Nursing Standard

patient safety

Why you should read this article:
- To recognise the importance of effective drain care
- To understand how you can ensure drain safety
- To maintain your knowledge of drain-related complications

Effective drain care and management in community settings

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Citation

Gibson S, Lillie A (2019) Effective drain care and management in community settings. Nursing Standard. doi: 10.7748/ns.2019.e11389

Peer review

This article has been subject to external double-blind peer review and checked for plagiarism using automated software

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Conflict of interest

None declared

Accepted

4 April 2019

Published online

xxxxx

Abstract

The literature indicates that drain monitoring is a frequently undervalued aspect of patient care, and that the drain care provided is often inconsistent and inadequate. There are numerous potential implications of suboptimal drain care for patients, nurses, teams and healthcare organisations. Since acute care is increasingly being delivered in the community, there is a greater need for nurses to have an understanding of effective drain care. This article describes the rationale for drain insertion and its associated complications. It uses a case study to illustrate how suboptimal drain monitoring and documentation can negatively affect patient care and safety. This article also discusses several important issues raised in the case study, such as suboptimal documentation, and how these may have consequences

for nurses, teams and healthcare organisations. Recognition of these elements supports initiatives that nurses could apply to practice to reduce the occurrence of similar incidents.

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Keywords

communication, community, community care, nursing care, observations, patient safety, patients, professional issues, record-keeping

Key points

- ***Drains are routinely used in post-operative practice as a prophylactic intervention to: reduce or eliminate blood, fluid or pus; remove air; or identify anastomotic leaks***
- ***Drain care and frequency of drain assessments are related to the drain type, function and position***
- ***An insufficient and non-systematic focus on drain care is associated with late identification of complications, resulting in inappropriate care or emergency hospital admissions, which can negatively affect patients' quality of life and physical functioning***
- ***There is a need for comprehensive and consistent monitoring, management and care of drains. Nurses should promote optimal practice in drain care to maintain patient safety***

The Nursing and Midwifery Council (NMC) (2018) stipulates that nurses must practise effectively and preserve patient safety. Nurses have a pivotal role in the rapid assessment, identification and escalation of deteriorating patients (Gluyas 2015). Failure to accurately assess patients' needs and record information has consistently been associated with suboptimal patient outcomes and quality of care (National Confidential Enquiry into Patient Outcome and Death (NCEPOD) 2012, Francis 2013, Neuberger 2013, Scruth 2014). Acute care, including drain monitoring and care, is increasingly being provided in patients' homes, and often to patients with complex needs and multiple co-morbidities (Hibbard and Gilburt 2014, Salim 2014, Millar and Hillman 2018). Therefore, there is a greater need for all nurses to be competent in drain care management to ensure patient safety.

However, the lack of literature examining nurses' competence in assessing drains indicates that drain monitoring is a frequently undervalued aspect of patient care, and that the care provided is often inconsistent and inadequate (Lyons et al 2015).

This article uses a case study to demonstrate the importance of drain assessment and management, holistic care and record-keeping. It also details the effects of suboptimal drain care on patient safety, and outlines the implications for patients, nurses, teams and healthcare organisations.

Use of drains

Drains are routinely used in post-operative practice as a prophylactic intervention to: reduce or eliminate blood, fluid or pus; remove air; or identify anastomotic leaks (Shrikhande et al 2013, Woodrow 2013, Lyons et al 2015). They are also used in other clinical settings to manage symptoms associated with biliary obstruction (blockage of the bile ducts), recurrent abdominal ascites (excessive accumulation of extracellular fluid within the peritoneal cavity) and recurrent pleural effusions (excess fluid that accumulates in the pleural cavity) (Huang et al 2015). Drains used for these purposes are often long term, and may be termed percutaneous or indwelling tunnelled catheters. Compared with traditional care involving frequent large-volume paracentesis (use of a hollow needle to remove fluid), these types of drains are a cost-effective and less invasive therapeutic intervention to enhance quality of life in palliative care (National Institute for Health and Care Excellence (NICE) 2018). For these reasons, and because more people are living longer with long-term conditions, the use of such drains in diverse clinical settings has increased (Lui et al 2016, Stukan 2017, Heedman et al 2018).

There are a wide variety of drains available. They can be categorised as open or closed, and active or passive (Orth 2018). Open drains flow directly onto gauze pads or into a stoma bag, whereas closed drains have tubes that are connected to a bag or bottle. Active drains employ negative pressure, while passive drains rely on pressure and gradient to drain effectively. Some long-term drains and drainage systems, such as those used to treat recurrent abdominal ascites and recurrent pleural effusions, allow intermittent connection and drainage, thus promoting patient autonomy (Narayanan et al 2014). The type of drain used will depend on the substance and volume being drained, drain function and position (Dougherty and Lister 2015).

