Overview of supporting module four, part two: fundamentals of cancer surgery

Key concepts

- Factors influencing the selection of surgery for cancer.
- Surgery in the prevention, diagnosis, staging, treatment and palliation of cancer.
- Future directions of surgery in the management of cancer.
- Experience and impact of cancer surgery on various health domains.
- Prevention, detection, and management of common health alterations experienced by people undergoing surgery for cancer.

Objectives

On completion of this supporting resource, you should be able to:

1. Explain the role of surgery in the prevention, diagnosis, staging, treatment and palliation of cancer.
2. Discuss the experience and impact of cancer surgery on the various domains of health.
3. Implement interventions to prevent, detect and manage common health alterations experienced by people undergoing surgery for cancer.

Learning activities

At times, you will have learning activities to complete. Click on the learning activities button and a list of questions will pop up. The questions will relate to the content you've just read or the video you've just watched.

Resource links

Resource links are included throughout the resource. These links lead to interesting articles or websites, and are designed to encourage you to explore other available resources.

PDF of EdCaN module: Fundamentals of cancer surgery.
You can download a PDF version of the module.

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Surgery in cancer control

The Specialist Cancer Nurse's (SCN) role in coordination of care, education and communication among the multidisciplinary team (MDT) is of utmost importance as surgical procedures become more complex, surgical stays become shorter, and people with cancer undergo multimodal treatment in a short time frame.

Although the earliest documentation of surgical management of tumours was found in the Edwin Smith papyrus in Egypt circa 1600 BC, the modern era of elective surgery for visceral tumours began in America in the early nineteenth century.[1] Developments in anaesthesia, and the introduction of the principles of antisepsis, reduced the surgical complications of pain and sepsis and facilitated use of surgery in the management of tumours.[1]

There are a number of roles and indications for surgery in cancer control:[2]

- prophylactic surgery
- diagnostic surgery
- definitive (or curative) surgery
- rehabilitative (or reconstructive) surgery
- palliative surgery.

Prophylactic surgery

Some underlying conditions or congenital or genetic traits are associated with a significantly higher incidence of cancer. When these cancers are likely to occur in non-essential organs, the potentially involved organ may be removed or the anatomical, developmental or genetic defect corrected to prevent or reduce risk of subsequent malignancy.[1, 2]

Examples of prophylactic surgical approaches include:[1, 2]

- surgical correction of cryptorchidism or undescended testis which is associated with a 10- to 40-fold increase in the incidence of testicular cancer
- prophylactic colectomy for individuals susceptible to hereditary non-polyposis colorectal cancer (HNPCC)
- prophylactic bilateral or contralateral mastectomy and oophorectomy for individuals with breast cancer who carry a BRCA1 or 2 gene mutation.

There are many psychological and ethical considerations related to prophylactic surgery and regular invasive surveillance. An at-risk individual's response depends on the real or perceived sense of threat they feel as a result of their cancer risk, personality traits and the psychological morbidity associated with a strong family history of cancer. Regular medical surveillance and counselling may help. SCNs need to consider the needs of the individual's whole family as anxiety, uncertainty and an irrational fear of cancer may persist irrespective of the test result.[2]

Learning activities	
Completed	Activities

☐	1 Access the following resources and complete the following :
	Targeted tailored management of the breast cancer patient at risk for harboring a germline mutation - current trends affecting the selection of patients considering surgical prophylaxis for breast cancer[3] (free resource, but you must register and login to access it)
	Decision making regarding prophylactic mastectomy: stability of preferences and the impact of anticipated feelings of regret[4]
	Positive, negative, and disparate - women's differing long-term psychosocial experiences of bilateral or contralateral prophylactic mastectomy[5]
	Support needs and acceptability of psychological and peer consultation: attitudes of 108 women who had undergone or were considering prophylactic mastectomy[6]
	• Summarise the indications for prophylactic bilateral or contralateral mastectomy
	• Outline the issues identified in the readings which affect a woman's decision making process when considering prophylactic mastectomy
	• Describe the role of the SCN in meeting the needs of women:
	  • Considering prophylactic mastectomy
	  • Following prophylactic mastectomy.

