

The Role of Surgical Nurses in Minimally Invasive Procedures

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Abstract:

Surgical nurses play a vital role in minimally invasive procedures, serving as essential members of the surgical team. Their responsibilities begin long before the procedure, as they prepare the operating room and ensure all necessary tools and equipment are sterile and ready for use. During the procedure, surgical nurses assist the surgeon by providing instruments, managing surgical supplies, and maintaining a clear field of vision. Their keen attention to detail and ability to anticipate the needs of the surgeon help ensure that the procedure proceeds smoothly and efficiently. Additionally, surgical nurses are trained to monitor the patient's vital signs and overall condition, which is crucial for swift intervention in case of any complications. Beyond the operating room, surgical nurses are involved in patient education and support, which is especially important in minimally invasive procedures that typically promise quicker recovery times and less postoperative pain. They provide patients with information about what to expect before, during, and after the procedure, alleviating anxiety and promoting better outcomes. By fostering open communication and rapport with patients and their families, surgical nurses contribute significantly to patient satisfaction. Their role is not only technical but also emotional, ensuring that the patient's experience is as positive as possible and that they feel supported throughout the entire surgical process.

Keywords: Surgical nurses, minimally invasive procedures, operating room, patient care, surgical team, vital signs, patient education, surgical instruments, hospital support, postoperative recovery.

Introduction:

The evolution of surgical techniques over the past few decades has ushered in a new era of less invasive surgical interventions, fundamentally transforming the landscape of patient care. Minimally invasive procedures (MIPs), characterized by smaller incisions, reduced tissue trauma, and shorter recovery times, have gained prominence across various specialties, including orthopedic, cardiac, gynecological, and general surgery. The successful execution of these advanced surgical techniques requires a collaborative effort among a highly skilled surgical team, where each member plays a pivotal role. Central to this team is the surgical nurse, whose

contributions are critical to the safety, efficacy, and overall success of MIPs. This research aims to explore the multifaceted role of surgical nurses in minimally invasive procedures, underscoring their responsibilities, competencies, and the impact of their presence on patient outcomes [1].

Surgical nurses are specially trained registered nurses who operate in the perioperative realm, encompassing preoperative assessment, intraoperative assistance, and postoperative care. Their responsibilities extend beyond assisting surgeons during surgical procedures; they are integral to ensuring patient safety, maintaining sterile environments, and optimizing surgical outcomes. In

minimally invasive procedures, surgical nurses are often tasked with managing advanced technologies and instruments, which necessitates a comprehensive understanding of both the equipment and the surgical techniques being employed. This involves not only a mastery of traditional surgical nursing skills but also an agility in adapting to technological advancements like laparoscopy, robotics, and endoscopy. As the complexity of these procedures increases, so too does the demand for surgical nurses who can navigate and manage the challenges they present [2].

One of the most critical roles of surgical nurses in MIPs is preoperative patient education and preparation. Prior to surgery, nurses conduct thorough assessments of patients, reviewing their medical histories, evaluating risk factors, and ensuring that patients are adequately informed and prepared for their upcoming procedures. This educational component is particularly vital in minimally invasive surgeries, where patients may have misconceptions regarding the extent of the procedure, recovery expectations, and potential complications. Surgical nurses provide detailed explanations and guidance, which not only alleviate anxiety but also enhance patient compliance and satisfaction. By fostering an open dialogue with patients, surgical nurses empower them, allowing for a collaborative approach to care that is essential in today's patient-centered healthcare environment [3].

In the intraoperative stage, the role of surgical nurses becomes even more pronounced. During minimally invasive procedures, surgical teams often rely on the nurse's expertise to manage sophisticated technology, assist in positioning patients, and maintain sterile fields. The ability to anticipate the surgeon's needs and demonstrate proficiency in using equipment such as endoscopes or robotic systems is paramount in facilitating smooth operations. Additionally, surgical nurses monitor patients' vital signs continuously and work collaboratively with anesthesiologists to ensure optimal anesthesia management throughout the procedure. This vigilant monitoring is critical in the minimally invasive context, where subtle changes in a patient's condition can demand rapid intervention. The nurse's dual role as both an assistant and a patient advocate makes them an invaluable member of the

surgical team, responsible for fulfilling both technical and compassionate care aspects [4].

Following surgery, the role of surgical nurses extends into postoperative care, where their involvement significantly influences recovery. In minimally invasive techniques, patients typically experience reduced pain, shorter hospital stays, and quicker rehabilitation timelines compared to traditional surgical approaches. However, postoperative monitoring remains crucial to ensuring that patients recover without complications. Surgical nurses manage the transition of patients from the operating room to recovery, continuously assessing their status and providing education on wound care, pain management, and activity restrictions. The comprehensive discharge planning conducted by surgical nurses not only contributes to a smoother recovery but also lowers readmission rates and enhances patient satisfaction.

