Chapter 2

Perioperative care

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CHAPTER CONTENTS

Introduction 17
Perioperative period 18
Elective or emergency surgery 18
The principles of intraoperative care 21
Immediate postoperative care 27
Conclusion 31

Key objectives of the chapter

The aim of this chapter is to provide a broad introduction to the holistic care given by nurses within the perioperative environment during the patient’s immediate preoperative, intraoperative and postoperative phases of their surgical experience.

This chapter will:

■ give a definition of the perioperative period
■ describe the various roles of the nurses and other healthcare workers within the perioperative environment
■ explore in depth the needs of patients during these phases of their surgical experience, and how care for the individual physical and psychological needs can be adapted
■ illustrate how technology and innovation has changed perioperative patient care.

INTRODUCTION

Historically, for patients, student nurses and other hospital staff, the perioperative or theatre area has been seen as one of high drama and action, as portrayed regularly by the media, many having preconceived ideas about the roles and contribution made by those within the environment. Yet for many individuals, it is a time when they are most vulnerable or scared. For
patients, they are asleep, unsure if they will wake up and what will happen to them; for student nurses, it is a strange experience, which to begin with they feel unable to relate to other environments; and for other hospital staff, they feel as if they are entering an environment where everything is different and goes on behind closed doors. Ensuring that the highest standard of patient care is delivered to each, individual patient throughout their journey within the perioperative environment is fundamental to the perioperative nurse’s role. Patient interaction and communication is essential, although covert if the patient is asleep, as perioperative nurses assess, prepare, plan and implement care. This chapter will demonstrate that perioperative nursing care is patient orientated and that nurses must have a thorough knowledge and understanding of the environment. This will enable them to deliver patient care safely, effectively and without harm to that patient.

**PERIOPERATIVE PERIOD**

‘Perioperative’ refers to the total surgical experience and includes pre-, intra- and postoperative phases of the patient’s surgical journey (Phillips, 2004). For the purpose of this chapter the perioperative period is from the minute the patient arrives in through the operating theatre doors to the moment they leave through those same doors post-procedure.

**PREOPERATIVE VISITING**

Preoperative visiting is not a new concept and has been around since the 1980s. Researchers have shown that visiting patients in the preoperative period can reduce anxiety, aid recovery and allow the patient the opportunity to express concerns and fears about the impending procedure (Boore, 1978; Copp, 1988; Hayward, 1975). The preoperative visit allows perioperative nurses to learn about their patients, establish a rapport, and develop a plan of care before the patient arrives in the department. In some hospitals preoperative visiting is advocated, particularly for those patients admitted the day before. However, preoperative visiting has met with resistance from staff due to limited staffing, timings of the visits and availability of the patient themselves (Phillips, 2004; Taylor and Campbell, 1998; Torrance and Serginson, 1997).

In modern surgery, the period of hospitalization both before and after surgery is decreasing rapidly and most patients are admitted less than 24 hours before surgery, many on the actual day. Although visits to the patient would broaden the scope of the perioperative nurse’s role and contribute to the continuity of care, the patient may have their anxiety heightened by the continual visits from different multidisciplinary teams immediately prior to surgery and in a relatively short period of time. Pre-admission/assessment clinics are now an essential part of the patient’s surgical pathway in preparing the patient for surgery, and are discussed more fully in Chapter 1 (Phillips, 2004; Taylor and Campbell, 1998; Torrance and Serginson, 1997).

Communication between such clinics and perioperative staff is therefore essential to ensure that patient’s specific needs are identified at this early stage, and preparation by perioperative staff ensures that the patient’s needs are met.

**ELECTIVE OR EMERGENCY SURGERY**

Surgical procedures can be broadly categorized as either elective (that which is planned) or emergency (that which is unplanned). Elective surgery aims to be performed when the patient is in optimal health but before the surgery affects the quality and threatens their life: e.g. an inguinal hernia can become life threatening if the bowel becomes obstructed within the sac. Clinicians decide if a planned procedure is ‘urgent’ or can be arranged at a time convenient for the surgeon and patient (Phillips, 2004; Smith, 2000).

Emergency surgery may be as a result of trauma or an accident, gastrointestinal obstruction, or from perforated viscera. The injury may be immediately life threatening, and therefore the procedure will be carried out within 1–2 hours from admission. Other emergencies may require procedures within 24–48 hours following the injury, but in both instances it may not be possible to preoperatively screen these patients. Information may be limited, and therefore it is essential that the perioperative team communicate with each other to coordinate the delivery of safe patient care during this potentially traumatic period in the patient’s journey (Smith, 2000).

For this chapter the emphasis will be on the care of the patient for elective surgery, as many of the principles discussed apply to any patient undergoing a surgical procedure.

**PATIENT PREPARATION**

Preparing the perioperative environment starts before the patient arrives. Turner et al (2000) identified that the perioperative environment is potentially one of the most hazardous of all clinical environments. The only information that may be available for the staff is retrieved from the operating theatre list, which is written daily and produced ideally 48 hours before the...
scheduled surgery (National Health Service Modernisation Agency, 2002). At a minimum, this should detail the patient’s name, age, gender and procedure. This will enable the perioperative nurse to prepare their own area to ensure a safe working environment. For example, knowing the patient’s age allows the anaesthetist and recovery nurses to prepare the correct equipment for the management of that patient’s airway; the procedure will identify how this patient will be positioned and potentially how long they may be in that position for. However, liaison with the preassessment clinic may also have highlighted specific needs for that patient, such as latex allergy (requiring special preparation of the theatre environment), immobility problems, hearing impairment or medical history requiring additional interventions from the clinicians.

MEETING AND GREETING THE PATIENT

The patient is escorted to the operating theatre either with a porter or ward nurse, or both. Ward staff must check the patient’s identity, operating consent form, patient notes, and that all documentation is completed before the patient is transferred to theatres (NATN, AODP, RCN et al, 1998; Taylor and Campbell, 2000a). The patient may be transported by wheelchair or on their bed, or in some hospitals, particularly within a day surgery unit, they are given the choice of walking (Phillips, 2004). Depending on the facilities within each unit, the patient is either admitted to the holding area (this may be part of recovery) or waits in reception. The patient at this time may have their stress and anxiety heightened due to the unknown environment and unfamiliar staff. It is therefore essential that the perioperative nurse communicates effectively with patients, to ensure that they understand the actions being performed, and that they are able to question and challenge these at any time (Reid, 2003). An accurate assessment at this time by the perioperative nurse will form the basis for delivering high standards of patient care tailored to meet their needs (O’Reilly, 2001). An adult or parent may accompany a child to the operating department and therefore the perioperative care extends to the whole family. Parents themselves may be anxious as they relinquish care of their child to strangers and consideration of their needs as well as the child’s needs to be defined (NATN, 1996).

