-centred care during the short but intense TAVI procedure time, and patients' perceptions of the care they received and their interactions with the team. Patients' perspectives of being a member of *their* peri-procedure Heart Team may be facilitated by focused strategies: raising the team's awareness of the needs of conscious TAVI patients, leveraging perioperative nursing expertise, strengthening the close communication between

nursing, anaesthesiology and cardiology around patient assessment and coaching, and modifying patient education resources to match individual patient learning styles and help manage patient expectations.

This study offers unique insights to inform future research to develop interventions to improve patients' experiences during TAVI and contribute to closing the gap between advances in the care of valvular heart disease and the needs of patients.

Lay Summary

The goal of this study was to explore patients' experiences during TAVI to help nurses, physicians and other health care providers provide the best possible care. Fifteen participants shared their experiences in telephone interviews during their first week after returning home. We found that participants shared a desire to be included on *their* Heart Team during their procedure and to be actively involved in their care. Participants wanted timely information, education, guidance, emotional support, and safety during TAVI. The study is important because it demonstrates that there are opportunities for the Heart Team to improve their delivery of patient-centred care with the ultimate goal of having the patient as a member of *their* Heart Team. Future research is required to learn how to best achieve this goal.

Preface

This thesis is the original, unpublished, independent work by the author, Celeste Grace Percy. Ethics approval was obtained from the University of British Columbia—Providence Health Care Research Ethics Board (Certificate number: H20-03917).

Table of Contents

<i>Abstract</i>	<i>iii</i>
<i>Lay Summary</i>	<i>v</i>
<i>Preface</i>	<i>vi</i>
<i>Table of Contents</i>	<i>vii</i>
<i>List of Tables</i>	<i>ix</i>
<i>List of Figures</i>	<i>x</i>
<i>List of Abbreviations</i>	<i>xi</i>
<i>Acknowledgements</i>	<i>xii</i>
<i>Dedication</i>	<i>xiii</i>
Chapter 1: Introduction	1
1.1 Transcatheter Aortic Valve Implantation: A Treatment Option for Patients Living with Aortic Stenosis	1
1.2 Towards a Minimalist Approach: Anaesthesia Strategy	2
1.3 Towards a Minimalist Approach: Patient Care	3
1.4 Problem Statement	3
1.5 Purpose of the Research	4
1.6 Research Question	4
1.7 Summary	4
Chapter 2: Literature Review	5
2.1 Conceptual Thinking	5
2.2 The Role of Nursing in TAVI Care	7
2.2.1 The Role of Nursing in Pre-procedure Care: Education and Managing Expectations	8
2.2.2 The Role of the Nurse Intraoperatively	8
2.2.3 The role of the nurse in early discharge planning	9
2.3 Patient Population and Treatment Decision	9
2.4 Temporal Trends in the Development of Peri-procedure Approaches	11
2.5 Contemporary Practice: Transition to a Minimalist Approach	12
2.6 Trends in Practice: Anaesthesia	13
2.7 Summary	15
Chapter 3: Methods	17
3.1 Study Design	17
3.2 Setting	18
3.3 Sampling Plan	18
3.3.1 Sample Size	19
3.4 Data Collection	19
3.5 Data Management	20

3.6 Data Analysis	21
3.7 Credibility	22
3.8 Ethical Considerations	23
3.9 Summary	24
<i>Chapter 4: Research Findings</i>	<i>25</i>
4.1 Summary of Recruitment.....	25
4.2 Participant Clinical Characteristics	25
4.3 Procedural Details	25
4.4 Summary of Data Analysis	27
4.5 Seeking Membership on my Heart Team	28
4.6 Who Am I to Them?	30
4.6.1 Entering an Unfamiliar Environment.....	30
4.6.2 Experiencing Fear of the Unknown	31
4.6.3 Finding Comfort in Caring Gestures	32
4.6.4 Summary.....	34
4.7 How Can I Be a Good Patient?.....	34
4.7.1 Making Sense of TAVI	34
4.7.2 Seeking Guidance on Behavioural Expectations	36
4.7.3 Relating Procedural Awareness to Overall Experience	37
4.7.4 Summary.....	38
4.8 How Do I Manage This Complex Wave of Emotions?.....	38
4.8.1 Experiencing Anticipatory Stress.....	39
4.8.2 Tuning in to Signals of Hope and Danger	40
4.8.3 Breathing a Sigh of Relief.....	41
4.8.4 Summary.....	42
4.9 Conclusion	42
<i>Chapter 5: Discussion</i>	<i>44</i>
5.1 Summary of Findings.....	44
5.2 TAVI under Conscious Sedation: Adapting to a New Standard of Care	44
5.3 Improving Patient-Centred Peri-procedure Care for TAVI.....	47
5.4 Facilitating Patients' Membership on <i>Their</i> Heart Team	50
5.4.1 Team Awareness Related to Care of Conscious TAVI Patients	51
5.4.2 Recommendations Related to Communication: Leveraging Perioperative Nursing Expertise	53
5.4.3 Modification of Patient Education Resources to Facilitate Membership on the Heart Team	56
5.5 Study Limitations	58
5.6 Conclusion	59
<i>References</i>	<i>60</i>
<i>Appendix.....</i>	<i>68</i>

List of Tables

Table 1	Participant demographics, medical history, procedural details and 30 day outcomes.....	26
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List of Figures

Figure 1	Participants' perspectives during TAVI.....	29
Figure 2	Recommendations related to practice: TAVI under conscious sedation: adapting to a new standard of care.....	47
Figure 3	Recommendations related to practice: improving patient-centred peri-procedure care for TAVI.....	50
Figure 4	Recommendations related to practice: team awareness related to care of conscious TAVI patients.....	53
Figure 5	Recommendations related to practice: leveraging perioperative nursing expertise	56
Figure 6	Recommendations related to practice: modification of patient education resources to facilitate membership on the Heart Team.....	58

List of Abbreviations

ADL	Activities of daily living
AS	Aortic stenosis
BCMH	British Columbia Ministry of Health
CABG	Coronary artery bypass graft
CINAHL	Cumulative Index to Nursing and Allied Health Literature.
GA	General anaesthetic
GFR	Glomerular filtration rate
ICU	Intensive care unit
LVEF	Left ventricular ejection fraction
MeSH	Medical subject headings
OR	Operating room
PAD	Peripheral arterial disease
PCC	Patient-centred care
PCI	Percutaneous coronary intervention
PHC	Providence Health Care
REB	Review Ethics Board
SAVR	Surgical aortic valve replacement
SD	Standard deviation
TAVI	Transcatheter aortic valve implantation
TAVR	Transcatheter aortic valve replacement
TEE	Transesophageal echocardiogram
THV	Transcatheter heart valve
TTE	Transthoracic echocardiogram
UBC	University of British Columbia

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Dedication

Dedicated to my parents, Dixie and John.

Chapter 1: Introduction

1.1 Transcatheter Aortic Valve Implantation: A Treatment Option for Patients Living with Aortic Stenosis

Among the elderly population, aortic stenosis (AS) is the most common valvular heart disease (Osnabrugge et al., 2013; Yurek, Jakub, & Menacho, 2015). After symptom onset, survival rates for AS are extremely poor in the absence of treatment. The average two-year mortality rate is 50% (Osnabrugge et al., 2013). Therefore, timely intervention for these patients is crucial (Marumoto, Nakamura, Kishimoto, Saiki, & Nishimura, 2014).

Treatment of severe symptomatic AS requires replacement of the diseased aortic valve (Yurek et al., 2015). Prior to the introduction of transcatheter aortic valve implantation (TAVI), surgical aortic valve replacement (SAVR) was the only treatment option available for aortic stenosis (Alsara, Alsarah, & Laird-Fick, 2014). While SAVR is a well-established procedure that has yielded remarkable results for patients, including “improved life expectancy, cardiovascular symptoms, and quality of life”, up to 30% of symptomatic patients are not eligible for surgery (Alsara et al., 2014; Rex, 2013). Higher risk patients may not be eligible for surgery because of the excessive burden of advanced age and multiple comorbidities (Alsara et al., 2014; Rex, 2013; Yurek et al., 2015). While these comorbidities may not be direct contraindications to surgery *per se*, they may indicate that patients may not derive benefit from SAVR (Yurek et al., 2015).

To address this clinical need, TAVI emerged as a less invasive and alternative treatment option to SAVR. SAVR is performed as open-heart surgery which requires a sternotomy and cardio-pulmonary bypass machine (Butala et al., 2020). In contrast, TAVI is performed percutaneously through access sheaths in the groin and does not require a sternotomy or cardiopulmonary bypass machine. A series of pivotal clinical trials have contributed to growing

indications across patients of varying surgical risk. Advancements in valve technology, procedural approaches, imaging techniques and care pathways have contributed to the development and adoption of increasingly minimalist strategies to care for TAVI patients and contribute to improved outcomes (Butala et al., 2020).

1.2 Towards a Minimalist Approach: Anaesthesia Strategy

Since the early days of the development of TAVI, periprocedural practices have evolved significantly to reflect contemporary technology and other advances, as well as reduce TAVI-related risks to patients. Procedures were initially performed exclusively under general anaesthesia (GA) with the use of invasive hemodynamic monitoring and transesophageal echocardiography (TEE). Hemodynamic monitoring is used to assess for significant hemodynamic changes and the need for vasoactive medications. When used, the function of TEE is to ensure adequate valve implantation (Butala et al., 2020). As TAVI technology evolved and operators gained familiarity with the procedure, many teams began to shift away from a GA approach in favour of less invasive strategies, ranging from conscious sedation to local anaesthesia (Butala et al., 2020; Miles et al., 2016).

As evidence continues to evolve, there is on-going debate about optimizing the anaesthetic strategy for TAVI. There is significant variation across regions and within programs. The avoidance of GA is associated with improved perioperative hemodynamic stability and decreased requirements for inotropic agents for these patients (Chopra, Luk, De Backer, & Søndergaard, 2018). The use of conscious sedation offers operators the ability to monitor patients' neurological status and pain tolerance throughout the procedure (Chopra et al., 2018). Furthermore, the use of conscious sedation and local anaesthesia is associated with decreased procedure times, shorter hospital stays, and avoidance of the intensive care unit (ICU) among

patients (Chopra et al., 2018). Considering that elderly patients are at an increased risk in the context of using a GA, not using a GA can help avoid potential damage to end organs and help prevent potential post-operative delirium (Hosoba et al., 2018).

In contrast, TAVIs performed under GA have been associated with greater hemodynamic instability and longer procedure times (Miles et al., 2016). While GA may offer potential advantages to the operator, including improved periprocedural imaging with the use of TEE to monitor valve function, and immobilization of the patient, there is growing adoption of a more minimalist approach to anaesthesia (Fröhlich et al., 2014).

1.3 Towards a Minimalist Approach: Patient Care

In parallel, there has been a similar shift in patient care from early practices informed by cardiac surgery, including the use of invasive hemodynamic monitoring lines and urinary catheters to a more streamlined procedure better matched to procedural and patient needs (Lauck et al., 2018). Although the definition of what constitutes “minimalist TAVI” continues to evolve, a less invasive approach is increasingly accepted as equal in safety and effectiveness compared to a more traditional approach (Chopra et al., 2018). Despite the growing evidence, there is a gap in research to understand how this rapid transition in peri-procedure practices is experienced by patients, evidence of which is foundational for integrating patients’ perspectives in the development of new nursing and multidisciplinary practices.