As the field of minimally invasive surgery continues to evolve, so too must the training and education of surgical nurses. There is an increasing recognition of the necessity for specialized training programs that equip nurses with the requisite skills and knowledge to excel in this dynamic area. Continuous professional development opportunities, workshops, and simulations focusing on the latest technologies and techniques are critical to ensuring that nurses remain proficient and confident in their capabilities. Moreover, interprofessional teamwork training can enhance collaboration among surgical teams, ultimately leading to improved patient care and outcomes [5].

Overview of Surgical Nursing Responsibilities:

The realm of nursing is multifaceted, encompassing a diverse range of specialties and responsibilities. Among these, minor surgical nursing stands out as a critical area that bridges the gap between surgical interventions and patient care. Nurses working in this field play an essential role in ensuring the safety and efficacy of the minor surgical procedures carried out within clinics, outpatient surgical centers, and emergency departments.

Minor surgical nursing refers to the specialized nursing practice focusing on the care of patients undergoing minor surgical procedures. These procedures may include, but are not limited to, wound suturing, incision and drainage of abscesses, removal of small tumors, and

other minimally invasive interventions. Unlike major surgeries that require extensive anesthesia and longer recovery times, minor surgeries usually occur under local anesthesia and have shorter recovery periods. The role of a minor surgical nurse extends from pre-operative preparation to post-operative follow-up [6].

Pre-Operative Responsibilities

The pre-operative phase is crucial in minor surgical nursing, as it sets the foundation for a successful procedure. Responsibilities in this phase include:

1. **Patient Assessment:** Nurses conduct thorough assessments of patients by collecting medical histories, evaluating physical conditions, and identifying potential risks associated with the procedure. This involves asking about allergies, previous surgeries, and current medications, which helps to ensure the safety and appropriateness of the surgical intervention [7].
2. **Education and Informed Consent:** One of the critical roles of a minor surgical nurse is to educate patients about the procedure they are about to undergo. This includes explaining the steps of the operation, potential risks and benefits, and what to expect during recovery. Informed consent is paramount, and the nurse often ensures that patients understand the information conveyed before signing consent forms.
3. **Preparation of the Surgical Site:** Proper preparation of the surgical site is vital to prevent infections and ensure the best possible outcome. Minor surgical nurses are responsible for cleaning and shaving the area, as well as applying antiseptics as required.
4. **Equipment Preparation:** Nurses play a critical role in ensuring that all necessary tools and equipment are sterilized and readily available for the procedure. This may involve arranging surgical instruments, ensuring sponges and sutures are available, and preparing any anesthetic agents [7].

Intra-Operative Responsibilities

During the surgical procedure, the role of the minor surgical nurse is dynamic and crucial. Their responsibilities include:

1. **Assisting the Surgeon:** Minor surgical nurses often assist surgeons during procedures, which may involve passing instruments, providing suction, or holding

structures in place. A good understanding of surgical procedures and materials is essential in this role [8].

2. **Monitoring Patient Vital Signs:** Continuous monitoring of the patient's vital signs—such as heart rate, blood pressure, and oxygen saturation—is essential during the procedure, especially when local anesthesia or sedation is used. The nurse must be vigilant and ready to act if any complications arise during the surgery.
3. **Maintaining Sterility:** Adhering to aseptic techniques is crucial in the surgical setting. Nurses must ensure that the sterile field is maintained and that instruments are handled without contamination, thus reducing the risk of infections.
4. **Documentation:** Accurate documentation of the procedure is vital. Nurses are responsible for recording important details, including the procedure performed, anesthesia used, and any immediate post-operative observations. This information is crucial for continuity of care and for legal documentation [8].

Post-Operative Responsibilities

The post-operative phase is equally important, as it involves monitoring and supporting patients as they recover from their procedures. Responsibilities include:

1. **Recovery Monitoring:** After the surgery, minor surgical nurses monitor patients as they wake from anesthesia (if used), ensuring they are stable before discharge. They evaluate pain levels, manage discomfort, and are alert for any adverse reactions [9].
2. **Patient Education for Aftercare:** Educating patients on post-operative care is an essential responsibility. Nurses provide instructions on wound care, pain management, signs of infection, and when to seek medical help. Clear communication is crucial to help patients understand their recovery journey.
3. **Discharge Planning:** Minor surgical nurses often participate in discharge planning. They assess whether the patient is fit to go home, provide recommendations for follow-up appointments, and ensure that patients have prescriptions for any required medications.
4. **Follow-Up Care:** While not all minor surgical nurses will have ongoing responsibilities, many are involved in follow-up care, which may involve scheduling additional

visits, changing dressings, or providing additional assessments as required [9].