Adolescents, too, may have concerns about their surgery but be too embarrassed or scared to articulate those fears and, depending on their age and hospital policy, may be nursed in an adult or paediatric ward (Smith, 2000).

An elderly patient may be confused and require additional explanations and reassurance. The nurse with experience may assess the patient’s skin condition, mobility and general appearance as an indication of the patient’s health and well-being (Smith, 2000).

The patient should be greeted by name and then the nurse should introduce themselves to the patient. A preoperative checklist should be completed in accordance with hospital policy (Table 2.1). This documentation ensures that the correct operation is carried out on the correct patient, who has been prepared to enable the safe administration of anaesthesia and continuation of the surgical procedure. At all times the patient must be treated with privacy, dignity and respect. Perioperative nurses also need to provide equitable and appropriate care with respect to cultural, religious, ethnic and racial beliefs (NATN, 1999a).

THE PRINCIPLES OF CARE DURING ANAESTHESIA

The anaesthetic nurse will, based on the information known or relayed by the anaesthetist, prepare the anaesthetic room, anaesthetic machines and all other equipment to ensure the maintenance of a safe environment for the delivery of care during anaesthesia. This will include not only preparing the anaesthetic equipment but also applying knowledge and skills of anaesthesia related to age, medical history and surgical procedure to ensure that the patient’s individual needs are met: e.g. if the patient is elderly, then additional precautions are needed when caring for their skin; if the patient has language difficulties, an interpreter may be required.

An anaesthetic nurse must hold an appropriate, recognized qualification as identified by the Royal College of Anaesthetists in 1998. The nurse must also continue to demonstrate continuing knowledge, skills and understanding in the field of anaesthesia (NMC, 2002).

King (1998: p 95) listed those skills required by the anaesthetic nurse and essential to patient care in the anaesthetic room as:

- communication
- comfort and dignity
- reassurance and explanation
- consideration of patient’s special needs.

Patients may be frightened or anxious, which can inhibit communication at this point. Barriers, such as the wearing of a mask when greeting the patient, undue background noise such as talking and telephones and lack of explanations when performing tasks, must be removed. It is therefore essential to support and reassure the patient, offer appropriate explanations and provide care based on their needs at the time (Taylor and Campbell, 2000b). Communication is not
always verbal and the use of touch, holding the patient’s hand and just being a physical presence can offer additional support for the patient (Hughes, 2002). Continuing with cleaning and decontamination of equipment, and preparation of specialist equipment, may be unavoidable while the patient is in the anaesthetic room, but the anaesthetic nurse must be aware that some patients may be afraid of needles, and find such activities distressing, so the nurse should aim to prepare the room before the patient arrives (King, 1998). The anaesthetic nurse may also need to remove dentures, glasses, prostheses or wigs in preparation for surgery. Reassurance, Table 2.1 The preoperative checklist

<table>
<thead>
<tr>
<th>To check</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name/date of birth of patient</td>
<td>To ensure that this is the correct patient with the correct notes. The date of birth acts as an additional check, as patients with the same name may be on the same ward</td>
</tr>
<tr>
<td>Consent</td>
<td>Written consent is preferred as it provides documentary evidence (NATN, 1999b; Reid, 2003). The consent form should clearly state without abbreviations the operative procedure and should be signed by the patient (exceptions apply such as minors, life-threatening situation, legally or mentally incompetent (Hind, 2000)) and a qualified practitioner competent to carry out the procedure. For consent to be valid the patient must be informed of the procedure, its expected outcomes, benefits, potential risks and alternatives (NATN et al, 1998; Hind, 2000). The perioperative nurse must check the patient’s understanding of the procedure to safeguard their autonomy (Reid, 2003)</td>
</tr>
<tr>
<td>Procedure site is marked</td>
<td>Side or site is clearly marked with an indelible marker to avoid confusion. This should then be confirmed with the patient’s notes, X-rays and the operating list. It is the responsibility of the person performing the procedure to ensure that the correct side/site is marked (NATN et al, 1998)</td>
</tr>
<tr>
<td>Last ate or drank</td>
<td>Patients must fast preoperatively to minimize the risk of inhaling gastric contents while under anaesthetic, which could prove fatal (Jester, 1999; Dean and Fawcett, 2002). Dean and Fawcett (2002) recommend that fasting times for fluids should not normally be less than 2 hours or more than 4 hours, and that for solids fasting should be not less than 4 hours or more than 6 hours. Rowe (2000) also identified that prolonged fasting preoperatively can result in dehydration, hypoglycaemia and confusion. Reducing fasting times may improve wound healing, comfort and postoperative outcomes</td>
</tr>
<tr>
<td>Allergies</td>
<td>Identify allergies to minimize risk for patient during surgery. These should include elastoplast, specific drugs (antibiotics, suxamethonium, or any that contain eggs or nuts), fluids such as iodine, latex, and also note patients’ adverse reactions to anaesthetic or blood transfusions (King, 1998; Phillips, 2004)</td>
</tr>
<tr>
<td>State of teeth</td>
<td>Caps, crowns, dentures or loose teeth can become dislodged or damaged during intubation and may compromise the airway (King, 1998). Dentures, if tight fitting, and if the patient does not normally remove them routinely, may be left in place throughout the procedure at the anaesthetist’s discretion</td>
</tr>
<tr>
<td>Jewellery</td>
<td>Some items of jewellery are worn for religious or cultural reasons and may cause offence if removed, so perioperative nurses must respect patient needs. Some body piercings may interfere with the surgery or compromise the airway and may be removed if required. Secure all rings and other jewellery to ensure that they are not lost during positioning or moving of the patient (NATN, 1998)</td>
</tr>
<tr>
<td>Wearing of any prosthesis</td>
<td>Hearing aids are essential for the patient to communicate with theatre staff, so can be left in until the patient reaches the anaesthetic room and is about to be anaesthetized. The hearing aid should then be removed and given to recovery staff so that they can insert it once the patient regains consciousness. Glasses can also be worn to theatres for the same reason. Contact lenses should not be worn, because during the procedure there is a risk that they can become dry and may scratch the cornea. Other prostheses such as wigs, false eyes and artificial limbs should be removed prior to surgery and retained on the ward for safe-keeping. However, patients may express anxiety and every effort should be made to preserve a patient’s dignity and respect during the perioperative period (King, 1998)</td>
</tr>
<tr>
<td>Medical and nursing records</td>
<td>All medical and nursing records should accompany the patient to the operating theatre so that an accurate assessment of the patient’s history can be made for the delivery of safe perioperative care. Documentation should include results from investigations completed at preoperative assessment, blood tests, X-rays and baseline observations (NATN, 1999b)</td>
</tr>
</tbody>
</table>
comfort and sensitivity about the patient’s potential loss of dignity are essential in reducing the patient’s anxiety further (Hughes, 2002).