1.4 Problem Statement

Patients routinely undergo minimally invasive valve replacement without general anaesthesia. Given the range of anaesthetic strategies employed, patients’ level of awareness during the procedure may range from deep sedation to an awake state. This practice is in contrast to the historical context of operating room teams with development of protocols and practices

that assume that patients are under a general anaesthetic for the duration of their procedures (Mitchell, 2008). Given the recent adoption of a minimalist approach to anaesthetic management for TAVI, OR staff have begun to see an increase in ‘awake’ patients. Little is known to inform nursing and multidisciplinary practice to optimize patients’ experiences and contribute to improving outcomes.

To date, patients’ peri-procedure experiences of undergoing TAVI have not been studied. While the technical aspects of TAVI are well documented, less is known about patients’ perspectives, especially in the context of the avoidance of GA.

1.5 Purpose of the Research

This gap in research creates a unique opportunity to explore patients’ reports of their experiences during TAVI. The purpose of this study is to explore patients’ experiences of undergoing TAVI to inform nursing and multidisciplinary practice.

1.6 Research Question

What can be learned from patients undergoing transcatheter aortic valve implantation (TAVI) to inform nursing and multi-disciplinary practice?

1.7 Summary

As the population continues to age, the prevalence of aortic stenosis is projected to rise, while TAVI becomes increasingly available to various patient groups (Ruparelia & Prendergast, 2015). As standards of care shift to the adoption of minimalist approaches, there is a pressing need to inform nursing practice by gaining insights from patients’ perspectives of their peri-procedure care.

Chapter 2: Literature Review

To better understand the current state of evidence on patients' experiences of undergoing TAVI, I performed a literature search using the following online databases: the Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed and Google Scholar. To help guide my search, I used controlled vocabulary and keywords, including 'transcatheter aortic valve replacement, TAVI, patient perspective, patient experienc*, awake surger*, anesthetic management for TAVI, and patient-centred care. Additionally, the following Medical Subject Headings (MeSH) were used: (anaesthesia), (anaesthesia, general), and (surgical procedures, operative). To help narrow my search, I applied filters for peer-reviewed articles in English. In an effort to capture the early days of TAVI, I included articles from as early as 1998. To help maintain the sensitivity of the search, no additional filters were applied. I performed a manual search of references to determine the relevance of articles to my research topic. What became evident after reviewing the literature was that there is a significant gap in knowledge pertaining to the study of patients' self-reported experiences of undergoing TAVI. The proposed research aims to contribute new knowledge to strengthen a patient-centred approach to the innovative management of valvular heart disease.

2.1 Conceptual Thinking

As healthcare and technology continue to evolve at a rapid pace, it is important to not lose sight of patient needs during these times. Mounting pressures for increased speed and efficiency in healthcare and an emphasis on "delivering technically appropriate evidence-based care" are contributing factors to why healthcare is labelled, at times, as "impersonal and routinized, with little attention being paid to issues of personhood" (Chochinov et al., 2015, p. 978). While the concept of personhood is studied across many disciplines including philosophy,

psychology, law, medicine and anthropology, there is no universally accepted definition (Young, 2019). In the context of healthcare, however, Chochinov et al., (2015) define personhood as “seeing people in terms of who they are rather than exclusively in terms of whatever ailment they have” (2015, p. 975). By getting to know patients and “taking an interest in who they are, what matters to them, and how they want to be seen” we can enhance trust between the patient and the healthcare provider (Chochinov et al., 2015, p. 978). Oftentimes, failing to acknowledge personhood results in patient dissatisfaction and perceptions of healthcare as being impersonal or “abrasive” (Chochinov et al., 2015, p. 975).

When I reflect on some of the specific vulnerabilities of TAVI patients, including advanced age and multiple comorbidities, I have to wonder how the effects of the operating room (OR) may or may not impact these individuals. My experience working in the OR has given me insight into how the environment can be perceived: cold, uninviting, impersonal, and, often times, overwhelming. Patients are brought to the OR on a stretcher with no personal belongings, wearing nothing but a hospital gown. The OR bed is stiff and narrow, the lights are blinding, and technology is mounted in all corners of the room. Staff outnumber the patient and are often indistinguishable with matching outfits with their faces concealed behind masks. My observations as a registered nurse in the OR make me wonder what observations patients have in the OR. With these contextual factors in mind, the question “what can be learned from patients undergoing TAVI to inform clinical practice?” seeks to explore how patients experience their time during the procedure.

The concept of personhood can be seen as the basis for patient-centred care, whereby getting to know patients and understanding what matters most to them can help healthcare providers develop care plans tailored to meet individual patient needs. As part of the British

Columbia Ministry of Health's 2014 strategic plan, *Setting Priorities for the B.C Health System*, a shift from clinician-driven to patient-centred care was set as the top healthcare priority in the planning of health services (British Columbia Ministry of Health, 2015). The aim of patient-centred care is to build upon already established care practices and help advance the uptake of patient-centred care through "creating a common understanding of what patient-centred care is and a shared vision for adopting patient-centred care" (British Columbia Ministry of Health, 2015).

The main thrust behind the Ministry of Health's endorsement of patient-centred care was to reorient the provision of care to meet patients' needs as opposed to the needs of the healthcare providers or administrators (British Columbia Ministry of Health, 2015). By acknowledging patients as a source of data and experts in their own care, healthcare providers can help ensure that patients "retain control over their own choices" and help patients to "make informed decisions" about their care (British Columbia Ministry of Health, 2015).

The pursuit of health system transformation through this shift in culture and processes is complex and multi-factorial. The proposed study does not set out to test how to best integrate the concept of personhood or patient-centred care, but rather is informed by the collective goal of patients, health care providers and policy-makers to generate new evidence to inform the delivery of in-hospital cardiac care.

2.2 The Role of Nursing in TAVI Care

Nurses play a key role in delivering high-quality patient care from the time of first assessment through to discharge home from hospital. In doing so, nurses take on many roles, including the roles of "clinicians, educators, and patient advocates" (Bruckenthal & Simpson, 2016, p. 21). A key role in the TAVI program is the role of the TAVI nurse coordinator. This

role “is pivotal to coordinate the complex aspects of patients’ assessment and procedure planning, facilitates effective and streamlined multi-disciplinary collaboration, and serves as a central point of contact for patients and their family” (Asgar et al., 2019, p. 4). The TAVI nurse coordinator meets regularly with the rest of the Heart Team “to review and interpret clinical data to arrive at a consensus on the optimal treatment strategy for each patient” (Asgar et al., 2019, p. 2).

2.2.1 The Role of Nursing in Pre-procedure Care: Education and Managing Expectations

There is a tremendous amount of pre-procedure planning that occurs prior to patients’ arrival in hospital for TAVI. Although all members of the heart team may provide education to patients, “the central responsibility of teaching “what to expect when expecting” and recovering from TAVR typically lies with the nonphysician members of the Heart Team” (Simone, 2020, p.9). Topics that the Heart Team nurse commonly addresses are: managing “expectations before and after the procedure, questions regarding medications, education, instructions regarding preoperative testing, logistics of where and when to report on procedure day, and questions during recovery” (Simone, 2020, p.8). The Heart Team nurse serves as a main point of contact for patients along their continuum of care.

2.2.2 The Role of the Nurse Intraoperatively

The role of the intraoperative nurse is complex and multifaceted. While OR nurses are responsible for providing direct patient care, they are also responsible for managing resources, monitoring for breaches of sterility, practicing ethical decision-making, assisting with induction of anaesthesia, and trouble-shooting equipment and technology (CNA, 2020). It is important to note that nursing engagement with the patient fluctuates during the intraoperative period. The OR nurse plays an active role in patient engagement during patient check-in, up until induction

of anaesthesia and patient positioning. After which, patient engagement is primarily led by the implanting physician and cardiac anaesthesiologist. Once the procedure has finished, the nurse again steps back into an active patient engagement role. During these times of active patient engagement, nurses are responsible for carrying out patient assessments, monitoring patient safety, and acting as patient advocates.

2.2.3 The role of the nurse in early discharge planning

The development of a nurse-led post-procedure pathway to help facilitate safe next-day discharge home has helped position nurses as key stakeholders in the continuity of care and post-procedure follow-up (Wood et al., 2019). Nurses are responsible for initiating patient teaching as early as 0 to 6 hours post-operatively, assessing readiness for discharge, confirming all criteria for discharge have been met, and confirming discharge plans with the patient and family (Lauck et al., 2016). It is important to note that post-procedure care does not end once patients have been discharged. Nurses must provide teaching on follow-up appointments, medication management, and when to seek medical attention.

2.3 Patient Population and Treatment Decision

Since its inception, TAVI has undergone iterations of clinical trials for patients of various surgical risk profiles, and is now indicated for patients who range from high to low surgical risks (Asgar et al., 2019; Otto et al., 2021). Patients often present with complex medical histories that are compounded by advanced age (Cerrato et al., 2017). For this reason, it is imperative that patient selection and eligibility for the procedure be conducted by a highly skilled team of specialists, including nurses, cardiac surgeons, TAVI coordinators, interventional cardiologists, cardiac anesthesiologists, and imaging specialists, collectively known as the “Heart Team” (Arai & Lefèvre, 2014).

After receiving a referral, the patient assessment process consists of an initial assessment, a functional assessment, and an overall procedural risk assessment (Otto et al., 2021). The initial assessment is used to gather information about the symptoms and severity of aortic stenosis as well as baseline clinical data such as physical exams, blood tests and evaluation of any major cardiovascular comorbidities. Following the initial assessment, patients undergo a functional assessment which assesses frailty and disability, physical functioning, cognitive functioning and futility (Otto et al., 2021). Areas for special consideration may include: “advanced age, consideration in younger patients, coronary artery disease, renal disease, lung disease, liver disease and peripheral arterial disease” (Asgar et al., 2019, p. 1442).

Although TAVI is minimally invasive (See Appendix A), the procedure is not without risk (Arai & Lefèvre, 2014). While the procedure is considered an option for higher risk and inoperable patients, it is important to note that some patients may not derive benefit when taking into account the overall health status of the patient. Risks that may indicate futility of the procedure include “advanced dementia, bedbound patients, cachexia or severe sarcopenia, disability for all or most ADL’s and end-stage renal, liver or lung malignant disease” (Asgar et al., 2019).

Ultimately, severe symptomatic AS patients must be assessed by a heart team to make a treatment recommendation about the most appropriate plan of care. The options between offering TAVI, SAVR, or medical optimization, if possible, should depend on “patient-specific risks and technical considerations, as well as the expectations and wishes of the patient and the multidisciplinary consensus of the heart team” (Nishimura et al., 2014). Given that symptomatic AS patients have an average two-year mortality of 50%, aortic valve replacement should be performed promptly after the onset of symptoms (Osnabrugge et al., 2013).

2.4 Temporal Trends in the Development of Peri-procedure Approaches

The concept of TAVI was first demonstrated in the early 1990s in posthumous AS studies (Cribier, 2013). During the experimental days of TAVI, prototypes were trialed in animals before gaining approval for in-human implantation in 2002 (Cribier, 2013). The first in-human implantation, performed with a transvenous and trans-septal approach by a team led by Dr. Cribier, was a transformative achievement for the treatment of valvular heart disease, effectively confirming the possibility of percutaneous implantation of a valve in a beating heart without the need for open-heart surgery. While the outset of TAVI was marked with notable excitement, the early days were fraught with setbacks and skepticism, imparted largely by cardiac surgery (Cribier, 2013). Despite the setbacks that implanting physicians faced, technological advancements, enhanced operator experience, and an evolving body of evidence helped bring TAVI to the forefront of treatment for severe symptomatic AS (Cribier, 2013). The first reproducible trans-arterial procedures were performed at St. Paul's Hospital in 2005; this became the established approach that is now the standard of care for the treatment of more than 50% of patients undergoing aortic valve replacement (Webb et al., 2006).