Skills and Competencies

To effectively perform these responsibilities, minor surgical nurses require a diverse skill set and a range of competencies. Key skills include:

1. **Clinical Skills:** Proficiency in clinical skills, particularly those related to surgical procedures, is essential. This includes understanding surgical instruments, aseptic technique, and emergency interventions.
2. **Communication Skills:** Effective communication is critical in every aspect of patient care. Minor surgical nurses must convey information clearly and compassionately to patients and collaborate with the surgical team.
3. **Critical Thinking:** The ability to make swift, informed decisions is crucial, especially when monitoring patients during surgery or in recovery.
4. **Detail Orientation:** Given the intricacies involved in surgical procedures, attention to detail is paramount for maintaining safety and accuracy throughout the process.
5. **Empathy and Patient Advocacy:** Recognizing and addressing patients' emotional and psychological needs contributes significantly to their overall experience and satisfaction with care [10].

Preoperative Duties: Preparing for Success:

Surgical nursing is an integral facet of the healthcare system that plays a pivotal role in ensuring positive surgical outcomes. Surgical nurses are tasked with a variety of responsibilities that encompass preoperative, intraoperative, and postoperative care for patients undergoing surgical procedures. Among these responsibilities, preoperative duties stand out as vital components designed to facilitate the safe transition of patients into surgery. A successful surgical nurse must possess a profound understanding of these preoperative responsibilities, emphasizing patient education, safety protocols, and the coordination of multidisciplinary teamwork, all of which contribute to an optimal surgical experience [11].

The preoperative phase begins the moment a patient is scheduled for surgery and can extend until the patient is transported into the operating room. Within this

framework, a surgical nurse's role encompasses multiple critical functions. Initially, the surgical nurse must perform a comprehensive assessment of the patient, which includes reviewing the patient's medical history, current medications, allergies, and prior surgical experiences. This holistic view is essential to identify potential risks that could complicate the surgical procedure or administration of anesthesia [12].

Moreover, understanding the patient's emotional and psychological state is pivotal in preoperative care. Anxiety, fear, and misunderstandings about the surgical process can significantly affect patient outcomes. Research has shown that patients who are well-informed and feel supported often perceive less pain and have shorter recovery times. The surgical nurse, therefore, must not only be a caregiver but also an educator and a source of emotional reassurance [13].

One of the most critical preoperative duties of a surgical nurse is patient education. Effective education serves not only to alleviate anxiety but also to empower patients by equipping them with knowledge about what to expect. This can include explanations about the surgical procedure, details on anesthesia, and information about postoperative care. Informed patients are often more compliant and better prepared for the realities of surgery, whether it entails preoperative fasting, medication alterations, or necessary lifestyle changes [14].

Nurses must also inform patients about the importance of adherence to preoperative instructions. For instance, patients may need to refrain from eating or drinking for a specified amount of time prior to surgery. Failing to adhere to these guidelines can increase the risk of complications, such as aspiration during anesthesia. Additionally, discussing smoking cessation, medication management, and optimization of preexisting conditions, such as diabetes or hypertension, is critical for improving surgical outcomes [15].

Safety is a paramount concern in any surgical environment. As part of their preoperative duties, surgical nurses are responsible for ensuring that all safety protocols are followed meticulously. This includes verifying patient identification and surgical site through standardized processes such as "time-out" procedures, where the surgical team pauses to confirm details before the operation begins [16].

Furthermore, nurses must assess vital signs and perform necessary lab tests to establish a baseline for the patient's health, which will assist anesthesiologists and surgeons in making informed decisions during the procedure. Any discrepancies or abnormalities must be communicated to the healthcare team promptly. Monitoring a patient's psychosocial aspects is also critical; any concerns about the patient's mental state or understanding of the procedure should be addressed proactively [17].

The surgical nurse acts as a vital link between various multidisciplinary team members, including surgeons, anesthesiologists, and other healthcare professionals. Effective coordination and communication are essential to ensure that each team member is on the same page regarding the patient's care plan. This collaboration involves not only logistical coordination, such as surgical scheduling and equipment readiness but also sharing critical patient information that may influence the operative approach [17].

Another important aspect is the preoperative huddle, where all team members come together to discuss each patient scheduled for surgery. This meeting serves to ensure that everyone is informed about the specific nuances of each case, potential risks, and the overall workflow of the surgical day. Such practices are vital in minimizing errors and enhancing the surgical experience for patients [18].

Accurate and thorough documentation is a fundamental duty in the preoperative process. Surgical nurses must ensure that all assessments, interventions, and patient communications are meticulously recorded in the patient's medical record. This documentation serves multiple purposes: ensuring continuity of care, providing legal protection, and facilitating seamless communication among healthcare providers.

Moreover, compliance with regulatory and institutional protocols is essential. Surgical nurses must stay abreast of guidelines set forth by organizations such as The Joint Commission and the American Nurses Association, ensuring that the institution's practices align with federal and state regulations regarding surgical procedures [18].