‘Anaesthesia’ is a Greek word meaning ‘no feeling’ and ‘analgesia’ means ‘without pain’ (Simpson and Popat, 2002). The anaesthetist must ensure that both anaesthesia and analgesia are achieved and maintained for the duration of the procedure (Simpson and Popat, 2002; Wheeler, 2002). When making a decision about the type of anaesthesia to be administered – i.e. general, regional or local – the anaesthetist will be influenced by the type and technique of the planned surgery, the patient’s risk factors, their personal skills and patient’s preference. Most anaesthetists assess their patients pre-operatively to decide on the type of anaesthetic and any additional requirements required for each individual.

A general anaesthetic can be divided into three components, called the triad of anaesthesia. These three elements are hypnosis (sleep), analgesia and relaxation (usually of the muscles). Different surgical procedures require differing degrees of each. Surgical stimulation and pain can cause a series of physiological responses such as tachycardia, hypertension, sweating and vomiting. Analgesics reduce the body’s response to such stimulation (Hughes, 2002). Anaesthetic techniques and drug therapy have evolved, which allow the anaesthetist to adjust the proportions of each part of the triad of anaesthesia to suit individual requirements. For procedures requiring little or no muscle relaxation, the anaesthetist may induce anaesthesia using an intravenous agent (although a gas induction can be used with patients with a needle phobia), and maintain anaesthesia with a volatile agent, allowing the patient to breathe the gases spontaneously via a mask or a laryngeal mask airway attached to the appropriate breathing system. Where muscle relaxation is required after anaesthesia is induced, a muscle relaxant is given and the patient’s airway maintained via an endotracheal tube or a laryngeal mask airway, and the patient is connected to a ventilator. The third part of the triad of anaesthesia is analgesia. This is achieved using differing categories of drugs, which block the stimulation of pain at the nerve impulses (Griffiths, 2000). Opioid analgesics such as fentanyl are used intraoperatively because of its short duration of action and thus it can be titrated to the patient’s needs. Side-effects include respiratory depression, nausea and vomiting and sedation (Simpson and Popat, 2002).

Regional and local anaesthesia provide the patient with excellent analgesia and negate the need for rendering the patient unconscious. Such techniques include peripheral nerve blocks (injection of a local anaesthetic agent into a plexus of nerves); central nerve blocks (injection of local anaesthetic into the subarachnoid space or epidural space for surgery on lower abdomen, lower limbs and postoperative analgesia); and infiltration anaesthesia (injection of local anaesthetic around the surgical incision site or prior to cannulation) (Avidan et al, 2003; Simpson and Popat, 2002; Wheeler, 2002). Table 2.2 gives information on agents used for anaesthesia.

During regional anaesthesia the patient is awake or sedated, therefore requiring additional reassurance and support from all perioperative staff. Diligence by clinical staff is essential in maintaining confidentiality of other patients and ensuring that minimal noise and interference occurs during the procedure, which may distract the patient and so cause them to move. Conversely, if the procedure is long, it may be difficult for the patient to stay still on an uncomfortable table/bed and therefore sedation may be administered or a combination of general and regional anaesthesia may also be a considered option (Avidan et al, 2003).

The Association of Anaesthetists recommends minimum standards of monitoring during anaesthesia and recovery. During induction of anaesthesia, this will include pulse oximeter, non-invasive blood pressure monitoring, electrocardiogram and capnography (measurement of CO₂ in expired air at end of respiration) (Wheeler, 2002). For those patients undergoing complex procedures, or are high risk due to co-morbidities, monitoring of urine output, body temperature and invasive monitoring such as central venous pressure and arterial pressure are essential.

During the induction of anaesthesia it is important that all personnel are calm and that noise, disruption and disturbance are minimal, as hearing is the last sense to go when the patient loses consciousness. Such ambience will aid the patient’s state of mind at this time (Griffiths, 2000).

During the maintenance of anaesthesia the anaesthetic nurse will observe and monitor the patient’s well-being. Eye pads may be applied over the eyes to prevent corneal abrasions and to maintain closure of the eyelids to prevent drying of the corneas due to a reduced eye reflex.

The nurse will also assist the operating team to position the patient safely, to minimize potential anaesthetic complications during transfer and the procedure itself (King, 1998).

The Principles of Intraoperative Care

Patient and staff safety is paramount throughout the perioperative environment and a proactive clinical risk management strategy involves assessing, identifying, controlling, monitoring, reducing and evaluating...
risks to improve the quality of care delivered (Wilson, 2000). Within the intraoperative phase, the patient is vulnerable and totally reliant on perioperative nurses and other members of the team to ensure that they come to no harm. Some of these risks have already been addressed with patient identification, informed consent and patient monitoring in the anaesthetic room. Intraoperatively, such clinical risks are associated with patient positioning, the risk of infection, risk of deep vein thrombosis, risk of hypothermia and the risk to both staff and patients from the use of equipment. This list is not exhaustive but identifies those potential risks to each patient undergoing surgery. For each risk, strategies are discussed to minimize the risk to patients and staff.