Since these early days, there has been a considerable shift in practice with respect to vascular access and anesthetic management. Although the concept has remained unchanged: using catheter technology to introduce a collapsible valve into the aorta, advancements in device technology have allowed operators to simplify and minimize the procedure even further, thereby decreasing the need for a general anaesthetic (Ruparelia & Prendergast, 2015).

When we consider historical practices of TAVI, it is important to acknowledge that early practice was informed by cardiac surgery to promote patient safety and optimize patient monitoring (Hawkey et al., 2014). Some of these early practices included routine insertion of

central venous and urinary catheters, reliance on general anaesthesia with the use of transesophageal echocardiography and a requirement for the procedures to be performed in hybrid operating rooms (Hawkey et al., 2014). As teams gained experience and technology evolved, there was growing interest in adopting more minimally invasive practices to improve patient outcomes and enhance rapid recovery. Early mobilization, avoidance of urinary catheters, central venous catheters, and early removal of temporary pacemakers all helped contribute to changes in protocols and practice (Hawkey, et al., 2014). As evidence continues to emerge, there is growing support for the use of clinical pathways to “help transform care, improve outcomes, streamline health resource utilization, and decrease costs” (Hawkey, Lauck, Perpetua, & Simone, 2020, p. 2).

2.5 Contemporary Practice: Transition to a Minimalist Approach

There are two significant changes to note with contemporary TAVI. The first change is improvement in operator technical skill, and the second change is improvement in technology. The level of operator skill has improved to the point that patients no longer need a GA since TEE is no longer required. Improved technical skill yielded more accurate valve implantation, which meant less paravalvular leak and less hemodynamic instability (Butala et al., 2020; Ruparelia & Prendergast, 2015). Advances in technology and the availability of newer devices has helped contribute to the trend of increasingly minimalist approaches to TAVI. Newer generation devices offer operators the benefit of “lower insertion profiles”,¹ repositionable devices and “more stable and predictable valve deployment” (Chopra et al., 2018, p. 5). Initially, delivery systems were limited to large access sheaths and required higher risk percutaneous or surgical access of the femoral artery. As new devices were introduced, smaller delivery systems became the new

¹ Insertion profiles refers to the diameter of access sheaths used to load and insert the valve. A lower insertion profile refers to a smaller gauge delivery sheath.

standard of practice and allowed operators to perform the procedure completely percutaneously (Figulla, Franz, & Lauten, 2020; Ruparelia & Prendergast, 2015)

To mitigate the risks associated with the use of invasive surgical techniques, and the vulnerabilities of older patients, the Heart Team in Vancouver developed a vital clinical pathway aimed at identifying “opportunities to adopt minimalist practices, standardize post-procedure care, decrease LOS, and facilitate safe discharge home” to help change practices regarding elderly patients undergoing significant cardiac surgery (Lauck et al., 2016, p. 2). Ultimately, the pathway demonstrated that next-day discharge for TAVI patients was not only safe, but that next-day discharge did not interfere with the efficacy of TAVI (Wood et al., 2019). Following the development of the Vancouver Clinical Pathway, The Multidisciplinary, Multimodality but Minimalist (3M) TAVR study evaluated “the efficacy, safety, and feasibility of next-day discharge home in patients undergoing balloon-expandable transfemoral TAVR” (Wood et al., 2019, p. 460). The study suggested that The Vancouver 3M Clinical Pathway is safe to use regardless “of site experience and volume and does not compromise clinical or hemodynamic outcomes” (Wood et al., 2019, p. 467). These findings further augment other emerging research that is rapidly shifting practice to the adoption of a minimalist peri-procedure approach (Barbanti et al., 2017; Wood et al., 2019).

2.6 Trends in Practice: Anaesthesia

To help understand the trends in anaesthetic management for TAVI, it is worthwhile to explore some of the goals of care for TAVI. As discussed by Lauck et al., (2020), some of these goals include “the capacity to easily communicate with patients during the procedure, patient comfort and experience, hemodynamic stability, and predictable readiness for mobilization within 4 hours of the completion of the procedure” (p. 310). Patient safety should not be

compromised in the pursuit of these goals. Additionally, “sites must retain the ability to convert to GA or to obtain peri-procedure imaging (TTE or TEE) within 5 minutes, or to initiate femoral-femoral hemodynamic support within 10 minutes” in the context of a complication requiring emergent resuscitation (Lauck, Wood, Sathananthan, Forman, & Webb, 2020, p. 310).

It is important to note that there are a range of anaesthetic strategies available, including local anaesthesia, local anaesthesia and procedural sedation, also referred to as conscious sedation, and general anaesthesia (GA) (Lester, Brady, & Brown, 2017; Sathananthan et al., 2019). Similarly, there is a wide range of preferences for individual anaesthesiologists (Butala et al., 2020). While it is outside the scope of my project to provide a detailed examination of these strategies, I am interested in patients’ individual experiences of undergoing TAVI in a multidisciplinary team setting.

The most comprehensive evidence available regarding mode of anaesthesia for TAVI comes from the SOLVE-TAVI (Second-Generation Self-Expandable Versus Balloon-Expandable Valves and General Versus Local Anaesthesia in TAVI) trial (Butala et al., 2020). The SOLVE- TAVI trial was the first randomized trial comparing conscious sedation versus general anaesthesia for TAVI. The trial randomized 447 TAVI patients into either a conscious sedation or a GA group.² The two groups showed no differences in the composite primary endpoint of all-cause mortality, stroke, myocardial infarction, infection requiring antibiotic treatment, and acute kidney injury at 30 days (Butala et al., 2020). The researchers concluded that conscious sedation can be used safely for TAVI without compromise to patient outcome (Butala et al., 2020). While conscious sedation has been shown to be safe, “patient factors and

² The conscious sedation group received local anaesthesia and procedural sedation, which consisted of “continuous infusion of dexmedetomidine, propofol, or other nonbenzodiazepine drugs, and was titrated to induce a light to moderate sedation” whereas the GA group received a general anesthetic. All other care remained the same between the two groups (Butala et al., 2020, p. 1439).

preference, as well as centre and operator experience, should play a major role in the decision-making regarding the optimal anesthetic type” (Thiele et al., 2020, p. 1445).

Evidence of the rapid shift towards minimalist anaesthetic approaches can be seen in the Vancouver program where conscious sedation is now used in more than 90% of TAVI cases (Lauck & Keegan, 2020). This change in practice was made possible by the ongoing support and involvement of anaesthesiologists (Lauck & Keegan, 2020).

It is important to note that some cases performed under conscious sedation require a conversion to GA. The SOLVE-TAVI trial reported a 5.9% conversion rate to GA with 13 of 218 patients from the conscious sedation group requiring an escalation of care. The most common reasons for conversion to GA were procedural complications requiring cardio-pulmonary resuscitation (CPR), respiratory insufficiency, or agitation (Lauck & Keegan, 2020). In anticipation of emergency events, all centres should have a plan in place for “emergency vascular repair, emergency percutaneous coronary intervention, management of severe hemodynamic instability, intervention for pericardial tamponade, and conversion to cardiac surgery” (Lauck & Keegan, 2020, p. 9). Evidence guiding the selection of anaesthesia strategy continues to evolve.

2.7 Summary

Nurses play a pivotal role in setting patients up to undergo minimalist TAVI. Continuity of communication and patient education are key components of peri-procedure care. While peri-procedure care continues to evolve, there is a knowledge gap in understanding patients’ experiences and their self-reported perspectives of their procedure, from the moment they are admitted to their transfer for post-procedure care. In order to better understand these experiences, we must acknowledge patients as experts in their own care. In doing so, we are acknowledging

the concept of personhood and allowing patients to identify what matters most to them. Driven by a focus on the needs of the patients as opposed to the needs of the healthcare providers, the proposed study aims to better address patient-specific needs. Gaining a better understanding of patients' experiences during TAVI will help inform nursing and multidisciplinary care as the management of valvular heart disease continues to evolve.

Chapter 3: Methods

3.1 Study Design

I conducted a qualitative study to explore patients' experiences of undergoing TAVI with a transfemoral vascular access approach in the operating room and the cardiac catheterization laboratory under the care of a multidisciplinary team. The study focused on patients' experiences during the pre-operative/admission, intraoperative, and immediate post-operative periods of TAVI. I interviewed patients within the first week post-discharge to explore their perspectives on the care received and their recommendations for improvement. I used interpretive description; a qualitative methodological approach appropriate to inform the knowledge needs of applied disciplines. Interpretive description was used as a tool to help generate new ideas and augment existing knowledge in the context of clinical practice.

Interpretive description encourages researchers "to deconstruct the angle of vision upon which prior knowledge has been erected and to generate new insights that shape new inquiries as well as applications of evidence to practice" (Thorne, 2016, p.25). As noted by Thorne, the nursing discipline needs "new knowledge pertaining to the subjective experiential tacit and patterned aspects of human health experience -- not so that we can advance theorizing but that we have sufficient contextual understanding to guide future decisions that will apply evidence to the lives of real people" (Thorne, 2016, p. 25)

Using interpretive qualitative research allowed me to provide an in-depth description of patients' experiences through analysis and interpretation of meaning (Bradshaw, C., Atkinson, S., & Doody, O. (2017).

3.2 Setting

The study took place at St. Paul's Hospital, Vancouver BC. Gaining entry into the study environment was facilitated by my role as a registered nurse in the operating room and the support of my supervisory committee. Participant interviews were performed via telephone within one-week post-discharge at the patient's convenience.

3.3 Sampling Plan

Participants were recruited through the St. Paul's Hospital Transcatheter Heart Valve (THV) clinic. I used purposeful sampling to identify individuals who were most suitable to the study and a sample representative of variation in participant characteristics of relevance to the study (Polit & Beck, 2012, p. 517). In addition to purposeful sampling, I used maximum variation sampling to help select participants that represented varying characteristics. For example, male and female participants and participants of varying ages and risk profiles (Polit & Beck, 2012, p. 517).

Participants included in the study met the following criteria (1) the ability to converse in English, (2) accepted the option of TAVI procedure without elective use of GA, and (3), the ability to give informed consent.

Eligible candidates received a letter of invitation to join the study as well as an information brochure and a consent form. Candidates were invited to reply to the study invitation via telephone or in writing as per the guidance of the Providence Health Care (PHC) Research Ethics Board (REB).

3.3.1 Sample Size

With respect to sample size, there are no definitive guidelines for, nor is it considered appropriate to predetermine the number of study participants to include in qualitative research. Unlike quantitative research, sampling is not dictated by a goal to generalize findings to a specific population (Polit & Beck, 2012, p. 524). Instead, sample size is informed by the needs of the study. Qualitative sampling takes into consideration the question of what will “generate enough in-depth data that can illuminate the patterns, categories, and dimensions of the phenomenon under study” (Polit & Beck, 2012, p. 521). I aimed for a sample size that was sufficient in information power as discussed by Malterud, Siersma, and Guassora, (2016). “Information power indicates that the more information the sample holds, relevant for the actual study, the lower number of participants is needed. An initial approximation of sample size is necessary for planning, while the adequacy of the final sample size must be evaluated continuously during the research process” (Malterud et al., 2016, p.1759). My final sample size for this study was 15, a sample size that was also influenced by the feasibility of conducting this research as my master’s thesis.