Intraoperative Support: Instruments and Assistance:

Surgical procedures are complex and dynamic events that require the seamless integration of various

components for successful outcomes. Among the most crucial elements in this high-stakes environment are the surgical tools, instruments, and, significantly, the healthcare personnel who operate them. In particular, the role of nurses cannot be overstated; they are integral to the surgical team, providing essential support throughout the entire process.

Before exploring the role of nursing, it is essential to understand the surgical environment in which they operate. A typical surgical setting consists of an operating room (OR) designed to provide a sterile environment where surgical procedures can be performed safely. This sterile environment is crucial for minimizing the risk of infection, which can significantly compromise patient outcomes. The operating room is equipped with specialized tools and technology, including surgical instruments, anesthesia machines, lighting systems, and monitoring devices. Each component is vital for the successful execution of the operation and serves a specific purpose within the surgical workflow [19].

Tools and Instruments Used in Surgery

Surgical procedures rely on an array of tools and instruments, each designed for particular tasks. Fundamental categories of surgical instruments include:

1. **Scalpels and Blades:** These are used for making incisions into the skin and underlying tissues. The precision and sharpness of scalpel blades are critical in minimizing trauma to surrounding tissue.
2. **Scissors:** Surgical scissors come in various shapes and sizes, designed for cutting tissues, sutures, and drains. Some scissors are specifically designed for delicate manipulation, while others are made for tougher materials [20].
3. **Forceps:** These instruments are employed to grasp, hold, or manipulate tissue. Forceps can be either traumatic or non-traumatic, depending on their design and intended use in the surgical field.
4. **Clamps and Hemostats:** Hemostatic clamps are essential for controlling bleeding during surgery. They are used to occlude blood vessels and tissues, allowing the surgeon to work without excessive hemorrhage [21].
5. **Electrosurgical Devices:** These instruments use electrical currents to cut tissue and coagulate blood

vessels, minimizing blood loss and improving visibility during surgery.

6. **Retractors:** These provide exposure to the surgical site by holding back tissues, which allows the surgeon greater visibility and access to the area being operated on.
7. **Suction Devices:** Surgical suction systems help to remove blood, fluids, and debris from the operative field, which is vital for maintaining a clear view during the procedure [21].

Each of these tools plays a crucial role in the effectiveness of surgical procedures, aiding surgeons in their quest to accomplish precise and efficient interventions.

The Role of Nurses in the Surgical Team

In the context of surgery, nurses are indispensable members of the surgical team, operating primarily as either scrub nurses or circulating nurses. Each role carries specific responsibilities that ensure the procedural flow is maintained while prioritizing patient safety [22].

Scrub Nurses

The scrub nurse, or surgical nurse, works within the sterile field during the surgery. Their primary responsibilities include:

- **Sterilization and Setup:** Before any surgery begins, the scrub nurse is responsible for preparing the surgical instruments and ensuring that they are sterile. They set up the sterile field and maintain the integrity of this environment throughout the procedure.
- **Instrument Management:** During the surgery, scrub nurses are tasked with passing instruments to the surgeon and assisting with any changes needed quickly. This position requires a deep understanding of the instruments used and dexterity in handling them effectively [22].
- **Anticipation of Needs:** Experienced scrub nurses are adept at anticipating the surgeon's needs based on the progression of the surgery. Their ability to predict what instruments will be needed at various stages can enhance the efficiency and effectiveness of the surgical process.
- **Safety Practices:** The scrub nurse monitors the sterile field continuously, ensuring that no contaminants are

introduced and that all members of the surgical team adhere to aseptic techniques [23].

Circulating Nurses

Circulating nurses operate outside the sterile field and provide broader support to the surgical team and the patient. Their key responsibilities include:

- **Patient Safety and Advocacy:** The circulating nurse acts as a patient advocate, ensuring that all necessary preparations are completed before surgery, such as confirming patient identities, surgical sites, and allergies.
- **Communication and Coordination:** They facilitate communication between the surgical team and other healthcare personnel, coordinating the flow of information necessary for optimal patient care.
- **Monitoring Patient's Vital Signs:** Throughout surgery, circulating nurses are responsible for monitoring the patient's vital signs and overall condition. They are crucial in recognizing any changes and responding promptly.
- **Managing Resources:** The circulating nurse is in charge of ensuring that all necessary materials and equipment are readily available during the procedure, including blood products, medications, and surgical instruments, which underscores their role as a leader within the surgical team [24].

Collaboration and Team Dynamics

The surgical arena thrives on collaboration. Surgical teams comprise surgeons, anesthesiologists, surgical technicians, and various nursing professionals, all of whom must work cohesively. Effective communication is crucial in this setting, as even minor miscommunications can lead to adverse outcomes. Nurses, due to their dual roles as scrubs and circulators, are often the bridge that connects various members of the surgical team. Their insights, honed through experience, contribute to informed decision-making during critical moments [25].