**SURGICAL ACCESS AND POSITIONING**

Positioning the patient correctly to enable easy surgical access requires coordination and cooperation from...
Manual handling regulations recommend that the team involved undertake a risk assessment for the moving and positioning of each individual patient, and that relevant aids and methods are used to reduce patient movement and potential injury to both staff and patients (Turner et al, 2000). An assessment will include the physical condition of the patient, nature of the intervention and individual patient needs (NATN, 1998). When positioning patients, consideration should be given to avoiding nerve and joint injury, avoiding mechanical trauma such as shearing, friction burns and damage to soft tissue, and ensuring that at all times the anaesthetized patient is physically well supported.

Nerve injuries are an outcome of poor positioning, with direct pressure resulting in ischaemia to that area: e.g. radial nerve injury can occur if the arm is left hanging over the edge of the operating table; ulna nerve injury due to compression by an inappropriately placed arm support; and fibular nerve injury due to compression when using the lithotomy poles. Perioperative nurses must therefore ensure that mechanical aids and supports are padded and used appropriately (Stoker, 2002).

<table>
<thead>
<tr>
<th>Surgical position</th>
<th>Description and potential risks</th>
<th>Procedures performed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supine</strong></td>
<td>Patient lies on their back, with their arms folded and secured across their chest, or on an arm board at less than 90° degrees to the body to prevent brachial plexus injury, or at their side. A lumbar support should be used to prevent postoperative backache. Pressure-relieving devices for the ankles should not hyperextend the knee as this may result in injury.</td>
<td>Administration of general anaesthesia. Patient transfer to and from the operating table. Abdominal, breast and lower limb surgery</td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td>Patient is turned on to their side and the head, rear of chest and pelvis is supported with padded table attachments. Arms are secured to allow venous access. A pillow should be placed between the knees to prevent pressure on bony contact.</td>
<td>Hip surgery. Some kidney procedures. Thoracic surgery</td>
</tr>
<tr>
<td><strong>Prone</strong></td>
<td>Patient lies on their stomach with their head supported on a ring or turned to one side, and their arms positioned to prevent extension and abduction at the shoulder, either above their head or by their side. The chest must be supported to allow movement of the abdomen for respiration.</td>
<td>Spinal surgery. Neurosurgery</td>
</tr>
<tr>
<td><strong>Trendelenburg</strong></td>
<td>Patient is in a supine position with a head-down tilt. Abdominal organs fall towards diaphragm due to gravity, allowing greater surgical access. Legs may be bent at the knee to add stability.</td>
<td>Lower abdominal surgery, e.g. abdominal hysterectomy. Lower limb surgery, e.g. varicose veins</td>
</tr>
<tr>
<td><strong>Lithotomy</strong></td>
<td>Patient lies supine with their legs raised in supporting poles. These may support the calf to ankle or just the ankles are secured. The patient’s arms are secured across their chest while the end of the table is removed. The legs are elevated, lowered and positioned simultaneously to prevent lower back injury, sacroiliac ligament damage and pelvic asymmetry. Nerve damage may occur from pressure applied directly from lithotomy poles, which are inadequately padded, to the medial or lateral side of the leg. A lumbar support will prevent postoperative backache.</td>
<td>Gynaecological procedures. Urological surgery. Rectal surgery. Obstetric procedures</td>
</tr>
</tbody>
</table>

*Source: from Taylor and Campbell (2000a) and Stoker (2002).*

Table 2.3 Common surgical positions
Shearing forces can occur when moving the patient on the operating table, resulting in tissue damage, which may go undetected. The use of gel mattresses or similar pressure-relieving adjuncts can redistribute the pressure across a wider area (O’Reilly, 2001).

Common sites for skin pressure injury during surgery are the elbows, heels, buttocks and sacrum (Stoker, 2002). A study in the Netherlands identified that pressure ulcer development during surgery is a potentially serious problem and preventative measures should be in place to reduce the risk and incidence. The findings revealed that ulcers developed on the heels and sacrum (Schoonhoven et al, 2002). The risk to the patient increases as the surgery time increases but all patients undergoing surgery are at risk of intraoperative ulceration and Hartley (2003) supports the argument that pressure-reducing overlays for operating tables must be used for all patients.

### Prevention of Deep Vein Thrombosis

Deep vein thrombosis (DVT) is a serious postoperative complication and one where the actions of perioperative nurses can influence the outcome for the patient. DVT occurs as a result of venous haemostasis, tissue or vessel wall trauma and increased coagulant activity. DVT prophylaxis includes the use of graduated compression stockings, low molecular weight heparin and intermittent pneumatic compression (IPC) devices. However, each patient should be assessed to ensure that the appropriate prophylaxis is administered. Intermittent pneumatic compression has been shown to benefit patients undergoing surgery and to be as effective as low molecular heparin but may be limited due to a lack of resources on the ward (Arnold, 2002a; Quantrill, 2001). Risk assessments on each individual patient allow clinicians and perioperative nurses to make an informed decision about the regime for thromboembolic prophylaxis (Arnold, 2002a).

### Prevention of Inadvertent Hypothermia

Inadvertent hypothermia – i.e. unintended loss in body temperature – is a potential problem for all patients undergoing a surgical procedure. The main contributory factors are:

- the ambient temperature – kept cool to suit the staff comfort
- use of fluids at room temperature – intravenously or on the skin
- unnecessary exposure of the patient before the surgical team is ready
- the patient’s age (very young or very old)
- type and length of procedure
- patient’s mobility
- effects of anaesthetic agents.

The detrimental effects of hypothermia include increased rates of wound infection, increased blood loss and increased length of stay in recovery and hospital (Harper et al, 2003; Turner et al, 2000). Perioperative nurses can adopt a variety of measures to control and maintain the patient’s temperature throughout a surgical procedure and these include the control of the environmental temperature (21–24°C), use of forced air warming blankets, warming intravenous fluids, irrigation and skin preparation fluids and the monitoring of a patient’s core temperature. Scott et al (2001) also found that warming therapy reduced the incidence of pressure ulcers intraoperatively.

### Infection Control in the Perioperative Environment

The prevention of infection necessitates the understanding of policies and protocols, and the knowledge and skills to adapt them to the perioperative environment. A surgical intervention requires a break in skin integrity and the insertion of instruments and other foreign material into the body tissues, therefore exposing the patient to the potential to acquire an infection. Infection prevention comprises various components, all of which are aimed at reducing the risk of infection to the patient (Table 2.4).