3.4 Data Collection

In keeping with the tenets of descriptive qualitative research, data collection and data analysis occurred simultaneously (Schneider, N. C., Coates, W. C., Yarris, L. M., & Promes, S. B, 2017). Participant interviews lasted between 18 to 52 minutes. All interviews were audio-recorded and transcribed verbatim. The semi-structured interview guide consisted of a set of open-ended standard questions that were designed to be flexible and allow a dialogue between the researcher and the participant. The interview guide included questions focussing on patients’ experiences during TAVI, interactions with healthcare providers, and recommendations for

improvement from patients. The interview guide was used to help facilitate conversation. In addition to using the interview guide, I asked follow-up questions, prompting participants to expand on their answers and posed new questions based on what participants highlighted as important. Transcriptions were de-identified to remove all personal information. Sociodemographic, procedural and follow-up data were collected from medical records to describe the sample.

I took personal notes during and after the interviews that helped me reflect on my own biases and helped challenge assumptions that I had in relation to the research (Polit & Beck, 2012). As stated by Polit and Beck, “it is essential to reflect on such feelings because there is no other way to know whether the feelings are influencing what is being observed or what is being done in the participant role. Personal notes can also contain reflections relating to ethical dilemmas” (p. 549).

3.5 Data Management

Study data was stored in accordance to UBC’s policy on data storage and management and the requirements of the PHC REB. All patient information was de-identified. Each participant was given a unique study identification code. The principal investigator held a password-protected list of the study participants on the PHC server. All data files were numbered with the study ID and password protected. All hard copy documents were stored in a locked cabinet in the principal investigator’s locked office within St. Paul’s Hospital, which is routinely patrolled by security.

Audio recordings of the interview were encrypted and password protected, compressed, and transferred to an automated transcription service. I employed a transcription service with established processes for compliance with data security and privacy requirements. Audio

recordings of the interviews were permanently deleted following transcription. The individual transcripts were coded with a study ID 01-20 (as required) and all personal information was removed. The principal investigator was responsible for the storing and destruction of study data. According to UBC policy, study files will be retained for 5 years after publication. After 5 years, study documents will be shredded and electronic study files will be deleted.

3.6 Data Analysis

Concurrent collection and analysis of data allowed study members to provide feedback to one another, modify the interview guide as needed, and discuss suitable analytic approaches. Acknowledging that familiarity and intimacy with data in qualitative research are key to extrapolating meaning, I reviewed the transcripts several times before assigning meaning to the documents (Polit & Beck, 2012). Once I familiarized myself with the transcripts, I began by highlighting and jotting down notes on the transcripts. Engaging with the data in a tactile manner as opposed to using conventional coding allowed me to become more familiar with the data and helped me avoid assigning meaning too early in the analytic process (Thorne, 2016). To assist with data analysis, I used NVivo 12 software. The software was used primarily to help sort and organize the data.

To help make sense of the data, I relied on an iterative reasoning process whereby I considered various relationships that existed between groups of information with the ultimate goal of constructing a “coherent whole” (Thorne, 2016, p. 163). I created a set of analytic notes that helped pose “increasingly complex questions” about what the data might mean and what the data was telling me (Thorne, 2016, p. 170). I continued to test the relationships between groups of information and asked myself questions such as “what am I missing?” or “how else could this

data be interpreted?”. To help identify any individual biases, investigator triangulation was used (Polit & Beck, 2012).

As a novice researcher, there are a number of potential data analysis hazards to be mindful of: premature closure, misinterpreting frequency, and over-inscription of self (Thorne, 2016). Premature closure can be avoided by “determining from the outset that you will critically reflect on all possible “solutions” that you may come up with as your mind engages itself in the work of making pattern and building relationships between and within your data set” (Thorne, 2016, p.194). To help address the risk of misinterpreting frequency, it is important for researchers to be aware that, although information may present frequently within the data, it does not necessarily mean the information is relevant to the study. Similarly, if information is missing in the data, it does not necessarily mean a phenomenon doesn’t exist, but rather, it might be worth exploring further by increasing the sample size (Thorne, 2016). In order to avoid over-inscription of self, it is important for researchers to step back from the research “creating some distance from the process, and taking advantage of every opportunity to challenge the intellectual linkages you find yourself beginning to formulate” (Thorne, 2016, p. 196).

3.7 Credibility

In keeping with the tenets of interpretive description, I demonstrated credibility in my study by referencing the following criteria: epistemological integrity, representative credibility, analytic logic, and interpretive authority (Thorne, 2016, p. 224). To address epistemological integrity, I ensured transparency of my research from the initial development of my research question through to the development of knowledge from my study. With respect to representative credibility, I made sure that any knowledge claims resulting from my study were “consistent with the manner in which the phenomenon under study was sampled” (Thorne, 2016, p. 224). To

address analytic logic, I ensured that my decision-making process was visible throughout my research by providing a clear audit-trail. The audit trail was made visible by my thought process from the outset of my study “through to the interpretations and knowledge claims made on the basis of what was learned in the research” (Thorne, 2016 p. 225). To demonstrate interpretive authority, I built-in “systems to check” my interpretations of data with those of my research team (Thorne, 2016, p. 225). At several points throughout the data analysis stage, I consulted with my research team to discuss emerging themes in the data. I engaged in self-reflexivity throughout the research process and remained aware of any personal biases that I had. In terms of a pragmatic approach to this research I used the above criterion to help enhance my study credibility.

3.8 Ethical Considerations

To help situate myself within my study, I acknowledged the need to differentiate between my role as a researcher and my role as a nurse. As part of this process, Thorne (2016) notes that certain aspects of clinical practice may need to be abandoned “temporarily in order to take on the new challenge of becoming the instrument of credible and meaningful research” (p. 118). Some of these aspects may include learned communication strategies or systematic interviewing methods. Part of my new role as a researcher entailed tracking personal reflections, learning not to lead, disclosing my discipline, and constraining my influence (Thorne, 2016). While I continued to work in the OR throughout the duration of my study, I did not provide any direct patient care to participants enrolled in the study. Given that participant interviews took place post-operatively, via telephone, my research did not interfere with routine care provided to patients, nor did it interfere with the work of my colleagues.

Prior to commencing my study, I obtained ethics approval from the UBC review ethics board. Informed consent was obtained in accordance with the Tri-Council Policy Statement and

participants were informed that their participation in the study was voluntary and that they could withdraw from the study at any time (Canadian Institutes of Health Research, 2018).

Additionally, a risk assessment was performed to determine the level of risk associated to participants. I believe the likelihood of possible harms caused by participating in this study are no greater than those encountered by participants in routine care. Confidentiality of documents was protected in accordance to UBC's policy on uses and disclosure of personal information (The University of British Columbia, 2018).

Prospective participants received a consent form in the mail along with the Letter of Information and study brochure. A phone number and email address were provided for the potential participant to contact for information. If no contact was received within one week of mailing the consent form, the potential participant was contacted by a research team member. The principal investigator discussed the study and provided information about the study. The potential participant had received the consent form in the mail and was able to ask questions regarding this as well. If the individual was interested in participating, a self-addressed, stamped envelope was included in the package in order for them to mail back the signed consent.

3.9 Summary

As technology continues to advance at a rapid pace, there is a need to understand the lived experiences of patients in order to not to lose track of their interests in an ever-changing healthcare landscape. I used interpretive description, a qualitative methodology, to help explore patients' experiences of undergoing TAVI in a way that seeks "to render an understanding of them that honors their inherent complexity" (Thorne, 2016, p. 83).

Chapter 4: Research Findings

4.1 Summary of Recruitment

Purposeful sampling was used to identify individuals who were most suitable to the study and to ensure maximum variation among participants. A total of 15 participant interviews were conducted for this research. All interviews were completed over the telephone and within one-week post-discharge home from the hospital. Interviews lasted between 18 to 52 minutes with a mean interview time of 30 minutes. Data collection began on June 22, 2021 and ended on October 28, 2021.

4.2 Participant Clinical Characteristics

The majority of participants were men (n=10, 66.7%) with a mean age of 83 years old. The most common comorbidities among participants were: hypertension (n=13, 87%), diabetes mellitus (n=5, 33%), atrial fibrillation (n=4, 27%), severe lung disease (n=3, 20%), and peripheral arterial disease (PAD) (n=2, 13%). Of note, only one participant had severe left ventricular dysfunction, four participants had previous percutaneous revascularization, and none had previous cardiac surgery.

4.3 Procedural Details

With respect to how TAVI was performed, 14 participants had a transfemoral artery access approach, and one participant had a subclavian artery access approach. Regarding anaesthetic management strategies, 13 participants received conscious sedation administered with various agents and doses, one participant received a general anaesthetic and one participant received local anaesthesia only. The majority of procedures took place in the cardiac catheterization laboratory (n=9, 60%) with the remaining procedures conducted in a hybrid operating room (n=6, 40%). The median procedure time was 1 hour and 42 minutes from patient

entry to exit; the median procedure time from skin puncture to closure was 56 minutes.

Following the procedure, two participants required additional care interventions: one participant was cardioverted for cardiac arrhythmia and another participant received a new pacemaker following the onset of a new conduction delay. The median in-hospital length of stay was one day. All patients were alive at 30-days, and none were readmitted during that time. Detailed information on participant demographics, medical history, procedural details, and 30-day outcomes are outlined in Table 1 below.

Table 1

Participant Demographics, Medical History, Procedural Details, and 30-Day Outcomes

Participant Demographics, Medical History, Procedural Details, and 30-Day Outcomes	
Participant demographics	
Participants (N=15)	N (%)
Age (mean, SD)	(83, 5.4)
Sex	
Male	10 (67%)
Female	5 (33%)
Medical history	
Hypertension	13 (87%)
Atrial fibrillation	4 (27%)
Diabetes mellitus	5 (33%)
Severe lung disease	3 (20%)
Peripheral arterial disease	2 (13%)
Previous cerebrovascular accident	2 (13%)
Previous percutaneous coronary intervention (PCI)	4 (27%)
Previous coronary artery bypass graft surgery (CABG)	0 (0%)
Left ventricular ejection fraction (LVEF) < 35%	1 (6.7%)
Estimated glomerular filtration rate (eGFR) (mean, SD)	(58, 17)

<i>Participant Demographics, Medical History, Procedural Details, and 30-Day Outcomes</i>	
Procedural details	
Anaesthetic management	<i>N (%)</i>
General anaesthetic	1 (6.7%)
Conscious sedation	13 (87%)
Local anaesthesia only	1 (6.7%)
Procedure approach	
Transfemoral	14 (93%)
Subclavian	1 (6.7%)
Procedure location	
Cardiac catheterization lab	9 (60%)
Operating room	6 (40%)
30-Day outcomes	
In-hospital complications	
Cardioversion	1 (6.7%)
Pacemaker implantation	1 (6.7%)
Readmission rates, 30-day	0 (0%)
Mortality rates, 30-day	0 (0%)

4.4 Summary of Data Analysis

In this chapter, I present the findings from 15 interviews exploring participants' experiences of undergoing TAVI. During the four-month data collection period participants shared their experiences of navigating the TAVI journey and trying to make sense of their role and experiences in the perioperative environment. While participants shared similarities between their experiences, there were also significant differences that demonstrated heterogeneity in participant experiences.

In keeping with the principles of descriptive qualitative research, data collection and analysis occurred simultaneously. Interviews were transcribed using an automated transcription service. Each interview was checked for accuracy upon receipt from the transcription company. Prior to analyzing the data, I reviewed the transcripts several times to ensure that I had a strong

understanding of the content. After reviewing the transcripts, I began to highlight sections of the data that demonstrated key ideas, relationships between the data, as well as emerging themes. All sections were coded using NVivo™ data management software. To help organize the data into broader concepts, I grouped codes into larger categories that reflected ‘bigger picture’ thinking. I tried to challenge my understanding of the data by asking myself questions such as “what am I missing” or “how else could this data be interpreted?”. Throughout data collection and analysis, research team members met regularly. Team members discussed research logistics, suitable analytic approaches, and emerging trends in the data.