Patient Monitoring and Safety Protocols:

In the realm of modern medicine, the emphasis on patient safety and optimal care is paramount. As healthcare systems increasingly embrace technology and innovation, minimally invasive techniques have emerged

as a cornerstone not only for treating various ailments but also for enhancing patient safety and monitoring protocols.

Minimally invasive procedures refer to surgical and diagnostic methods that limit the size of incisions needed and, consequently, reduce recovery time, minimize physiological stress, and lessen the risk of infection. Techniques such as laparoscopy, endoscopy, and robotic-assisted surgery exemplify minimally invasive methods, allowing healthcare providers to perform complex operations through small incisions using specialized instruments and camera systems. The advantages of these techniques are manifold and directly correlate with improvements in patient outcomes [26].

Patient Safety Benefits of Minimally Invasive Procedures

1. **Reduced Surgical Trauma:** By limiting the extent of surgery, minimally invasive procedures result in less manipulation of the tissues, which translates to reduced trauma and a lower likelihood of complications. This aspect is crucial in ensuring patient safety, as it minimizes the risk of excessive bleeding, infection, and postoperative pain.
2. **Shorter Recovery Times:** Patients undergoing minimally invasive surgeries often experience shorter hospital stays and faster recovery times compared to traditional open surgeries. Quicker recovery not only enhances patient comfort but also allows for more efficient allocation of healthcare resources and reduces the risk of hospital-acquired infections.
3. **Lower Risk of Complications:** Studies have shown that minimally invasive procedures tend to correlate with a lower incidence of postoperative complications. Factors such as reduced blood loss, minimized scarring, and a quicker return to normal activity contribute to this enhanced safety profile.
4. **Enhanced Patient Monitoring:** The technological advancements associated with minimally invasive techniques have improved monitoring capabilities. For instance, the use of intraoperative imaging and monitoring tools, such as ultrasound and fluoroscopy, enables real-time visualization of surgical fields and patient status, facilitating immediate corrective actions if complications arise [27].

Monitoring Protocols in Minimally Invasive Procedures

Effective monitoring is critical in ensuring patient safety, especially during and after minimally invasive procedures. Protocols surrounding monitoring typically include:

1. **Preoperative Assessment:** Comprehensive preoperative evaluations involving risk stratification are pivotal. Physicians assess the patient's medical history, laboratory results, and current medications to identify any potential risks associated with surgery [28].
2. **Intraoperative Monitoring:** Real-time monitoring during surgery is essential for immediate identification of any anomalies. Advanced technologies like functional MRI, transesophageal echocardiography, and capnography allow for continuous assessment of vital signs, organ function, and fluid balances, thereby ensuring that any complications can be promptly addressed [29].
3. **Postoperative Monitoring:** After the procedure, patients might be monitored in a recovery unit where vital signs, pain levels, and other indicators are continuously observed. Protocols for postoperative care ensure that any signs of complications—such as infection or bleeding—are swiftly managed. Furthermore, the implementation of standardized postoperative care pathways has shown to enhance patient safety by providing structured guidelines for assessing recovery.
4. **Use of Remote Monitoring Technologies:** The integration of telemedicine and remote monitoring devices has increased in popularity, particularly in the postoperative phase. Wearable technology can track vital signs, activity levels, and even pain levels, allowing healthcare providers to monitor recovery without necessitating frequent in-person visits. This innovation not only keeps patients safer but also reinforces their engagement in their own recovery process [30].

The Broader Implications for the Future of Medicine

As medical practice continues to evolve, the incorporation of minimally invasive techniques and robust monitoring protocols represents a shift toward a more patient-centered approach. The ongoing refinement

of these methods bears significant implications for future healthcare practices:

1. **Enhanced Patient Outcomes:** The overarching goal of minimizing invasiveness is to achieve better patient outcomes. Continued advancements in both surgical techniques and monitoring technologies promise to enhance surgical precision and postoperative care, ultimately leading to improved health outcomes and patient satisfaction [31].
2. **Cost-effectiveness:** By reducing the length of hospital stays and minimizing complications, minimally invasive procedures can significantly lower healthcare costs. A cost-effective healthcare system places a dual emphasis on improving patient outcomes while using resources judiciously, thus benefiting providers, payers, and patients alike.
3. **Training and Education:** With the evolution of minimally invasive technologies, there is a growing need for enhanced training and education for healthcare providers. Robust training programs that incorporate simulations, hands-on workshops, and mentorship are critical to ensure that clinicians maintain proficiency in these advanced techniques and associated monitoring protocols.
4. **Future Research and Development:** As technology continues to advance, ongoing research into new minimally invasive techniques and smarter monitoring systems is vital. Innovations such as artificial intelligence and machine learning have the potential to revolutionize patient monitoring by predicting complications before they manifest and providing tailored interventions [31].