### Technology and Advancements in Surgical Practice

Minimally invasive surgical procedures, drug therapy (particularly in anaesthesia) and the development of electrical equipment (lasers, microwaves) have revolutionized the patient’s surgical pathway, altering the length of stay, reducing recovery time and increasing the potential for an early return to normal activity. However, as new technology is introduced, perioperative nurses must understand the principles and specifics of each new piece of equipment, drug or procedure. Turner et al (2000) recommend that every department has a protocol for the introduction of new technology, which includes risk assessments. Nurses are accountable for their own practice and should ensure that they and their colleagues do not harm the patient (NMC, 2002); therefore they should know how
the equipment works, any potential dangers, how to avoid them and to acknowledge when they do not have the required knowledge (Turner et al, 2000).

Electrosurgical units and the use of diathermy is now commonplace in the perioperative environment. Electrosurgical units are used in most areas of surgery where coagulation or cutting of tissues is required. Electrosurgery is efficient, effective and can be used for many tasks, although it basically involves the burning of human tissue. Modern units have many safety features to reduce risk, but the use of electrosurgery units is still fraught with potential dangers for both staff and patients (Moyle, 2002; Wicker, 2000). Perioperative staff must have a basic knowledge and understanding of the principles of electrosurgery before delivering safe care to the patient.

Burns constitute the main danger to patients from the inappropriate use and lack of procedures to ensure that safety checks on all associated equipment are made prior to their use. Table 2.5 details some of the risks associated with using electrosurgery and how they may be prevented.

Lasers are used in a wide range of surgical procedures and various types of laser exist. Laser is an acronym for Light Amplification by the Stimulated Emission of Radiation (light energy), and lasers are usually distinguished by the colour of the light they produce and the medium in which they are transported, such as carbon dioxide, argon and potassium titanyl phosphate (KTP).

Potential risks to the staff and patients are:

- from fire due to the use of high temperatures
- eye injury due to laser light inadvertently striking the cornea and destroying it or the retina behind
- skin injury due to burns by the laser beam
- the biological hazards of smoke plume.

Several legislative safety standards exist in all hospital departments where lasers are used and include the requirement for a Laser Safety Officer in each area. The utilization of lasers is rigorously controlled, monitored and recorded, and each perioperative practitioner must have appropriate knowledge and skills so as to be able to participate during a surgical procedure where lasers are used (Taylor and Campbell, 1998; NATN, 1998).

Minimally invasive surgery (keyhole surgery) is now commonplace in many operating theatre departments. Laparoscopic procedures provide an excellent internal view of the abdominal organs, causing less trauma to the abdominal cavity itself, and provide access for removal of the gall bladder (cholecystectomy), appendix, repair of inguinal and hiatus hernias, and in the past few years bowel resections and renal procedures. Complications can arise on trocar and Verres needle insertion, inadvertent insufflation of gas directly into a vessel (pneumoperitoneum) and diathermy injuries, which occur outside the view of the surgeon (McCabe, 2000; Welsh and Singh, 2003). Perioperative nurses must ensure that they are skilled and trained on the equipment and are familiar with the surgical procedure so that actions can be taken to prevent and control such incidences. The use of electrosurgery during laparoscopic procedures presents added risks to those already mentioned. These are due to the proximity of other instruments in a close, confined space, lack of direct all-round vision and the

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**Table 2.4 Infection control practices within the operating theatre department**

<table>
<thead>
<tr>
<th>Area</th>
<th>Infection control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theatre design</td>
<td>• Location of operating theatre department within the hospital</td>
</tr>
<tr>
<td></td>
<td>• Ventilation system with minimum 20 air changes per hour</td>
</tr>
<tr>
<td></td>
<td>• Scheduled preventative maintenance</td>
</tr>
<tr>
<td></td>
<td>• Controlled access to the department by visitors</td>
</tr>
<tr>
<td>Cleaning</td>
<td>• Cleaning between patients</td>
</tr>
<tr>
<td></td>
<td>• Cleaning at the end of a list</td>
</tr>
<tr>
<td></td>
<td>• Policies for using correct cleaning fluid depending on purpose</td>
</tr>
<tr>
<td></td>
<td>• Correct disposal of waste and linen</td>
</tr>
<tr>
<td>Staff</td>
<td>• Wearing of correct clothing: i.e. scrub suits, hats and footwear</td>
</tr>
<tr>
<td></td>
<td>• Appropriate use of personal protective equipment and adoption of standard precautions</td>
</tr>
<tr>
<td></td>
<td>• Appropriate use of masks</td>
</tr>
<tr>
<td></td>
<td>• Hand washing</td>
</tr>
<tr>
<td></td>
<td>• Safe handling and disposal of sharps</td>
</tr>
<tr>
<td></td>
<td>• Scrubbing and gowning techniques based on evidence and best practice</td>
</tr>
<tr>
<td></td>
<td>• Maintenance of aseptic technique</td>
</tr>
<tr>
<td></td>
<td>• Correct sterilization and disinfection procedures</td>
</tr>
<tr>
<td>Patient preparation</td>
<td>• Hair removal if needed in theatres immediately prior to the procedure</td>
</tr>
<tr>
<td></td>
<td>• Use of alcohol skin preparation fluids</td>
</tr>
<tr>
<td></td>
<td>• Identification of risk factors such as old age, obesity, malnutrition, other co-morbidities</td>
</tr>
<tr>
<td></td>
<td>• Surgical intervention such as operative site, duration of surgery, wound contamination (such as bowel contents, pus)</td>
</tr>
</tbody>
</table>

TABLE 2.5  ELECTROSURGERY RISKS

<table>
<thead>
<tr>
<th>Electrosurgery hazard</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation on equipment not intact</td>
<td>- Ensure that all equipment, including cables, surgical instrumentation and patient plates, are fully insulated and that any faulty equipment is removed immediately and reported as per hospital policy</td>
</tr>
<tr>
<td></td>
<td>- Always ensure that surgical electrosurgery equipment is kept within an insulated container throughout the procedure</td>
</tr>
<tr>
<td></td>
<td>- Do not coil the return electrode cable while in use</td>
</tr>
</tbody>
</table>

**Using alcohol-based fluids**

Alcohol-based fluids are commonly used to prepare the operative skin area prior to surgery. However, if the fluid is allowed to dry or remains pooled in the patient's skin or drapes, then it may be ignited by a spark from the electrosurgery, resulting in a burn.