4.5 Seeking Membership on my Heart Team

As discussed in Chapter 2, the Heart Team is a multidisciplinary group of health care providers who use their complementary expertise to manage the care of patients with severe, complex valvular heart disease along their trajectory of care. The Heart Team is responsible for managing patient care from the time of referral through to patient follow-up. The goal of the Heart Team is to provide high-quality, patient-centred care across the care continuum.

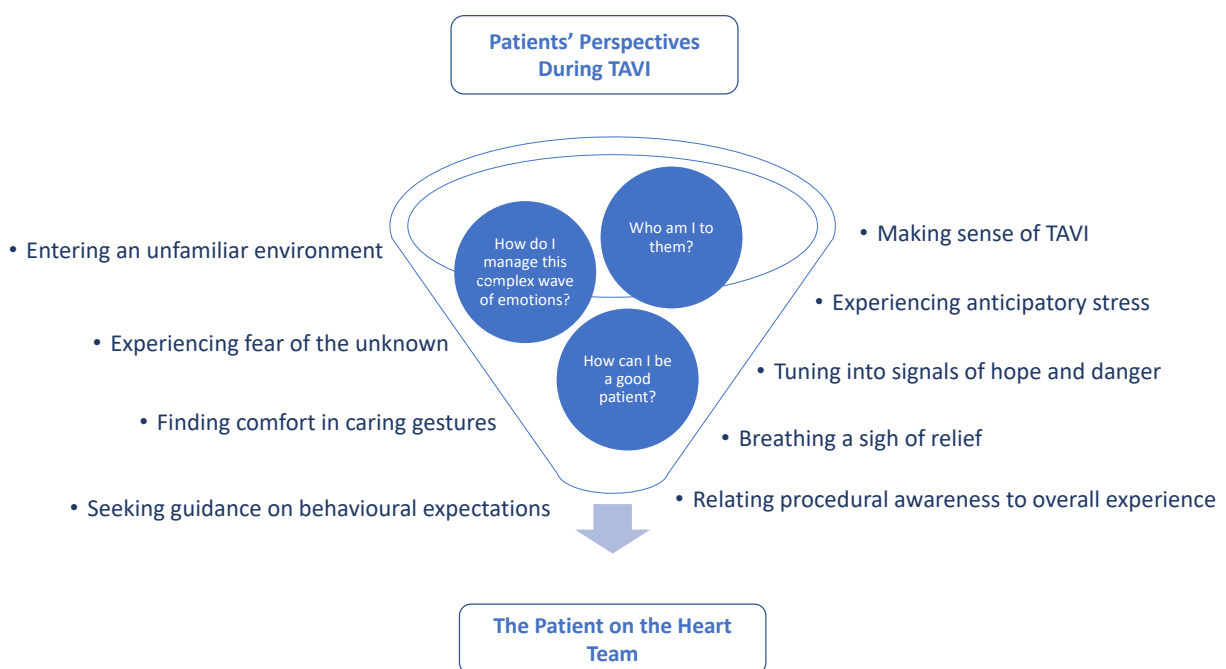
Although the Heart Team concept is conventionally viewed as the team of health care providers that surrounds the patient, study participants spoke of their role and experiences on this team during their procedure. Whereas the procedural team might see their role of caring *for* the patient, participants reported their experiences of having a procedure *with* the team. An overarching theme that emerged was participants’ sense that they had an important role to play and wanted to be invited to participate on *their* Heart Team during *their* procedure. Many participants described feeling isolated from the team, excluded or removed from involvement in their own care, or not knowing how to best play *their* part. Participants described how their lack of familiarity with the perioperative environment contributed to their feelings of role uncertainty.

Some participants discussed struggling with the idea of how to act so that they would be perceived as unproblematic or even helpful by the staff. In their quest to assume the role of the ‘good patient’, participants expressed that their primary focus was on trying to act appropriately and manage their complex wave of emotions so as not to interfere with the procedure.

Participants’ desire to be invited to participate on *their* Heart Team was illustrated by three main themes: (1) who am I to them? (2) how can I be a good patient? and (3) how do I manage this complex wave of emotions? To help make sense of the findings, each theme will be explored in subthemes. Figure 1 below outlines participants’ perspectives of undergoing TAVI.

Figure 1

Participants’ Perspectives During TAVI



4.6 Who Am I to Them?

The first theme highlights participants' desire to be included as a member of their Heart Team and raised questions about the complexity of their short relationship with the large number of people involved in the procedure. Participants expressed wanting to be involved in their care, understand who they were in relation to their team, and establish a way to communicate with a group of strangers in an unfamiliar environment; however, many participants discussed how their fear of the unknown contributed to their difficulty responding and adapting to social cues in an unfamiliar environment, while also trying to manage their emotions and expectations. Although participants expressed feeling isolated from the Heart Team, many participants related how meaningful and reassuring a caring atmosphere was to them. The intertwined subthemes highlighted patients' challenges in the unfamiliar environment of the procedure room, the experience of fear of the perceived unknown, and the power of caring gestures.

4.6.1 Entering an Unfamiliar Environment

The first subtheme describes the challenges that participants faced when entering the unfamiliar perioperative environment and their attempts to make sense of their surroundings. To undergo TAVI, participants traded the comfort and familiarity of their home environments for the uncertainty and unfamiliarity of the perioperative environment.

In most cases, participants reported experiencing the perioperative environment as a source of stress. The large number of staff and the abundance of technology caused participants to feel overwhelmed. When asked to recall their experience in the procedure room, one participant noted:

“It's like watching a TV show but trying to keep looking at the window because there's a car accident out there. See, you're never sure what's going on because you're too busy

watching other things because you can't see anything. So you can hear people talking. I know there's an enormous number of people. They're all very gentle and very nice, and they all ask you questions and talk to you, but you can't really get a handle on what they're doing, the ones that are touching you all the time, what they're doing and why they're doing it. But there's other things going on that you really wonder what it is...but anyway, it would be nice to know because you are awake and there's a lot of activity in that room” (*Participant ID-036*).

Some participants discussed how the fast-paced mobilization of equipment and technology in the room contributed to their difficulty in making sense of the unfamiliar environment. Other participants discussed feeling overwhelmed by the sudden appearance of multiple staff members upon their arrival in the procedure room. One participant stated “there was a group of about half a dozen people sitting there, talking and yappin’ just off from the side of my bed...I felt kind of like I was being attacked...It was overwhelming. Let's put it that way” (*Participant ID-009*).

4.6.2 Experiencing Fear of the Unknown

The second subtheme emerged from participants’ conversations surrounding their apprehensions during the procedure. Many participants discussed how their fear of the unknown contributed to feelings of emotional uncertainty and anxiety.

While some participants had difficulty articulating exactly what they were afraid of, others were able to discuss their fears more clearly. Some participants reported amplified feelings of vulnerability when faced with entering a room full of strangers. One participant noted “let's be honest...who wants to go into a room with 10 other people and they've all got missions to do something on your body? I mean, that's a very frightening position if you think about it” (*Participant ID-036*).

Interestingly, the majority of participants discussed their anticipatory fears around experiencing pain during TAVI; however, all participants denied actually experiencing pain during the procedure. Although some participants likened having TAVI to having an angiogram³, there was still an element of fear and anxiety related to their perception that they were having a more invasive or bigger procedure. Most frequently, participants reported feeling discomfort due to pressure on the vascular access site in the groin at the end of the procedure to help achieve hemostasis. One participant stated “I kept saying to myself, look, you fool, you had angioplasty, you went through that without freaking out, now you're going in for this one. Why are you scared? But I was still scared despite that” (*Participant ID-039*).

When probed to discuss their fears further, the participant stated:

“I was trying to fight the operation itself, symbolically, like not really mechanically... I was in my mind fighting this thing and saying, I don't want this thing to hurt ...I was frightened that I would feel the catheter and the wires protruding into my body and going bump, bump, bump, bump...I was as scared as could be. Quite scared. I have to be frank about it. I'm a little bit apprehensive, but I'm not a complete coward, you know?”
(*Participant ID-039*).

4.6.3 Finding Comfort in Caring Gestures

Lastly, participants spoke of the value they placed on communication and caring gestures as they navigated ways to establish a relationship with the team. Participants relayed how meaningful it was to feel acknowledged and cared for in the context of an unfamiliar environment.

³ “A coronary angiogram is a procedure that uses X-ray imaging to see your heart's blood vessels. The test is generally done to see if there's a restriction in blood flow going to the heart” (Mayo Clinic, 2022).

Although many participants expressed feeling like an outsider, some participants discussed how meaningful it was to experience moments of connection with the Heart Team. These participants relayed the importance of having their emotional needs tended to intraoperatively. When asked to reflect on their interactions with staff, one participant noted “they acted like they really cared if I lived or died. And who was I to them? But I was something to them. You know what I mean? That’s how I felt. Very cared and cared for” (*Participant ID-022*). The same participant elaborated on their experience stating the following:

“They were always so reassuring and I just wasn't anxious about it at all. I just knew it would all go right. I had the confidence and I'm sure that came from their attitudes. You know what I mean? The way they cared for me. And they kept asking me if I was in any pain or if I was comfortable and everything... I can't praise them enough. I just can't” (*Patient ID-022*).

In addition to the expressions of caring demonstrated by staff, some participants found the presence of the anaesthesiologist to be particularly reassuring and comforting during the procedure. One participant stated that the anaesthesiologist “was very concerned about me being comfortable and he kept stroking the side of my face to make sure that I wasn't in any discomfort and asking me if I was okay” (*Participant ID-002*). Similarly, another participant noted “the anaesthesiologist... said, I'm going to be right behind you, right on your shoulder, on the back. If anything comes up, anything happens, he said I can [get to you] quickly if we need to” (*Participant ID-011*).

These participants described how helpful it was to have a member of the Heart Team act as a point of reference during the procedure when they were unable to orient themselves. They expressed feeling reassured knowing that someone was looking out for them.

4.6.4 Summary

In summary, the first theme highlights how participants sought ways to understand their relationship with their team. As the outsider entering and unfamiliar environment, they talked about being the one to whom “TAVI was done”, their fears of the unknown, and how they valued the experiences of connection and communication during the short procedure time.

4.7 How Can I Be a Good Patient?

The second theme highlights participants’ desires to understand the expected behaviours and cues in the perioperative environment and how to be perceived as helpful and unproblematic by the Heart Team. Participants expressed wanting to do their part by assuming the role of the “good patient”. While participants had differing ideas on how best to prepare and make sense of the procedure, most shared a common desire to be informed, enabling them to comply with the expected behaviours and unspoken rules. Although participants had varying levels of awareness, they described how being conscious impacted their experience.

4.7.1 Making Sense of TAVI

The first subtheme focuses on participants’ experiences of trying to make sense of TAVI and navigate hospital-provided education resources to prepare for the procedure. Participants had varied levels of understanding and perceived preparation for TAVI.