Postoperative Care: Ensuring Optimal Recovery:

Postoperative care is a critical phase in the surgical process, significantly influencing recovery outcomes and overall patient satisfaction. As the shift from the operating room to recovery commences, the multidisciplinary healthcare team plays an essential role, with nursing professionals at the forefront of this transition. Nurses are uniquely positioned to provide comprehensive care that addresses the complex physical, emotional, and psychological needs of patients in the postoperative period [32].

Postoperative care refers to the care provided to patients following surgical procedures, focusing primarily on recovery in the immediate hours and days after surgery. The objectives of postoperative care include monitoring for complications, managing pain, facilitating healing, and promoting a safe transition back to preoperative functioning. Complications can arise at various points after surgery, including infection, bleeding, pulmonary issues, and thromboembolism, necessitating vigilant monitoring by the healthcare team. Effective postoperative care aims to minimize these risks through proactive interventions [33].

Nurses play a pivotal role in achieving optimal recovery outcomes. They are often the first to assess patients upon arriving in the recovery room and must be equipped to respond rapidly to any emerging concerns. This initial assessment includes monitoring vital signs, observing for signs of bleeding, administering medication, and ensuring that vital functions are stable as patients regain consciousness from anesthesia [34].

A critical aspect of postoperative nursing care is the thorough assessment of the patient's condition. Nurses systematically evaluate vital signs—monitoring for trends in blood pressure, heart rate, temperature, and respiratory rate—to identify any abnormalities that may signal complications. For instance, tachycardia may indicate pain or bleeding, while hypotension could suggest significant fluid loss. Continuous monitoring allows nurses to detect potential issues before they escalate, facilitating timely interventions [35].

Additionally, nurses assess the surgical site for signs of infection, hematoma, or dehiscence. The management of drainage devices, such as Jackson-Pratt drains or surgical dressings, falls under the purview of the nurse as well. By ensuring proper wound care protocols are followed, nurses contribute to reducing the risk of postoperative infections—a common and potentially serious complication [36].

Pain management is another critical component of postoperative care, wherein nurses must assess, manage, and document pain levels accurately. Effective pain control is essential not just for patient comfort, but also for promoting healing and mobilization. Unmanaged pain can hinder recovery, leading to delayed discharge times and increased risk of postoperative complications

such as deep vein thrombosis (DVT) and pneumonia, stemming from immobility [37].

Nurses employ various strategies for pain management, including the administration of analgesics, patient education regarding pain expectations, and the utilization of non-pharmacologic interventions, such as guided imagery, relaxation techniques, and gentle mobilization. Collaboration with anesthesiologists and pain management specialists is essential for developing a comprehensive pain management plan tailored to the individual needs of each patient [38].

Another vital responsibility of nurses in postoperative care is facilitating early mobilization. Evidence suggests that early movement helps enhance circulation, improves lung function, and reduces the risk of complications. Nurses play a crucial role in encouraging patients to participate in physical activity as soon as physically feasible, starting with simple activities such as ankle pumps and gradually progressing to standing and walking [38].

Nurses instruct patients on the importance of deep breathing exercises and incentive spirometry to prevent respiratory complications, particularly in abdominal and thoracic surgeries. These interventions serve to maintain lung health, enhance oxygenation, and decrease the likelihood of pneumonia. In a holistic approach, nurses also consider the psychosocial aspects of recovery, addressing any anxiety or fears patients may have regarding mobility [38].

Patient education is an essential component of nursing care during the postoperative period. Nurses provide detailed instructions on how to care for surgical wounds, recognize signs of complications, manage medications, and adhere to follow-up appointments. Education regarding lifestyle modifications, physical activity limitations, and dietary adjustments is fundamental to supporting optimal recovery post-discharge [39].

Effective discharge planning initiated by nurses sets the foundation for ongoing recovery. It involves assessing the patient's home environment, identifying any potential barriers to recovery, and coordinating with multidisciplinary partners, including physical therapists, social workers, and nutritionists. This comprehensive approach ensures a continuum of care, fostering

confidence and preparedness in patients as they transition from the hospital back to their homes.

Beyond the physical aspects of recovery, the emotional and psychological dimensions of postoperative care are significant and often overlooked. Surgery can elicit a range of emotions, from anxiety and fear to relief and gratitude. Nurses are uniquely positioned to provide empathetic support, addressing patients' concerns and helping navigate the emotional landscape that accompanies surgical recovery [39].

Nurses can employ therapeutic communication techniques, creating a safe space for patients to express their feelings and concerns. By fostering a trusting nurse-patient relationship, nurses can enhance patients' emotional well-being and, by extension, their overall recovery experience [40].

Patient Education: Empowering Through Knowledge:

In recent years, the landscape of surgical interventions has undergone a significant transformation, primarily due to advancements in technology and a growing emphasis on patient-centered care. Among these advancements are minimally invasive surgical procedures, which have become increasingly popular for their numerous benefits, including reduced recovery time, less postoperative pain, and decreased risk of infection. However, despite these advantages, many patients remain unsure about these procedures and their potential implications. This highlights the crucial role of patient education in empowering individuals, enabling them to make informed decisions about their healthcare options [41].