- Alcoholic skin preparations should be avoided.
- Ensure that if alcohol-based preparation fluid is used that it is allowed to dry or removed with a sterile swab
- Ensure that surgical drapes are free from contact with alcohol
- Avoid any fluid contact with the electrosurgery unit

**Alternative pathways**

Unintended routes for the electrical pathway due to the patient being in contact with other conductors, or if the patient is wearing a pacemaker.

- Patient plate should be as close to the surgical site as possible to reduce length of pathway through patient
- Ensure no exposed metal, e.g. from armrests, mayo table stands or metal infusion poles, are touching the patient
- For patients with a pacemaker, diathermy should be avoided, or if it cannot, then precautions should be taken to minimize the interference from the electrical current
- For patients with a pacemaker, diathermy should be avoided, or if it cannot, then precautions should be taken to minimize the interference from the electrical current

**Smoke inhalation**

Research has shown that surgical smoke is hazardous to the surgical team who are exposed on a daily basis. The risks are from biological and chemical hazards found in the particulate matter of the smoke (Biggins and Renfre, 2002). Patients require protection too (Rose, 2002).

- Utilization of dedicated smoke evacuators
- Wearing of compliant respiratory masks
- Regular changing of filters and maintenance of theatre departments

**Patient preparation**

Incorrect preparation of the patient could mean an increase in current density to one area and result in a burn.

- Ensure that the patient plate (return electrode) is clean and if single-use is never reused
- Ensure good contact with the plate and the patient by placing the plate over a muscular area, away from bony prominences or scar tissue, and remove hair from directly below the plate prior to positioning
- If the patient is moved during surgery, ensure that the plate remains intact or replace with another
- Record the position of the plate on the patient and the skin condition before and after

Source: from Wicker (2000) and Moyle (2002).

increase in heat energy leaking through the port or entry sites (Moyle, 2002; Wicker, 2000).

**SWAB AND INSTRUMENT COUNTING**

Managing other risks to patients from within the perioperative environment includes the use and handling of instrumentation; care and handling of specimens; and the swab, needle and instrument count. Perioperative nurses are accountable for delivering a high standard of care that does not cause the patient harm. Negligently using defective equipment during invasive procedures and leaving foreign objects within patient cavities is against the law, as all clinical staff have a duty of care to the patient (NATN, 2003). All swabs, instruments, needles and other sharps must be accounted for at all times throughout the surgical procedure, and are recorded on a 'swab board' for all invasive procedures where swabs, instruments or needles could be retained. A count is performed by
the scrub nurse and a circulating practitioner, who may be unqualified. The surgeon is informed at the end of the procedure that the count is correct and the scrub nurse documents this in the patient's care plan (NATN, 2003).

**PREPARATION FOR TRANSFER OF PATIENT TO RECOVERY**

At the end of the procedure, the patient’s perioperative care plan (whether this is an electronic or paper record) is completed: this details the procedure; patient position; position of diathermy plate and other equipment used; skin condition due to position and site of diathermy plate; signatures confirming that the needle, swab and instrument count are correct; skin closure used; and indication of presence of any drains or catheters (NATN, 1999b). The patient is prepared for transfer to the recovery or post anaesthetic unit, which may involve moving the patient to another bed or trolley. Preservation of the patient’s dignity and maintaining their safety is paramount. Once the patient has been transferred, the theatre can be cleaned and prepared for the next patient in accordance with local hospital policy.

**IMMEDIATE POSTOPERATIVE CARE**

For this chapter, the author will use the term ‘recovery room’ as the word recovery identifies that the care for each patient is being aimed at safeguarding them against the trauma and effects of surgery and anaesthesia (Hatfield and Tronson, 2001). The main objectives of recovery room care are to critically evaluate and stabilize the patient postoperatively, to anticipate and prevent potential complications and to safeguard the patient’s well-being until they are able to do so themselves (Starritt, 2000a). The room itself is easily accessible and usually situated within the operating theatre department or in an adjacent area.

The recovery nurse is a skilled and knowledgeable practitioner, able to deal quickly and efficiently with any changes in the patient’s condition. Within the perioperative environment, recovery nurses have the greatest autonomy, as they manage a patient’s care in the recovery area from arrival through to discharge, only requesting medical assistance when needed. Postregistration courses exist specifically for recovery room nurses but others may opt for high dependency or intensive care training. Recovery room nurses must also have knowledge of both anaesthetic and operating theatre techniques.

The postoperative phase of a patient’s journey starts when the patient is transferred from the theatre to the recovery room. However, preparation for each individual patient commences well before the patient arrives. All equipment such as resuscitation, oxygen and monitoring is checked and additional resources acquired if the surgery or anaesthesia indicates that this may be so: e.g. patient warming apparatus if the surgery has been long, provision of analgesic pumps, or pillows if the patient needs to be nursed sitting up due to surgery on the neck. The patient’s age will also influence the size of the equipment needed, particularly for children. The transfer cannot occur until the anaesthetist is satisfied that the patient’s condition is stable.

During transfer, the anaesthetist and a nurse from the perioperative team accompanies the patient to the recovery area. On arrival, the patient’s care is transferred to the recovery room nurse.

The recovery nurse assesses the patient immediately on arrival, with a focus on airway, breathing and circulation (Hatfield and Tronson, 2001; Sharp, 1998; Starritt, 2000a).

**AIRWAY**

- The patient’s airway must be patent, clear of blood or mucus.
- Adequate ventilation must be achieved and this may require assistance with the position of the head/neck or an airway adjunct; e.g. guedal or laryngeal mask airway (which may be present from theatres).
- The patient’s position may also affect ventilation, and therefore the patient will need to be moved. The patient should be nursed on their side or supine, depending on the clinician’s instructions.
- Oxygen therapy is commenced immediately via an oxygen mask or nasal cannulae. Usually, this is at 40%. Contraindications include chronic obstructive airways disease or where a prescribed percentage of oxygen is required.
- A pulse oximeter is attached to monitor oxygen saturation.
- Professional organizations such as the Royal College of Anaesthetists and the American Society of Post Anaesthesia Nurses recommend that until the patient is able to maintain their own airway continuous one-to-one observation is required.