While some participants were diligent with reviewing suggested reading materials, other participants had not previously consulted the patient education resources for a variety of reasons. When asked how well they thought they understood what was going to happen, participants had mixed responses. One participant noted “I knew exactly what was going to go on. [My doctor] described it to me...after I'd had an angiogram done... so, yeah, I had the best of information. I got all of the literature that I needed. I had no confusion. I knew exactly what was going to

happen” (*Participant ID-011*). Similarly, another participant noted “I’d say nine out of 10 understanding, like good, clear understanding. [My doctor] outlined the procedure for me quite clearly and it was substantiated by [X hospital] who sent out a raft of paper information that really clarified things” (*Participant ID-039*). In contrast, one participant shared their experience of thinking they understood the procedure but realizing after the fact that they did not. The participant stated

“In retrospect, I don’t think I understood it at all. You know, I knew that they were going to put in a valve but I had no idea how they were going to do it or not...but that’s only hindsight because...afterwards I find out that there were probably...bits of information that could have been put in place...you know, like a visual might have helped” (*Participant ID-008*).

Although some participants found the provided education materials to be helpful, others found the information to be overwhelming, and at times, contradicting. One participant noted

“It’s almost overkill...they give you an enormous amount of information...it’s probably too much because it starts to repeat itself as a little bit different so you’re never sure which thing to look at. Like, there’s quite a pile...little books and they’re not all the same because I guess they were written at different times and some have some things that others don’t” (*Participant ID-036*).

Additionally, one participant shared that they chose not to read the education materials at all. When asked about their choice to not to read the materials, the participant stated “I just didn’t pay enough attention” (*Participant ID-007*).

4.7.2 Seeking Guidance on Behavioural Expectations

The second subtheme emerged from participants' shared desire for guidance and coaching during TAVI. Participants sought direction on behavioural expectations in the procedure room in order to try to fulfill their role as "the good patient".

Most participants expressed wanting to be involved in their care and to know what was going on; however, many expressed feeling reluctant to speak up for fear of interrupting or speaking out of turn. While some participants were able to connect with physicians and nurses, others felt unsure of who they could communicate with. Participants alluded to the idea of wanting to know the rules of the procedure room and how best to anticipate and comply.

When asked about their experience of having their procedure with light or moderate sedation, one participant noted "the doctor had said to me before I went under, or whatever he was doing, don't try and help them. So, I kept quiet...I was wanting to know how it was going but I didn't ask any questions" (*Participant ID-002*).

While some participants concentrated on following orders, others focused on how their actions may impact the outcome of their procedure. One participant stated "I remember making sure I was staying awake the whole time...I was advised beforehand that I would be awake for the procedure and so I did not want to fall under an anesthetic haze or whatever. I tried desperately to stay awake" (*Participant ID-002*). Similarly, another participant noted "I tried to relax. I didn't want to tense up, 'cause I thought that if I tensed up, I might create a problem that I didn't want to create" (*Participant ID-008*).

Another participant shared a similar experience stating

"It was certainly a lot of tensing up over anxiety and fright...I kept thinking what's coming next here, but I have no reason really to think that because there was no physical

discomfort of a bad nature...I didn't even know they were up there around my heart, but I was still tense and I kept tightening up my legs and clenching my fist to the point where one of the guys said, relax your hand there, you know?" (*Participant ID-039*).

4.7.3 Relating Procedural Awareness to Overall Experience

The third subtheme discusses participants' experiences of being conscious during TAVI and how their consciousness impacted their overall experience. Participants demonstrated a high degree of heterogeneity in their response related to preferences for, and perspectives on procedural awareness.

When asked how they felt about being conscious, one participant noted "I felt I was a little more in control because I was able to hear what they were saying and be aware of what they were [doing]...I certainly didn't find it threatening in any way" (*Participant ID-027*). Similarly, another participant noted "I'm very nosy to start with. I like to watch and listen and see everything that goes on. So it's always nice to learn stuff. I'd do it again, no problem. I wouldn't think twice" (*Participant ID-015*).

Although the majority of participants liked the idea of being conscious or only mildly sedated because they felt more in control, others would have preferred to receive a general anesthetic. One participant stated "the idea of jabs and dental freezing scared me a lot, and when I was on the operating table itself... I was still fighting [the procedure] metaphorically... if I was knocked out, I would have been just sitting there...off in dreamland somewhere. That would've been nice" (*Participant ID-039*). When asked to elaborate on their experience, the same participant stated:

"I don't know why, but I just got it in my head that this was going to be a pain. I would rather have them knocked me out. Let me put it that way, then have this. That was a

prevailing thought. And it kept bugging me, you know, it kept building up until I had to kind of slap myself and say, this is just like the angio, a piece of cake. And I just couldn't get to reconcile it to that state I don't know what the heck was wrong with me...I don't have pleasant memories of the overall experience...I can't say that that was the most pleasant day of my life. It was maybe one of the scariest in a long time because of the consciousness” (*Participant ID-039*).

In contrast, some participants felt neutral about the idea of being conscious and embraced a mindset of acceptance towards the procedure. One participant stated “it just seemed like everybody was doing their thing and I just had to kind of relax and let whatever was going to happen, happen” (*Participant ID-008*).

4.7.4 Summary

In summary, the second theme illustrates how participants varied in their perceived levels of preparedness for TAVI, and their desire to conform to the expectations of the “good patient” as they sought how to be on the TAVI team. Although most patients had the procedure under conscious sedation, they spoke of their diverse experiences, ranging from relaxed acceptance and curiosity to intense anxiety and preference for being unconscious.

4.8 How Do I Manage This Complex Wave of Emotions?

Lastly, the third theme highlights the complex wave of emotions that participants experienced across the TAVI trajectory. Participants described their experiences of dealing with anticipatory stress leading up to the valve implantation, tuning into perceived signs of hope and danger, and feeling sudden relief after hearing that their new valve was successfully implanted.

4.8.1 Experiencing Anticipatory Stress

The first subtheme emerged from participants' reports of experiencing stress in anticipation of the moment of valve implantation and the various factors that contributed to the rising stress during this period of time.

Participants described a range of emotions that they experienced from the time they decided to have the procedure, to the time their new valve was deployed and ultimately returned home. Participants experienced their TAVI journey as a continuum and viewed the emotions during the procedure in this greater context. The wave of emotions and rising stress started early in their clinical care. While some participants described feeling upset and forgotten while waiting for confirmation about a procedure date, others spoke of the best way to approach TAVI was to adopt a state of acceptance for whatever the outcome may be.

When asked to reflect on their TAVI experience, one participant stated “the biggest hang-up was the uncertainty of when I was going to get in...that's the kind of thing that ticks you off because you have to change your life. I, in fact, I did change my life” (*Participant ID-036*).

Although some participants found the waiting period disruptive, others found some of the administrative formalities to be unsettling. One participant stated

“Death, I had that on my mind. I got to admit like, the night before I was wondering if they asked for a living will for heaven's sake and they asked for a priest...if they're doing that, they've got some reason to suspect maybe something's gonna go wrong here, you know? So yeah, that put a little bit of fear into my brain” (*Participant ID-039*).

Although fear and uncertainty were at the forefront of many participants' minds, others shared strategies that helped alleviate some of their worries. Some participants expressed how meaningful it was to have staff communicate their actions in a calm and relatable manner. One

participant stated “they kept telling me what they were going to do as they went along and ...that was calming, I think for me, having them talk to me like it was no big deal” (*Participant ID-038*). Another participant shared their experience stating “the anaesthetist...had a little chat [with me] about what was going to go on and, one thing about [Hospital X] is they are excellent in explaining what's going to happen. I was quite happy with that” (*Participant ID-009*).

4.8.2 Tuning in to Signals of Hope and Danger

The second subtheme reflects participants’ high degree of procedural awareness and their desire for orientation cues and status updates throughout the procedure. Participants discussed they heard physicians and nurses speaking to each other, and how their interpretations of that communication impacted their overall experience. They were tuned into these conversations, seeking signals of their status, the progress of the procedure, and possible alerts of danger.

Some participants discussed listening to verbal cues, while others were vigilant for visual cues. For some, these cues created a sense of cognitive dissonance. Some participants perceived that the team was signalling something out of the ordinary and that they might be in danger. One participant recalled “somebody said are we ready to start? And [the anaesthesiologist] said yes, blood is ready and I thought, oh my goodness” (*Participant ID-005*). Although confirming availability of blood is standard practice for TAVI despite the low rates of bleeding, the participant was unaware of this practice and worried that their safety might be in jeopardy. Similarly, another participant noted “perhaps 20 minutes in, they said ‘we got a problem here’. I heard that phrase, starkly, and that struck me a little...you know, these guys got a problem with me or, what's going to happen here?... and that shook me a little bit” (*Participant ID-039*). Although participants discussed tuning in to these examples of perceived signals of danger, they kept their concerns to themselves.

In contrast, other participants tuned in to perceived signs of hope, and focused on the thought and indications of a positive outcome. When asked to recall their experience, one participant stated “it was an hour or a bit more into it and I kind of caught the eye of one of the surgeons that was assisting and he gave me a thumbs up, more or less to say it's going well...so I thought that was nice” (*Participant ID-011*). This small gesture of encouragement gave the participant a sense of how the procedure was progressing and provided comfort and reassurance. Although participants did not verbalize the impact of these signals in the moment, they related how meaningful and memorable these small gestures were at the time and helped anchor their wave of emotion.

4.8.3 Breathing a Sigh of Relief

Following the crest of this wave of emotions, the third subtheme illustrates the immense relief that participants experienced after hearing that their new heart valve had been successfully implanted. Following the receipt of this news, participants reported a significant, sudden and welcome shift in their emotional state from anticipatory stress, fear and anxiety to elation and gratitude.

One participant shared their experience of feeling emotionally and physically exhausted during TAVI but discussed the significant wave of relief they felt after hearing confirmation that their procedure was a success. The participant stated

“I hope these guys finish quick because I'm not going to be able to hold on here much longer. But as it turned out...the specialist said...you've got a new valve. And I was just elated. I was so excited underneath all that stress and everything. And that phrase was all I needed to get me really happy” (*Participant ID-039*).

Similarly, another participant shared their experience stating “I’m lying there, right, and I can hear the voices, two doctors saying, pull back and then, you know, move forward and so on and so forth. And then all of a sudden... somebody said to me, it’s all done and I said, well, wonderful, thank you very much” (*Participant ID-005*). This illustrates how participants sought to understand the timepoints and progress of their procedure, and the confirmation of successful valve deployment and removal of the implantation equipment.

After experiencing a complex range of emotions, participants described feeling overwhelmed with gratitude and struggled to express their thankfulness to their Heart Team. One participant stated “I know I’m just going to get better and better and better, and I’m so appreciative cause they’ve given me my life back...I can’t praise them enough. I just can’t” (*Participant ID-022*).

4.8.4 Summary

In summary, patients experienced a wave of emotions that started while waiting for the procedure, crested during the procedure, and released rapidly once the procedure was successfully completed. They remained vigilant for cues of potential danger, sought signals that indicated the progress of their procedure, and were overcome with the elation of having a new valve.

4.9 Conclusion

The intraoperative TAVI journey is a unique and highly personal experience for each participant. Participants shared an awareness of the collective team effort required to ensure their safety and successful outcomes. Their shared experience of wanting to fulfil their role on the procedural team highlights important perspectives. We found that participants aimed to understand the rules of an unfamiliar environment and the nature of their relationship with the

various members of the team in the first theme “Who Am I to Them?”. In the second theme “How Can I Be a Good Patient”, we found evidence of participants’ intent to actively contribute to the success of their valve implantation and their goal of playing their part. Their experience of being conscious – ranging from being totally awake, receiving light or moderate sedation – varied significantly from “being aware but not caring” to “feeling tense and anxious”. In the final theme “How do I Manage this Complex Wave of Emotions”, we heard that participants had a shared experience of experiencing an emotional trajectory from uncertainty and anxiety to sudden relief. They reported listening and watching intently for clues to assess their safety and the progress of their procedure, and the importance of small signals of hope and reassurance. Overall, these experiences illustrated the prevailing desire of participants to be an active member of *their* Heart Team during the short time in the procedure room.