Drain safety and complications

Drain safety is vital in all drain management approaches. Sullivan (2008) reported that suboptimal drain care may lead to patient safety issues, identifying issues with chest drains such as drain dislodgement, blockage and haemorrhage. In response to these incidents, guidelines for chest drain management and specific documentation were developed (British Thoracic Society 2010, Havelock et al 2010), but these were not widened to include other drain types. Therefore, this article excludes chest drains and focuses on general drain care. Nonetheless, it should be noted that the issues reported with chest drains occur in all drain types (Dougherty and Lister 2015). Optimal practice in all drain care should be a priority for all nurses when seeking to maintain patient safety (Akram and Hartung 2009, Dougherty and Lister 2015).

Box 1 summarises the potential drain-related complications that can occur, excluding chest drains. In palliative care settings, complications such as site leakage and discharge, infection, erythema, pain, dislodgement, abnormal white blood cells and sleep interruption have been noted (Brown et al 2014, Narayanan et al 2014). A variety of factors may influence the risk of drain-related complications, including: patient comorbidities; the length of surgery; the number, type and anatomical position of drains; and the length of time the drain is in situ (Yılmaz et al 2014, Chim et al 2016, Mujagic et al 2019).

Box 1. Drain-related complications (excluding chest drains)

» Reduced skin integrity
» Surgical site infection
» Infection
» Haemorrhage
» Damage to surrounding vessels and organs
» Leakage around the drain site or tubing
» Reduced vacuum suction
» Moveable drain
» Drain retraction
» Damaged drain
» Drain dislodgment or fall out
» Drain disconnection
» Drain obstruction
» Pain or discomfort
» Sleep disturbance
» Anxiety

(Kwiatt et al 2014, Narayanan et al 2014, Athwal et al 2015, Dougherty and Lister 2015, Triantafyllopoulos et al 2015, Gavazzi et al 2016)

Drain care and frequency of drain assessments are related to the drain type, function and position. Drain observations should be undertaken as clinically indicated and in accordance with local policy (Dougherty and Lister 2015). Nurses should ensure that the drain is firmly anchored at the drain site to maintain stability, for example with sutures or self-adhesive dressings, and at one other point with a suitable fixation device or adhesive tape, before the drainage bottle or bag (Dougherty and Lister 2015). The nurse should monitor skin integrity and any leakage around the drain site for signs of infection, swelling, haematoma or drain leakage. Nurses should also monitor the volume of fluid output and observe for changes in the character of the fluid, including in odour, colour and viscosity. Increased sudden, unexpected changes in the character of the fluid and/or volume may suggest infection, haemorrhage, damage to surrounding vessels and organs, or anastomotic leaks. Unpredicted reduced fluid output could also indicate drain blockage – for example with debris, clots or pus – drain disconnection, dislodgement or migration.

The length of the tubing should be measured from the drain exit site, and frequently assessed for migration or withdrawal. Tubing and connections should also be observed for twists or kinks which could inhibit fluid drainage. Drains should be positioned below the insertion site to further aid drainage and multiple drains should be plainly numbered and correspond with drain documentation to avoid misunderstanding (Dougherty and Lister 2015). To promote holistic nursing care, the patient's pain and distress should be assessed using an appropriate, standardised, valid and reliable pain assessment tool (Royal College of Nursing (RCN) 2015). Table 1 identifies how nursing assessments and observations can identify drain-related complications and the nursing care and actions that should be taken.

Table 1. Nursing drain assessments, signs of complications and potential complications

Nursing assessment	Signs of complications	Potential complications	Nursing care and actions to be taken
Drain stability			
» Ensure drain stability at the drain site » Ensure the length of tubing has been measured from the drain site	» Moveable drain » Loose sutures or unstable anchoring device » Altered drain length from site to drainage collection system	» Drain instability » Drain retraction » Drain dislodgement » Drain migration » Drain dislodgment or fall out	» Notify the lead clinician
Drain position and labelling			