Minimally invasive surgery (MIS) involves surgical techniques that limit the size of incisions needed, thereby minimizing damage to surrounding tissues and facilitating quicker recovery. These procedures are typically performed using advanced technologies, including robotic systems, endoscopes, and laparoscopic tools, which allow for greater precision and control. The intent behind these innovations is to promote a more comfortable postoperative experience and improve surgical outcomes.

The effectiveness and safety of minimally invasive techniques have made them increasingly relevant in

various medical specialties, including gynecology, oncology, orthopedics, and cardiology. Common examples of minimally invasive procedures include laparoscopic cholecystectomy (gallbladder removal), laparoscopic hernia repair, endoscopic sinus surgery, and robotic-assisted prostatectomy. Each of these surgeries highlights the benefits associated with reduced recovery time, lower morbidity, and minimized scarring, illustrating why they are becoming the standard of care in many situations [42].

Patient education is fundamental in the context of minimally invasive surgery, as it enables patients to understand the nature of their conditions, the procedures being proposed, and the associated risks and benefits. Enhanced understanding leads to informed decision-making, which is essential for patient autonomy. When patients grasp the nuances of their surgical options, they are more likely to actively participate in their healthcare choices and adhere to postoperative care protocols [42].

Educational initiatives can take various forms, including one-on-one consultations with surgeons, informational brochures, videos demonstrating procedures, and interactive online resources. Physicians should strive to utilize multiple platforms to accommodate varying learning styles and preferences among patients. For instance, some individuals may benefit from visual aids, while others might prefer detailed discussions [43].

Patients often experience anxiety surrounding surgery, driven by fears of pain, complications, or postoperative recovery. By providing clear and comprehensive information about minimally invasive procedures, healthcare providers can help to alleviate these fears. Education can serve as a powerful tool to address misconceptions and remind patients of the relative safety and efficiency of these surgical techniques. Literature indicates that when patients are informed about what's to come, they report higher satisfaction levels and improved mental preparedness [44].

Moreover, knowledge of the anticipated recovery trajectory can also ease concerns. By understanding that minimally invasive procedures typically involve shorter hospital stays and quicker returns to daily activities, patients may feel more optimistic about their recovery plans. This, in turn, cultivates a conducive environment for healing, as patients who are engaged and informed

often experience reduced stress and enhanced psychological well-being [45].

The physical advantages of minimally invasive procedures heavily influence why many patients opt for them over traditional open surgery. In addition to reduced scarring and pain, these procedures usually entail shorter hospital stays. Many patients can return to their normal activities within days rather than weeks, which is often the case following more invasive surgeries. Additionally, the risk of complications, such as infections and significant blood loss, is statistically lower for minimally invasive approaches. This not only improves the patient's quality of life post-surgery but also contributes to overall healthcare cost-effectiveness [46].

The implications of 'empowerment through knowledge' extend beyond the physical realm. Decisions rooted in education can significantly impact a patient's mental and emotional well-being. Being equipped with knowledge allows patients to manage their expectations, thus reducing preoperative anxiety and fostering a sense of control. Psychological resilience is critical, as patients approach surgeries with confidence, knowing that they are involved in their care plans [47].

While patient education holds immense potential, several challenges can hinder its effectiveness. One major barrier is health literacy; not all patients possess the same level of understanding regarding medical terminology or concepts. Healthcare providers must therefore be diligent in tailoring their explanations, ensuring that patients comprehend the information presented. Furthermore, time constraints within medical practice can limit the opportunity for detailed educational discussions, making it imperative for practitioners to prioritize patient education within their practice [48].

Moreover, access to educational resources may vary by demographic factors, including socioeconomic status and geographic location. Telemedicine, online resources, and community-based educational programs can help bridge these gaps, allowing more patients to access crucial information about minimally invasive surgical options [49].

Future Trends in Surgical Nursing Practices:

Minimally invasive surgical (MIS) techniques have revolutionized the landscape of surgery over the last few decades, shifting the paradigm from traditional open surgeries to approaches that offer operative benefits with significantly reduced recovery times and complications. This evolution is not limited to the surgical techniques themselves but extends to the nurses and healthcare professionals who support these procedures. As MIS continues to develop, the role of surgical nursing is also evolving. The future of minimally invasive surgical nursing practices will be influenced by advancements in technology, a focus on holistic patient care, an emphasis on interdisciplinary collaboration, and the need for ongoing education and training [50].

One of the most significant influences on the future of minimally invasive surgical nursing practices will undoubtedly be the rapid advancement of technology. As surgical techniques progress, so too do the tools and equipment that surround them. Robotics, imaging technologies, and augmented reality are at the forefront of this transformation. For instance, robotic-assisted surgeries are gaining momentum not only in high-complexity surgeries such as cardiac and neurological operations but also in routine procedures, which increase nurses' reliance on these technologies [50].