Chapter 5: Discussion

The goal of this study was to explore patients' experiences of undergoing TAVI to help inform nursing and multidisciplinary practice. Interpretive description was used to help gain a better understanding of patients' perspectives and to strengthen patient-centred care in the innovative management of valvular heart disease. This is a novel study and, to the best of my knowledge, one of the first reports on TAVI patients' perspectives during the short but impactful preoperative, intraoperative, and immediate postoperative periods. The study yielded rich data that shines light on multiple aspects of patients' experiences that can guide multidisciplinary practice. For the purpose of this project, I focus the discussion on three main topics aimed at helping inform clinical care, including: (1) TAVI under conscious sedation: adapting to a new standard of care, (2) improving patient-centred peri-procedure care for TAVI, and (3) facilitating patient membership on the Heart Team. I discuss the limitations of this study as well as insights and implications for future practice.

5.1 Summary of Findings

In this exploratory study, we found that participants had shared a desire for inclusion on *their* Heart Team and wanted to play an active role in their care. In addition to seeking this sense of membership, participants sought guidance, support, and coaching during TAVI to help understand their roles and manage their complex wave of emotions. Ultimately, participants wanted to participate in, and contribute to a successful TAVI procedure

5.2 TAVI under Conscious Sedation: Adapting to a New Standard of Care

The findings of this study are pertinent to the clinical context of the rapid transition in anaesthesia strategy in the transcatheter treatment of aortic stenosis. With rapid advancements in TAVI technology and improvements in operator experience, the use of conscious sedation is

becoming increasingly common (Butala et al., 2020; Thiele et al., 2020). Although TAVI was routinely conducted under general anaesthesia in early practice, studies now support the safety and efficacy of transitioning to a more minimalist anaesthetic approach, using either local anaesthesia, conscious sedation, or a combination of both (Butala et al., 2020; Feistritzer et al., 2021; Thiele et al., 2020). While many centres have adopted this practice, there remains a degree of heterogeneity between sites (Butala et al., 2020). Some of this lack of standardized practice can be attributed to site volume and experience as well as physician and team preference.

When considering the impacts of general anaesthesia, it is important to note that even a minor anaesthetic insult in frail, older adults can “lead to permanent functional decline post-surgery” (Lin, McBride, & Hubbard, 2018, p.62). Blumenstein et al (2020), note that it is particularly beneficial to avoid general anaesthesia in elderly patients due to the reduced risk for postoperative delirium, decreased length of hospital stay, and the enhanced facilitation of early mobilization. While we know that frail, older adults can experience adverse events when treated with general anaesthesia, avoidance of GA is not always possible. Using conscious sedation can help mitigate the risks involved with GA, including:

“hemodynamic instability, higher need for inotropic drugs, higher risk of bleeding, increased risk of pulmonary infection, extubation difficulty or delay in patients with chronic pulmonary disease, late complication identification such as stroke or aortic complications and finally, longer procedural duration, hospital stay, higher staff workload, and global costs” (Akodad & Lefèvre, 2018, p.2).

With practice trends shifting towards the avoidance of general anaesthesia, caring for patients with varying degrees of consciousness, spanning from local anaesthesia to conscious sedation, is quickly becoming a standard of care across programs and regions. To date,

researchers have focused on the safety and feasibility of a minimalist anaesthesia strategy; however, the patients' voice has not been incorporated in this growing body of evidence. TAVI literature has not yet explored patients' perspectives of undergoing TAVI. Although there has been a rapid uptake of a minimalist anaesthetic approach for TAVI, evidence to inform clinical care for the conscious patient has not kept pace. This gap highlights the importance of the current study to inform practice.

What we learned from participants was that, overall, being conscious was relatively well-tolerated and painless; however, participants experienced a wide range of fears, emotions, and concerns. Our findings suggest that there are opportunities to improve nurses' capacity to assess our conscious patients' needs and for the multidisciplinary team to strengthen patient-centred care. It is important to note that, in the context of procedure rooms, caring for conscious patients is still a relatively new and under-researched practice.

The scope of practice for perioperative registered nurses "is a continuum of nursing activities that focus on identifying and meeting the individual needs of the surgical patient throughout the perioperative experience" (ORNAC, 2019, p. xxii). Providing care to a patient under a general anaesthetic requires a different approach than providing care to a patient who is conscious (ORNAC, 2019). When patients are under general anaesthesia, the peri-procedure team may consider that patients are "absent" from communication and other interactions. In this setting, the procedure is done "to" the patient. In contrast, patients with varying degrees of awareness during their procedure may be aware of conversations, background noise, and the steps of their procedure. When patients are more awake, the procedure may be done "with" the patient, as they are not an inert participant. Given the surgical team's dominant training of conducting invasive procedures in unconscious patients, this represents a significant shift in

training, communication, culture, and practice. To help meet the needs of the conscious patient, staff need to reorient their provision of care to help prioritize patient needs. This study adds a beginning understanding of patients’ perspectives and can help in setting these priorities. Current evidence on anesthetic management strategies for TAVI suggest that the procedure can be done safely and effectively with a minimal anaesthesia strategy. Figure 2 below outlines recommendations related to practice for adapting to a new standard of care.

Figure 2

Recommendations Related to Practice: TAVI Under Conscious Sedation: Adapting to a New Standard of Care

Recommendations Related to Practice	
For the Multidisciplinary Team	
<ul style="list-style-type: none">• Update nurses on changes to contemporary practice• Review practice standards on caring for conscious patients in the procedure room	
For the Patient	
<ul style="list-style-type: none">• Outline the rationale for using a minimalist anaesthetic approach• Educate patients on the goals of care for TAVI	

5.3 Improving Patient-Centred Peri-procedure Care for TAVI

As discussed in Chapter 2, patient-centred care is a “top healthcare priority” for the British Columbia Ministry of Health (BCMh) (British Columbia Ministry of Health, 2015). While a universal definition for patient-centred care is lacking, the central idea suggests that healthcare providers reorient their provision of care to reflect patients’ values and preferences as opposed to those of the health care providers. The BCMh defines their vision for patient-centred care as a “healthcare system in which the patient’s voice is anchored in all behaviours and drives

all activities of the health system. A culture of patient-centredness is self-evident across the health system and is integrated into existing health care programs” (British Columbia Ministry of Health, 2015). While it is important to keep BCMH’s vision for patient-centred care in mind, perhaps even more important, is to understand what patient-centred care means to patients. Healthcare providers may believe that they are providing patient-centred care but ultimately, that determination should be made by the patients. Without consulting patients as experts in their own care, we can’t be certain of what each patient’s needs are. In order to move towards the delivery of improved patient-centred care, we must not treat patients as objects. Instead, we must make a conscious effort to situate the patient at the centre of our care.

When we look at patient-centred care in the context of TAVI, it is helpful to understand the Heart Team approach during TAVI. While the concept of the Heart Team was introduced at the outset of TAVI, membership was initially limited to an interventional cardiologist and a cardio-thoracic surgeon (Hawkey, Lauck, Perpetua, & Simone, 2020). As TAVI evolved, so did the concept of the Heart Team. The utilization of a multidisciplinary Heart Team is currently endorsed as a Class I recommendation by European and American professional associations (Asgar et al., 2019; Tirado-Conte et al., 2021). Although the initial goals of the Heart Team included “improving patient selection, procedure planning and managing the highest risk patients”, the Heart Team “has evolved to a standard of care and a quality indicator for all programs” (Lauck & Smith, 2022). Many Heart Teams have expanded their membership to include “structural valve interventionalists, cardiovascular imaging specialists, cardiovascular surgeons, anesthesiologists, and nurses” (Hawkey et al., 2020).

While each member of the Heart Team possesses a unique and highly-specialized skill-set, the peri-procedure team works together to achieve a shared set of patient care goals,

including “the capacity to easily communicate with patients during the procedure, patient comfort and experience, hemodynamic stability, and predictable readiness for mobilization within four hours of the procedure” (Lauck & Smith, 2022). By identifying the goals of care during the procedure and in the immediate post-recovery period, we can adapt our processes and focus to incorporate patients’ values and perspectives and work to achieve these goals collectively as a multidisciplinary team while ensuring patient safety and optimal experience of care.

In this study, we identified evidence that there can be a gap between the intent to provide patient-centred care in a multidisciplinary team setting, and patients’ perceptions of receiving patient-centred care. Ultimately, this disconnect can result in unmet patient needs. The study highlighted the challenges of “centring” the team, the procedure and the care around the patient to truly ensure that evolving TAVI practices are patient-centred. The voice given to participants emphasized their desire for information, education, preparation, safety, and guidance. Although participants reported being satisfied with their experience overall, they shared accounts suggesting they did not perceive being at the centre of care and feeling like they were guests during their procedure and ultimately not a member of their peri-procedure Heart Team.

Figure 3 below outlines recommendations related to practice for improving patient-centred peri-procedure care for TAVI.

Figure 3

Recommendations Related to Practice: Improving Patient-Centred Peri-procedure Care for TAVI

Recommendations Related to Practice	
For the Multidisciplinary Team	
<ul style="list-style-type: none">• Foster therapeutic relationships with patients• Reorient the provision of care to ensure patients' needs are prioritized• Assess patients' physical and emotional well-being during TAVI• Provide ongoing information, communication, and education to patients	
For the Patient	
<ul style="list-style-type: none">• Communicate care preferences to the Heart Team	

5.4 Facilitating Patients' Membership on *Their* Heart Team

The findings from the study highlight participants' desires to participate in their care and play an active role on *their* Heart Team during their procedure. Given what we learned about participants' needs during TAVI, including the need: (1) to know who they are in relation to others, (2) to understand the rules of participation, and (3) to receive support to help manage their complex wave of emotions, there is an opportunity for the peri-procedure team to augment the delivery of care to better meet these patient needs.

Although the Heart Team may strive to provide patient-centred care in how they interact, organize care, and attend to patients' needs, not all participants felt that they were actually at the centre of this circle of care. In order to align the intent to shift the culture of care to a more patient-centred approach with the patients' perspectives, it may be helpful to extend the well-established concept of the power of the TAVI multidisciplinary Heart Team approach to include patients as members on *their* Heart Team, especially during a procedure conducted with no or

minimal sedation. Patient participation on the peri-procedure Heart Team may be facilitated by (1) team awareness related to care of conscious TAVI patients, (2) recommendations to enhance communication within and between procedural team members and patients, and (3) modification of patient education resources to facilitate active participation on the peri-procedure Heart Team.

5.4.1 Team Awareness Related to Care of Conscious TAVI Patients

When we consider the conventional nursing and multidisciplinary practices of procedure rooms, nursing practice has primarily focused on the care of patients who are under general anaesthesia (Mitchell, 2008). This historical template does not match the recent evolution in anaesthetic management strategies for TAVI with the rapid transition from a default strategy of general anaesthesia to the adoption of local anaesthesia and conscious sedation for most routine patients. In this study, we found that participants had a high degree of awareness of the physical environment during their procedure. Some participants recalled detailed conversations between staff, gestures of non-verbal communication, and specific details of the procedure space. These findings are in keeping with previous research exploring conscious patients' experiences, albeit in different surgical specialities, including vascular surgery, neuro surgery, and orthopedic surgery (Bidd & Lyons, 2020; Mitchell, 2008; Palese, Skrap, Fachin, Visioli, & Zannini, 2008).