**BREATHING**

- Observe the movements of the chest to ensure bilateral even movement and feel the air flowing in and out of the mouth.
● Noisy breathing is obstructed breathing and action must be taken to relieve the obstruction. The nurse may support the patient’s airway. However, obstructed breathing is not always noisy, as complete obstruction is characterized by silence.
● Skin colour (lips, nailbeds) may indicate cyanosis.
● Respiratory rate is taken to include depth and pattern. Changes could be an early indication of future respiratory or cardiac arrest.

CIRCULATION

● Once the airway has been established, blood pressure and pulse can be monitored.
● Assessment of perfusion status includes conscious state, skin temperature and pulse and blood pressure, as an indication of perfusion to all vital organs.
● Inspection of wounds and drains for evidence of haemorrhage.

However, it must be remembered that monitors alert staff to changes in condition, but ongoing physical visual assessment and observation will allow staff to detect subtle changes in condition without relying on monitors. The patient may be hypoxic despite a 98% reading on the pulse oximeter (Hatfield and Tronson, 2001).

Once the initial assessment has been completed, the nurse can gather information through an extensive handover from the anaesthetist and theatre/anaesthetic nurse. This should include past medical history, surgical procedure, vital signs, pharmacology given (particularly analgesics), blood loss, intravenous infusions, catheters and drains. It will detail any untoward events that occurred during the surgery and highlight any potential problems for the postoperative period. The anaesthetist will outline any specific postoperative instructions for each patient: e.g. analgesics regime, oxygen therapy and any additional monitoring requirements.

The nurse can then carry out a more thorough patient assessment to include:

● checking of consciousness levels and signs of protective reflexes returning
● intravenous infusions – type, rate and patency of site
● drains – types, amount draining and rate
● urinary catheters – patency, colour of drainage and amount.

Monitoring will include:

● temperature (hypothermia remains a potential risk)
● pulses and sensation following arterial or limb surgery
● wound site
● plaster of Paris casts
● pressure areas

(Hatfield and Tronson, 2001; Starritt, 2000a).

All postoperative assessment and observations must be recorded in the patient’s documentation. The immediate postoperative period is fraught with potential complications for each patient, and the recovery room nurse plays a vital role in detecting, preventing and managing dangerous life-threatening conditions by continuous, ongoing assessment of the patient visually and with the aid of monitors.

Waking up from an anaesthetic can be a frightening experience for the patient. The bright lights, uncharacteristic noises, lack of familiarity with the surroundings and pain may disorientate and confuse the patient. Constant communication with the patient during this phase and throughout their recovery is vital to reduce the patient’s anxiety. The nurse should communicate any procedures being undertaken even before the patient regains consciousness, as hearing is the first sense to return.

Recovery rooms are often large areas with bays segregated by curtains or screens. Maintaining confidentiality, privacy, dignity and respect is a challenge to all recovery room nurses, as they must juggle the individual needs with those of patient safety.

MANAGING A PATIENT’S PAIN

The objective of effective pain management is to pre-empt pain before it starts. Acute pain is brief in duration, ranges from mild to severe and eases as healing occurs (Starritt, 2000b). However, pain is a subjective and highly individual experience and an accurate assessment can only be made of the severity and extent of the pain with the actual patient. In the postoperative period this can be difficult if the patient is drowsy, confused or crying. The recovery nurse can observe non-verbal clues such as restlessness, grimacing and hyperventilation (Avidan et al, 2003). Hypoxia, hypothermia, anxiety, nausea, fatigue and pain are all symptoms of the body’s stress response to surgery. Pain postoperatively can magnify these responses and delay a return to normal function, as well as impair wound healing and predispose the patient to infection (Hatfield and Tronson, 2001).

Planning an analgesics regime postoperatively can start at the preoperative assessment clinic, where staff can discuss the amount of pain to be expected, how
long it will last and the options available for managing this after surgery. The patient’s perception of the pain can be reduced if they are prepared for and expecting it (Avidan et al, 2003; Hatfield and Tronson, 2001; Starritt, 2000b). The administration of early effective analgesics will optimize the recovery outcome. The patient in pain is anxious, distressed and agitated, yet explanations, reassurance and support can be equally as effective as pharmacological methods (Starritt, 2000b).

Analgesics can be administered through a variety of techniques and routes, i.e. intramuscular injection, intravenous bolus, intravenous patient-controlled analgesia (PCA), epidural, or rectally. Recovery nurses must have the knowledge and skills to understand and administer the different methods and analgesics available, and monitor the incidence and severity of side-effects. PCA is popular with both patients and clinicians, as it avoids the use of injections, eliminates the delay to the patient in receiving analgesia and allows the patient to feel more in control of their own pain and its management (Chumbly et al, 2002).

Assessment of the patient is ongoing, in order to monitor the efficacy of the pain relief. If the pain is controlled, then the patient should be able to move easily on the trolley/bed, take deep breaths and overall feel more comfortable and less anxious. Documentation of the assessment and actions taken must be made in the patient’s care plan. (See Ch. 7 for more detailed information on pain management in the surgical patient.)

MANAGING POSTOPERATIVE NAUSEA AND VOMITING

Postoperative nausea and vomiting is a significant postoperative complication and causes the patient stress, discomfort and additional pain. Avidan et al (2003) state that postoperative nausea and vomiting occurs in up to 15% of patients postoperatively, and is the commonest complication in day surgery necessitating overnight admission.

Arnold (2002b) reviewed the factors influencing postoperative nausea and vomiting and how preoperative assessment can assist anaesthetists and perioperative nurses to improve patient care by administering the appropriate treatment promptly. Patients may become pale and experience excessive swallowing or salivation and tachycardia prior to vomiting. If a patient vomits they may be embarrassed, particularly if other patients are in the room, and preserving a patient’s dignity and respect at this time is central to the delivery of a high standard of patient care.

Other postoperative complications include:
- pulmonary complications (upper airway obstruction, pneumothorax, aspiration of gastric contents)
- shock
- neurological complications (loss of sensation to affected limb)
- cardiovascular complications (hypotension, arrhythmias, myocardial ischaemia)
- postoperative bleeding
- for diabetic patients, hypo- or hyperglycaemia


DISCHARGE OF THE PATIENT TO THE WARD

The patient’s stay in the recovery room varies considerably, depending on the patient, type of anaesthetic, surgical procedure and postoperative recovery. Guidelines offer advice to staff on the minimum criteria for the safe discharge of patients back to the ward from the recovery room. It is decided by the recovery nurse based on an assessment of the patient’s conscious level, respiration, circulation, pain control, haemostasis and wound care (Reed, 2003). These criteria include definitions of acceptable normal limits of postoperative observations, guidance on written information and headings to provide an accurate handover to the ward staff. The recovery room nurse must provide detailed information to a competent nurse who will take on the responsibility for that patient’s care.