» Drain should be positioned below the insertion site, not on the floor » Multiple drains should be plainly numbered and correspond with drain documentation	» Unpredicted reduction of drain output » Patient reports feeling unwell » Miscommunication » Unpredicted/unexplained changes in fluid output	» Fluid collection around drain site	» Position the drain below the insertion site » If infection is suspected, measure and record vital signs, and notify the lead clinician » If surgical site infection is suspected, measure and record vital signs, swab the wound and notify the lead clinician » Ensure the care provided is relevant to the appropriate drain
Suction pressure			
» Check if the drain is still vacuumed, if required » If there is a one-way valve, check if it is working	» Air leak noted on tubing or connections » Air leak at drain site » Reduced vacuum suction » Vacuum indicator is activated » Reservoir filled with air » Unpredicted reduction of drain output » Patient reports increased swelling, pain and/or feeling unwell	» Fluid collection around drain site	» Tighten loose tubing or connections » Reseal the air leak at drain site with occlusive dressing » If the vacuum indicator is activated, reconnect a new bottle as per manufacturer instructions » If no air leak or equipment defects are noted, inform the lead clinician, and measure and record vital signs
Tubing and connections			
» Inspect for loose tubing and check all connections » Inspect tubing for twists or blockages	» Loose fittings and connections » Air leaks	» Drain disconnection » Drain leakage » Reduced suction » Damaged tubing » Obstruction	» Tighten loose tubing or connections » Straighten tubing

	» Drain fluid coating connections and/or tubing » Unpredicted reduction of drain output » Kinks in tubing » Debris, clots or pus » Resistance when flushed – if flushes are authorised and prescribed » Unpredicted reduction of drain output		» Notify the lead clinician if the tubing is damaged » If there are no kinks in the tubing and resistance is noted on flushing (if flushes are authorised and prescribed), notify the lead clinician
Unexpected fluid output			
» Monitor volume of fluid output » Monitor characteristic of fluid output	» Increased fluid output » Unpredicted reduction of drain output » Uncharacteristic fluid » Increased/unusual tenderness or pain around the drain site » Patient reports feeling unwell	» Infection » Haemorrhage » Damage to surrounding vessels and organs	» Measure and record vital signs » Notify the lead clinician
Drain site			
» Assess skin around drain site » Monitor characteristics of dressing exudate	» Inflamed drain site » Reduced skin integrity » Bloody discharge at site and/or on dressing » Purulent exudate at site and/or on dressing » Patient reports feeling unwell » Drain leakage at site » Odour, purulent discharge and/or other signs of infection at site	» Skin irritation » Cellulitis » Inadequate drainage » Breaks in skin » Haemorrhage » Surgical site infection » Blocked or misplaced drain	» If there is local irritation, consider using an alternative dressing » Consider using an appropriate barrier spray » Ensure the drain is well secured » Measure and record vital signs » Swab if surgical site infection is suspected » Notify the lead clinician
Pain			
» Assess pain using an appropriate, standardised, valid and reliable pain assessment tool	» Uncontrolled, unresolved or escalating pain	» Infection » Damage to surrounding organs » Anxiety	» Measure and record vital signs » Recognise anxiety and treat as appropriate

			» Notify the lead clinician
Anxiety			
» Use relevant, appropriate tools to recognise anxiety by developing **professional relationships** [Q1. is this referring to professional relationships with colleagues in other services, or therapeutic relationships with patients?] and practising in an open and impartial manner	» Uneasiness, fear or panic » Sleep disturbance » Insomnia » Palpitations » Nausea » Dyspnoea (difficult or laboured breathing)	» Depression » Relationship issues » Social isolation » Headaches » Insomnia » Digestion or bowel issues	» Undertake active listening and enhanced communication » Provide support and discuss interventions such as relaxation techniques, social support, sleep techniques and diet. Refer to other services if required [Q2. such as the mental health liaison nurse?] » Determine the risk of self-harm or suicide and liaise with appropriate clinicians » Seek timely assistance from a suitably qualified and experienced clinician if the required action is beyond the nurse's scope of practice
(Kwiatt et al 2014, Narayanan et al 2014, Athwal et al 2015, Dougherty and Lister 2015)			

Case study

Jim was a 72-year-old man with advanced bile duct cancer who was receiving palliative care. He had two passive biliary drains connected to two bags. He was discharged from hospital because home was his preferred place of death. Jim and his family were extremely anxious regarding his end of life care.

Neither the discharge letter nor the referral mentioned that Jim was being discharged with two drains in place. Also, there was no information about how the drains had been managed

or assessed in hospital, no drain management plan or indication of any hospital review dates, and no contact details provided in case any escalation of care was required. Jim was able to inform the community nurses that both drains were flushed daily while he was in hospital. However, it was unclear how this was undertaken, and no fluid flushes were prescribed. These issues were resolved through telephone calls to the ward nurses and medical consultants.