In nursing roles, this means an increased need for proficiency in operating and understanding new surgical equipment. Nurses will be required to become adept at handling robotic systems, ensuring that equipment is functioning properly, and troubleshooting any issues during a procedure. Additionally, with imaging technologies such as 3D printing and virtual reality simulations becoming commonplace, nurses will need to engage in training that equips them with the ability to interpret these advanced modalities effectively [51].

The integration of telemedicine also plays a vital role in surgical nursing. Pre-operative assessments, post-operative follow-ups, and patient education can leverage telehealth platforms to enhance efficiency and improve patient satisfaction. Surgical nurses will play an integral part in managing these virtual interactions, familiarizing themselves with digital health records, and ensuring that patient privacy is maintained in virtual environments [51].

Future trends in minimally invasive surgical nursing will increasingly emphasize holistic patient care. Traditionally, the focus has been primarily on clinical procedures and outcomes; however, the evolving healthcare landscape recognizes the importance of treating the whole person. The holistic approach considers not only the physical but also the psychological, emotional, and social needs of patients throughout their surgical journey [52].

Nurses will need to acquire skills to engage in effective communication, compassionate care, and patient advocacy. This will include offering psychological support and utilizing motivational interviewing techniques to address patients' fears and concerns about their surgeries. By taking a holistic approach, surgical nurses can help patients understand their procedures better, actively participate in their recovery, and ultimately promote better health outcomes [53].

Moreover, as patient-centered care becomes more prominent, nurses will need to work closely with patients to develop customized care plans that account for their unique needs, preferences, and lifestyles. The collaboration may extend to the inclusion of complementary therapies—such as acupuncture, guided imagery, or relaxation techniques—to alleviate anesthesia-related anxiety and promote faster recovery. This comprehensive model of care aligns the nursing profession increasingly with principles of geriatric and palliative nursing, reflecting the need for holistic healing across all patient demographics [54].

As healthcare becomes more multifaceted, the importance of interdisciplinary collaboration cannot be overstated. The future of minimally invasive surgical nursing practices relies on effective teamwork among various healthcare professionals, including surgeons, anesthesiologists, surgical technologists, and rehabilitation specialists [54].

Surgical teams will adopt a more collaborative approach in both pre-operative and post-operative settings, thereby improving communication and coordination across disciplines. Nurses will become essential in facilitating teamwork, bridging communication gaps, and acting as patient advocates. They will play a critical role in pre-operative education, ensuring patients have all the information needed to make informed decisions about

their care, and in post-operative recovery, where they will monitor vital signs, manage pain, and assess for complications—all while ensuring collaborative care plans are effectively implemented [55].

Interdisciplinary education will also gain prominence, with training programs designed to foster collaboration among nursing students and future medical professionals. By understanding the roles and responsibilities of their colleagues, surgical nurses can enhance their effectiveness in the surgical team dynamics, ultimately improving the quality of care delivered to patients [55].

With the rapid pace of innovation and change in minimally invasive surgical practices, ongoing education and training are crucial. The complexity of new surgical techniques and technologies demands that surgical nurses continuously engage in professional development. This focus on lifelong learning will include both formal education and informal training, empowering nurses to remain current in their knowledge and best practices [56].

Nursing certification in specific fields, such as robotics or utilization of certain imaging technologies, will become increasingly common as healthcare organizations look to improve competencies. Professional organizations are also likely to expand their offerings of continuing education opportunities, including workshops, simulation training, and online courses [57].

Additionally, mentorship programs where experienced surgical nurses can share their expertise and insights with less experienced nurses will help foster a culture of knowledge transfer within surgical settings. Such initiatives are essential, not only for maintaining high standards of practice but also for attracting and retaining nursing personnel in an increasingly competitive job market [58].

Conclusion:

In conclusion, surgical nurses play a crucial role in the success of minimally invasive procedures, significantly impacting patient outcomes and overall surgical efficiency. Their comprehensive involvement spans preoperative preparation, intraoperative support, and postoperative care, ensuring that each phase of the

surgical process is executed flawlessly. By providing essential assistance to surgeons, closely monitoring patient vitals, and facilitating effective communication, surgical nurses enhance the safety and effectiveness of these advanced techniques.

Additionally, their dedication to patient education fosters a supportive environment that empowers patients to engage actively in their care, ultimately leading to improved recovery experiences and satisfaction. As the field of minimally invasive surgery continues to evolve, the expertise and adaptability of surgical nurses will remain vital in embracing new technologies and techniques, further enhancing their contributions to patient care. Their role not only exemplifies the importance of teamwork in healthcare but also highlights the indispensable nature of nursing in delivering high-quality surgical interventions in today's medical landscape.

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