GENERAL POSTOPERATIVE CARE ON THE WARD

The ward nurse then escorts the patient back to the ward, monitoring the patient’s condition throughout the transition. Having settled the patient on the ward, regular recording of vital signs and systemic observation can reveal early indicators of postoperative complications. Close monitoring of the patient will allow immediate action to be taken in the event of a complication. Observations should be recorded initially every 30 minutes and compared to baseline assessment by the anaesthetist and preassessment clinic, and observations in recovery, to provide an overall view of the patient’s condition. Observations and their frequency can be reduced as the patient’s condition improves (Table 2.6).

The aim of the care is to allow the patient to move along the patient dependence–independence continuum.
### Table 2.6 General postoperative nursing care

<table>
<thead>
<tr>
<th>Observation</th>
<th>Action and rationale</th>
<th>Complication</th>
</tr>
</thead>
</table>
| **Level of consciousness** | • Patient can be roused easily  
• Patient becomes gradually aware of surroundings  
• Patient can explain where they are and what has happened to them | Patient not rousable or confused:  
• check baseline admission nursing and medical notes  
• review medication in theatres or recovery  
• inform medical staff immediately |
| **Respirations**       | • Monitor rate, depth and chest movement  
• Breathing should be unhindered  
• Skin colour is pink or based on baseline assessment of the individual patient  
• Alert for signs of cyanosis and poor oxygenation  
• Sitting patient upright as soon as possible will encourage lung expansion and oxygenation | Reduced respiratory rate may indicate early respiratory arrest  
Reduced respiratory rate may be due to analgesics or other drugs administered, and nurses should be aware of what the patient has received and its potential side-effects  
Nurses must be aware of patient's medical history when administering oxygen |
| **Pulse**              | • Monitor and assess against baseline recording  
• Monitor rate, volume and irregularities  
• Nurses need to be aware of drugs given in theatre and recovery as they can affect pulse rate | Rising pulse rate may indicate reduced circulating volume due to haemorrhage  
Anrhthmias may indicate cardiac problems and therefore an ECG may be required  
Bradycardia may indicate reaction to drugs or cardiac arrest. Inform medical staff immediately |
| **Blood pressure**     | • Monitor and assess against baseline recording  
• Nurses need to be aware of drugs given in theatre and recovery as they can affect blood pressure  
• Blood pressure should return to within patient's normal limits | Hypotension may indicate haemorrhage or lack of fluid replacement  
Hypotension may also be indicative of pain or nausea |
| **Temperature**        | • Body temperature can alter significantly in surgery and should be monitored on the ward | Continuing reduction in body temperature may indicate inadvertent hypothermia, reaction to surgical assault or drugs. Warmed blankets, increasing the room temperature and specifically designed warming blankets may be used  
Increase in body temperature may indicate postoperative infection; inform medical staff so that appropriate action can be taken |
| **Pain and nausea**    | • Monitoring of patient's pain and nausea by scoring or dependency  
• Type and rate of analgesics must reflect patient's needs  
• Nurses need to be aware of patient's allergies and any drugs administered in theatre and recovery | Restlessness, agitation, confusion and non-verbal clues indicate increasing pain levels  
Restlessness, hypotension and excessive salivation can indicate nausea |
| **Fluid intake**       | • Encourage fluid intake as soon as possible, dependent on the surgery performed  
• Accurately record fluid intake if intravenous infusion sited  
• Monitor infusion site, rate of infusion and type of fluid being administered | Oral intake should be gradual and halted if the patient is nauseous until more comfortable  
Intravenous site becomes blocked or damaged, then it may need to be resited, depending on patient's condition and needs postoperatively  
Administration of a blood transfusion requires careful observations and monitoring of the patient |
| **Fluid output**       | • Every postoperative patient should have noted on their records when they pass urine  
• Urinary catheters must be checked for patency and flow of urine  
• The colour, smell and amount of urine must be recorded | Restlessness and agitation may indicate a full bladder. The patient must be assisted and encouraged to pass urine  
If catheterized, ensure patency, no blockages and if no flow a bladder washout may be performed on medical instructions |
CONCLUSION

Entering the perioperative environment is a daunting prospect both for student nurses and the patient. Yet it is an essential part of the surgical patient’s journey.

Perioperative nursing is perceived as technical, assisting the surgeon or anaesthetist – ‘handmaidens’ and as such not real nursing. The author hopes that through providing a rationale for nurse’s actions, that those who visit the operating theatre department can gain an understanding of the high standard of nursing care that is required and delivered to the individual patient undergoing a surgical procedure. The Code of Professional Conduct clearly states that in caring for patients and clients we must:

- ‘Respect the patient or client as an individual’
- ‘Protect confidential information’
- ‘Co-operate with others in the team’
- ‘Maintain your professional knowledge and competence’
- ‘Act to identify and minimize risk to patients and clients’.

(NMC, 2002: p 2).

Each perioperative nurse, no matter what their role is, is personally accountable for their practice and the author has demonstrated that the concept of perioperative nursing is centred on the well-being of the patient.

<table>
<thead>
<tr>
<th>Observation</th>
<th>Action and rationale</th>
<th>Complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurovascular status</td>
<td>• Monitor colour, warmth, sensation and movement, and circulation return to the affected limb</td>
<td>• Report any change in condition as this may reflect constriction of blood supply or nerve damage</td>
</tr>
<tr>
<td>Wounds and drains</td>
<td>• Observe for excess blood loss or haemorrhage • Ensure patency of drain</td>
<td>• Excessive blood loss may indicate further haemorrhage. Further pressure wound dressings may be applied and the patient’s overall physical status observed closely.</td>
</tr>
</tbody>
</table>

References


NATN (1996) *Nursing the Paediatric Patient in the Adult Perioperative Environment*. Harrogate: NATN.


NATN (1999a) *Respecting Cultural Diversity in the Perioperative Setting*. Harrogate: NATN.

NATN (1999b) *Operating Department Records*. Harrogate: NATN.


Further reading


Relevant website addresses