Jim received daily visits from the community team for several weeks. He had a variety of uncontrolled symptoms [Q3 Can you give an example of these?] that required a multidisciplinary approach to his care. The nurses involved in Jim's care had varying levels of experience and knowledge with regard to drain care. From the nursing documentation, it became apparent **that staff were undertaking inconsistent and ad hoc drain observations and documentation** [Q4 Are we talking about the ward nurses here, or the community nurses who were now in charge of his care?].

On this occasion, [Q5 By 'this occasion', are we talking about a consultation with Jim by one of the community nurses who was now in charge of his care?] a week had passed without any record of Jim's drain site being assessed, and 48 hours had elapsed since any documentation had been completed to support assessment of drain output. It was observed that the output from one of the drains had significantly decreased and that Jim had reported pain when the drain had been flushed. On examination, the drain site was found to have extensive excoriation and leakage with purulent discharge. The surrounding area was also warm and tender to the touch, and Jim reported feeling 'shivery and unwell for a few days'. His vital signs were taken, which indicated potential further systemic infection.

The community nurse spoke with Jim's GP and medical consultant and Jim was readmitted to hospital. This caused further anxiety for Jim and his family. On his readmission, it was discovered that Jim should have attended the hospital for a drain review during the previous week, but neither Jim, his family nor the community team were aware of this. Jim was diagnosed with a surgical site infection and drain-related complications, and he died while in hospital.

Main issues

Nursing knowledge of drain care and assessment

Athwal et al (2015) identified that patients are often concerned about the management of their drain in community settings. As illustrated in this case study, ad hoc drain assessments can lead to inconsistent approaches, increase psychological distress and cause patient harm

(Findik et al 2013, Liddle 2013, Woodrow 2013). Jim's care demonstrates that inadequate drain assessments and variable, uncoordinated care has potential iatrogenic consequences such as placing patients at risk of developing undiagnosed surgical site infections and the related danger of sepsis. Orth (2018) identified that drains, particularly abdominal drains, generate ideal conditions for surgical site infections without appropriate management, which can lead to the development of sepsis (Khatoon et al 2015).

An insufficient and non-systematic focus on drain care is associated with late identification of complications, resulting in inappropriate care or emergency hospital admissions, which can negatively affect patients' quality of life and physical functioning (Murnane et al 2015). Failure to accurately assess patients' needs and record information about other aspects of care [Q6 By 'other aspects of care', do you mean aspects that are not directly related to drain care but are still important to patient care such as nutrition for example?] has been a consistent factor associated with suboptimal patient outcomes and low quality of care (NCEPOD 2012, Francis 2013, Neuberger 2013, Scruth 2014). Nurses should employ lifelong learning and continuing professional development to address gaps in their drain care knowledge and update their skills and competence to ensure that they are practising safely and effectively (RCN 2019), while a structured drain assessment framework may also promote quality care through improved data collection, clinical decision-making and communication (Banning 2008, Munroe et al 2013). Such a reflective approach can also form part of required revalidation or registration renewal process.

In the case study, the effects of nurses' inexperience, workload and increasing demands may have impaired the nurses' clinical decision-making. Reflection on these issues can raise nurses' awareness of their influence on patient safety and patient outcomes (Beyea 2014). To address some of these issues, a specific drain assessment chart with the essential information required could be used. Such a chart could also act as a checklist, which is a valuable tool that bridges gaps in nurses' knowledge, standardises optimal practice and reduces the risk of failure to identify and respond to patient deterioration (Thomassen et al 2011, Gan and Tan 2015).

Coordinated care

In the case study, the disjointed handover between the ward nurses and community nurses resulted in a suboptimal patient experience for Jim and his family, and compounded the anxiety they experienced on his discharge home for palliative care. The lack of communication between healthcare settings also resulted in team inefficacy, since community

nurses' time was spent liaising with other healthcare professionals to obtain missing information. Community nurses report frequent suboptimal communication from healthcare professionals in acute settings and they are often unaware of when patients are to be discharged (The Queen's Nursing Institute 2016). This affects proactive planning and is particularly problematic when patients such as Jim require substantial nursing care but there are differences between acute and community care practices.

Dysfunctional multidisciplinary team communication leads to uncoordinated care (Gluyas 2015). For instance, in the case study it resulted in missed hospital appointments and inadequate information about early warning signs and drain complications. Therefore, a uniform approach to drain care in which relevant, accurate information is communicated, both during and between transitions in care, could lead to team efficiency, appropriate use of resources and coordinated care (Manias et al 2015).