In order to provide patient-centred care, nurses must adapt their practice and provide leadership in the care of conscious patients undergoing minimally invasive procedures. For example, nurses are particularly well positioned to remind the team that the person under the surgical drape may be listening and watching the activities and team around them, often in a state of stress-induced hypervigilance. Nurses' competency in advocacy, communication and holistic care can help raise the team's awareness of patients' sensory experiences and mitigate the risks of adverse experiences. Nurses' input is particularly important given our findings that patients'

intent is to be “a good patient” by following the rules and meeting expectations. To do this, patients must be told the details of these rules, and coached to conduct themselves in ways that facilitate their participation on their Heart Team. There is evidence that patient participation at pivotal safety timepoints such as safety briefings and time outs can strengthen the goals of these protocols and improve patients’ experiences (Abbott et al., 2018; Sendlhofer et al., 2015).

It is important to acknowledge that the procedure room is an unfamiliar and anxiety-provoking environment for patients. What we learned from participants was that, in the context of this unfamiliar environment, they sought support and direction on behavioural expectations and managing their complex wave of emotions so that they could better fulfill their desire to be “a good patient”. In light of our findings, patients would benefit from the adoption of practices and other standards of care to establish an individualized approach to care to help them clarify “who they are” in relation to the peri-procedure team and establish the short duration but intense relation that nurses and other members of the team have with patients. In addition, providing clear, timely and adapted guidance for patients to understand how to act during their procedure, as well as coaching and support to move through the wave of emotions from the start to the end of the procedure would facilitate the integration of patients on *their* peri-procedure Heart Team.

Figure 4 below outlines practice recommendations related to care of conscious TAVI patients.

Figure 4

Recommendations Related to Practice: Team Awareness Related to Care of Conscious TAVI

Patients

Recommendations Related to Practice
For the Perioperative Registered Nurse <ul style="list-style-type: none">• Raise the multidisciplinary team's awareness of the patient's conscious status• Assess the patient's comfort level with being conscious during TAVI
For the Anaesthesiologist and Cardiologist <ul style="list-style-type: none">• Provide frequent orientation cues and updates to the patient during TAVI• Reorient the patient as necessary

5.4.2 Recommendations Related to Communication: Leveraging Perioperative Nursing

Expertise

The findings from the study demonstrate the importance of communicating with, and assessing patients' evolving needs during TAVI, and raising the team's awareness of the presence and participation of the patient in the synchronized choreography of the TAVI procedure. Due to the fast-paced nature of the perioperative environment, multidisciplinary team members are often tasked with establishing therapeutic relationships with patients in short periods of time—often in a matter of minutes. These brief introductions and interactions with patients are an opportunity for team members to help strengthen patients' feelings of inclusion on *their* Heart Team and engage in relational care. When we consider the intricacies of communication during TAVI, we must consider the unique, yet intertwined roles of anaesthesiology, cardiology, nursing and the patient. Effective communication requires an

understanding of each individual's role and a willingness to work together as a team to ensure the patient remains at the centre of our care.

In the study, participants discussed how meaningful it was to have a member of the Heart Team provide status updates and caring gestures throughout the procedure. This reflects existing evidence about the effectiveness of patient coaching and navigation at vulnerable times in their health journey (Paterick, Patel, Tajik, & Chandrasekaran, 2017; Seeman, 2019). While not all participants felt like they received sufficient communication intraoperatively, the ones who did, attributed those interactions to an overall positive experience.

Before discussing recommendations on communication strategies during TAVI, it may be helpful to explore some of the complexities of procedure rooms that can serve as barriers to communication. Staff flow through the rooms is kept to a minimum to help maintain an aseptic environment, conversation is kept to a minimum to help reduce noise distraction, and physical barriers, such as surgical drapes and imaging technology, cover the patient's face (ORNAC, 2019). These factors, combined with working in a tight physical space, can make it difficult to communicate effectively with the patient without interfering with other members of the team.

When we consider the value that participants placed on being able to communicate with the Heart Team during TAVI, it is useful to examine potential strategies to help facilitate timely, patient-centred, and effective communication. While we may not be able to eliminate all of the barriers to communication, we can shift our focus towards improving patients' capacity to become members of *their* Heart Team during their valve procedure.

One strategy that may help provide continuity of communication during TAVI is to utilize a tag-team approach between nursing, anaesthesiology and cardiology. When we consider the role of the circulating nurse, their duties include, but are not limited to, assessing patient

status, acting as a patient advocate, and providing physical comfort measures to patients (ORNAC, 2019). During the preoperative and postoperative periods of TAVI, the circulating nurse is particularly well-suited to help assess and respond to patient needs and act as a primary patient communicator. During these phases, access to the patient does not require an interruption to care or interfere with the sterile field. Throughout the intraoperative period, however, the anaesthesiologist and cardiologist may be best suited to act as designated patient communicators due to their proximity and direct access to the patient.

The designation of one or more members of the Heart Team to act as a patient liaison can help anchor patients to someone with whom they can easily communicate and from whom they can receive information, coaching and support. The selection of the most appropriate “coach” may depend on patient need, physical layout and timing of support. Regardless of who assumes the responsibility of communicating with the patient during TAVI, there is room to improve upon assessing patients’ intraoperative needs and incorporating their wishes.

Figure 5 below outlines recommendations related to practice for leveraging perioperative nursing expertise.

Figure 5

Recommendations Related to Practice: Leveraging Perioperative Nursing Expertise

Recommendations Related to Practice
For the Perioperative Registered Nurse <ul style="list-style-type: none">• Assume an active role in patient communication during the preoperative and postoperative phases of TAVI• Perform a needs assessment for each patient
For the Anaesthesiologist and Cardiologist <ul style="list-style-type: none">• Assume the role of primary patient communicators during the intraoperative phase of TAVI• Provide frequent status updates throughout the procedure to keep the patient informed
For the Patient <ul style="list-style-type: none">• Communicate needs throughout procedure

5.4.3 Modification of Patient Education Resources to Facilitate Membership on the Heart Team

In this study, we learned that there are opportunities to modify the patient education resources to help patients reach their goal of being members of their Heart Team. Although some participants felt that they had sufficient information leading up to TAVI, others indicated that they would have benefited from further information about what to expect during the procedure and details such as the valve itself. Participants identified inconsistencies in the hospital-provided education materials which resulted in frustration and confusion. In some cases, participants attempted to seek clarification online, which ultimately resulted in further confusion and conflicting information. When we look at existing literature on patient education, we know that providing high-quality, individualized patient education yields greater patient satisfaction and improved patient health outcomes (Elgin, 2018; Seeman, 2019).

When we consider the numerous different adult learning theories, we know that individuals have different learning styles. The consideration of strategies to best meet diverse needs is pertinent to improving patients' preparation for TAVI. Inott and Kennedy (2011) suggest that the learning theory that focuses on four domains of learning, including visual, aural, reading or writing, and kinesthetic (VARK) is particularly well-suited to patient education (Inott & Kennedy, 2011). While it is not within the scope of my research to explore adult learning theories in detail, I highlight this theory to help draw attention to the need for various learning modalities to adapt to various learning styles. It may be helpful to augment existing education resources to include materials in all four domains of the VARK learning theory. The modification and diversification of education resources may give patients an opportunity to choose resources that align most closely with their learning style and needs. Patient education resources should include information about what to expect during TAVI and guidance about the physical environment, the team members, and the expectations for patient behaviour.

Figure 6 below outlines practice recommendations related to modification of patient education resources to facilitate patient membership on the Heart Team.

Figure 6

Recommendations Related to Practice: Modification of Patient Education Resources to

Facilitate Membership on the Heart Team

Recommendations Related to Practice	
For the TAVI Clinic Coordinator	
<ul style="list-style-type: none">• Review existing education materials for inconsistencies• Modify and diversify education materials to reflect different learning modalities, including read, write, aural, and kinesthetic• Assess patient literacy levels	
For the Patient	
<ul style="list-style-type: none">• Identify preferred learning styles• Voice any learning needs during preoperative consultation	

5.5 Study Limitations

This exploratory study provides novel evidence to inform the peri-procedure care of TAVI patients. Nevertheless, the findings should be interpreted in light of the limited diversity in the study sample. Study recruitment was performed through a single TAVI clinic in Western Canada. Data was obtained from a sample of 15 participants. Recruitment was completed based on the richness of the data obtained, and as a pragmatic decision based on the scope of the study. Although participants came from different geographic regions within Canada, all participants travelled to the same site to undergo TAVI. The results of this study may not accurately reflect experiences of participants in other TAVI programs, especially given the impact of local contexts of care, multidisciplinary practice, and processes of care. While there was a diverse representation of participants, a multi-site recruitment approach may have elicited different experiences for participants due to practice variation across sites.

There are multiple nuances to perioperative practice including the administration of anaesthesia, and the conduct of the TAVI procedure that may not be fully accounted for in our data. This is not to suggest that the findings of this study are not applicable, but rather, the findings from this study must be interpreted within the context of the research methods used.

This study offers a beginning understanding of patients' experiences of undergoing TAVI. Future research is required to explore the development of standardized care interventions to help enhance patients' experiences.

5.6 Conclusion

In this study, we aimed to explore patients' perspectives of their peri-procedure experiences to determine what could be learned to inform nursing and multidisciplinary care. We have reported novel findings that can help guide and modify care to support patients to become members of their peri-procedure team and improve their experience of care. We identified opportunities for nurses to leverage their expertise and competencies to achieve this goal. Future research is needed to further close the gap between the evolution of TAVI and patients' experiences of care during their procedure and contribute to shifting the culture of care from clinician-focused to patient-centred, especially during the intense and impactful time when patients undergo complex cardiac procedures.

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Appendix

Transfemoral Transcatheter Aortic Valve Implantation

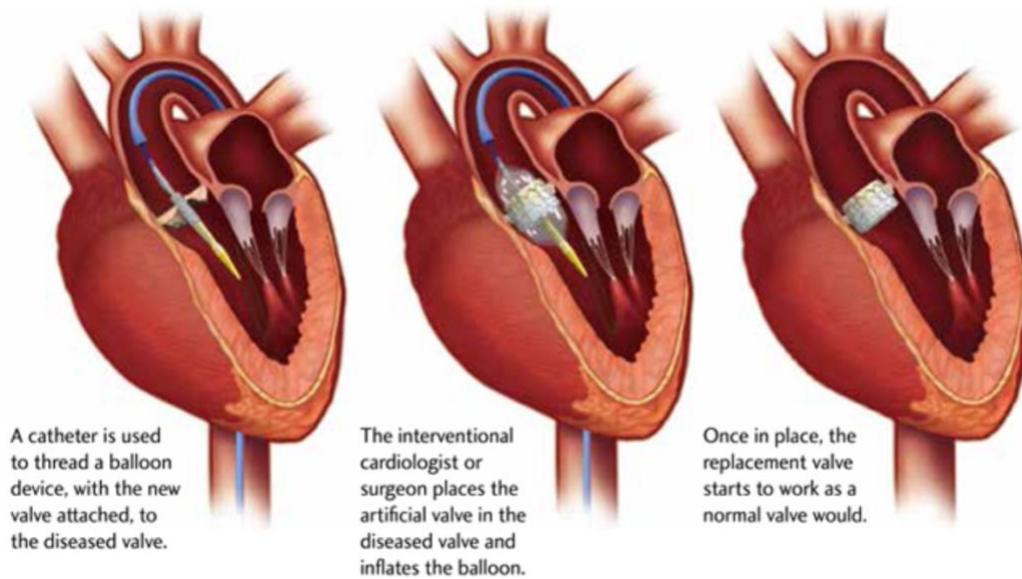


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