Communication and documentation

The case study demonstrates how variation in practice and miscommunication can negatively affect patient safety and increase the risk of patient harm (Lyons and Popejoy 2014, Wears 2014, Royal College of Physicians 2017). Inadequate communication has a significant role in many clinical errors, including those during hospital discharge (Bruton et al 2016). Breakdown in communication between healthcare professionals, as occurred at Jim's hospital discharge, is common during transitions in care, and this can lead to adverse events, hospital readmissions and suboptimal patient experience (The Queen's Nursing Institute 2016).

The lack of communication and drain care documentation impaired clinical decision-making and compromised Jim's safety, both of which are preventable causes of harm (Lyons et al 2015, NHS England 2015, Massey et al 2017, NMC 2018). Failure in clinical management is also classed as preventable patient harm (Panagioti et al 2017). It could be suggested that if staff had been aware of Jim's drain management plan and scheduled hospital review, any identified issues could have been escalated at the review [Q7 Are we saying that if the community nurses had been aware that there was an upcoming hospital review, they could have escalated their concerns at this review?].

On some hospital wards, fluid balance charts are used to monitor drain output (NICE 2007). However, these are often inadequately completed (Francis 2013, Jeyapala et al 2015), and more comprehensive documentation is required (Table 1) (Lyons et al 2015, Tsang et al 2016). Lyons et al (2015) suggested that the information recorded on fluid balance charts is

inadequate for the purpose of drain monitoring, indicating that there is insufficient space for the required recording of various aspects of drain monitoring, such as documenting multiple drains, position and type of drain, character of the fluid, running total, and 24-hour output from drains.

The lack of standardised, comprehensive documentation means that healthcare professionals have to search through patient notes to retrieve all of the relevant information, which affects patient safety, increases workload and is an inefficient use of time (Degnim et al 2013, Braaf et al 2015, Lyons et al 2015). A structured clinical system comprising of relevant tools, guidelines and policies may assist in the consistent and efficient transfer of information, thus improving patient safety and team coordination (NHS England 2013, Gluyas 2015). A standardised, robust and comprehensive drain assessment chart could be used with drain care guidelines and protocols to escalate concerns between various healthcare settings. This approach is central to quality improvement (Alderwick et al 2017).

Implications of suboptimal drain care

Alongside compromising patient safety, suboptimal drain care can also affect nurses and healthcare organisations. Nurses have a duty of care and are accountable for their actions or omissions; thus, if drain care falls below an acceptable standard, nurses may be subject to professional and legal investigations (NMC 2018). Variations in drain care can also interrupt hospital discharges and lead to inefficient use of resources (Lyons et al 2015), resulting in increased financial costs (Panagioti et al 2017, The Health Foundation 2018).

Moreover, healthcare organisations may be held accountable for negligence in care, which can damage their reputation (NHS England 2014, Alderwick et al 2015, NHS Litigation Authority 2016, Busby et al 2017, Trueland 2017). Box 2 outlines the implications of inadequate drain assessment, monitoring and documentation.

Box 2. Implications of inadequate drain assessment, monitoring and documentation

Patients
» Inconsistent drain care
» Compromised care and safety
» Patient vulnerability

Nurses and teams
» Wasted time
» Suboptimal care and communication

» Hindered clinical decision-making
» Professional vulnerability through risk of professional and legal investigations

Healthcare organisations
» Ineffective care
» Inefficient care
» Organisational vulnerability involving increased risk of NHS negligence claims and reputational damage

(NHS England 2014, Alderwick et al 2015, Lyons et al 2015)

Recommendations for practice

There is a need for comprehensive and consistent monitoring, management and care of drains. Nurses should promote optimal practice in drain care to maintain patient safety. The authors suggest that there is a need to enhance practice through the standardisation of drain assessments and documentation. Moreover, consistent use of drain assessment charts is encouraged to potentially address the issues discussed. These charts should be comprehensive and include all aspects of drain care. They could also act as a checklist for nurses, improve professional knowledge, standardise optimal practice and reduce the risk of failure to identify and respond to early warning signs of drain complications. Together with guidelines and procedures, standardised systems such as these have the potential to maintain patient safety through improved communication and coordinated care. Nurses should also undertake holistic assessments and be aware of how to interpret drain observations and act appropriately (Douglas et al 2014).

Conclusion

Drain care is an important but potentially undervalued aspect of nursing care. To prevent patient harm, nurses should regularly and systematically assess the drain site, skin condition, suction pressure and drain equipment, as well as the colour, characteristics and volume of drain output. Nurses should also assess the patient's care experience, including pain and anxiety levels associated with the drain. The lack of appropriate documentation may contribute to suboptimal drain care and increased awareness of these issues has the potential to enhance patient care.

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