☐	2 Jeff is a 38 year old man who has had treatment for hereditary non-polyposis colon cancer (HNPCC). His sister, aged 35, has the same gene mutation. Their father and paternal grandmother both died in their 40s from colon cancer. Discuss the evidence which may inform: • The advice and support an SCN may provide to this family about

	their cancer risk • The role and implications of regular surveillance and prophylactic surgery. The following resources may be helpful: • Familial aspects of bowel cancer: a guide for health professionals[7] • NHS National Genetics Education and Development Centre website

Diagnostic surgery

The major role of surgery in the diagnosis of cancer lies in the acquisition of tissue for exact histologic diagnosis. Endoscopic approaches are replacing many open surgical procedures for diagnostic purposes.[2] Laparoscopic staging procedures may identify metastatic or unresectable disease so the person affected by cancer may avoid a major operation.[1]

Biopsy procedures include:[1, 2]

- **Fine needle aspiration biopsy**: the least invasive procedure. It can be performed in an outpatient setting and is least likely to cause tissue damage. A positive cytology result may indicate the need for further surgery.
- **Core needle biopsy**: involves the removal of a 1.0 - 1.2mm core of tissue through a hollow needle under local anaesthetic. It provides a larger specimen for histopathological investigation.
- **Incisional biopsy**: refers to removal of a small wedge of tissue from a larger tumour mass using a scalpel or punch biopsy instrument.
- **Excisional biopsy**: involves excision of the entire suspected tumour tissue with little or no margin of surrounding normal tissue.

An important principle in the diagnosis of cancer is that only positive biopsy findings are definitive. A negative biopsy can mean no cancer but it can also mean that the specimen was not representative of the tumour. If a high index of suspicion for cancer exists, another biopsy should be done.[1, 2]

The person affected by cancer will often be anxious during the diagnostic phase. The SCN can alleviate or minimise this by providing timely and sensitive information on when the results will be available, how they'll be informed, and what to expect during and after the procedure.

Learning activities	
Completed	Activities

☐	1 For each of the biopsy procedures listed below, complete the following learning activities:
	• Describe a specific indication
	• Identify potential complications of the procedure
	• Outline the supportive care and information provision role the SCN may have in the following procedures:
	  • Fine needle aspiration biopsy
	  • Core needle biopsy
	  • Incisional biopsy
	  • Excisional biopsy.

☐	2 Summarise the role of the SCN in preparing and supporting a person undergoing: • Bronchoscopy • Gastroscopy.

Definitive (or curative) surgery

Surgery can be a simple, safe method to cure patients with solid tumours when the tumour is confined to the anatomic site of origin. Resection of the primary cancer involves definitive surgical treatment, encompassing a sufficient margin of normal tissue with the goal of cure with surgery alone. The magnitude of surgical resection is modified in the treatment of many cancers by the use of adjuvant treatment modalities. Selection of definitive surgical treatment involves careful consideration of the likelihood of local cure balanced against the impact of surgical morbidity on quality of life.[1, 2] For example, pelvic nerve preservation is considered to maintain erectile functioning, ejaculation and orgasm.[8]

During tumour resection, early ligation of blood vessels and lymphatics is carried out to decrease the risk of spread and the tumour should be removed with minimal manipulation. 'En bloc' resection of the primary tumour and its regional extensions to adjacent organs and lymph nodes will reduce the risk of metastatic spread. The surgical procedure also ensures accurate staging of the tumour by determining size, nodal involvement and involvement of adjacent and regional tissues. Such information ensures that the need for and type of adjuvant therapy can be individualised. The extension of the surgical resection to include areas of regional spread can cure some patients, although regional spread is often an indication of undetectable, distant micrometastases and may indicate the need for systemic or locoregional therapy.[1, 2]

Individuals with a single site of metastatic disease that can be resected without major morbidity are generally considered for resection. This approach is especially appropriate for cancers that respond poorly to systemic therapy.[1]

Extensive local spread of cancer sometimes precludes the removal of all gross disease by surgery. The partial surgical resection of bulky disease in the treatment of selected cancers, termed 'cytoreductive' surgery, improves the ability of other treatment modalities to control gross residual disease that has not been resected.[1, 2] Recent advances have seen shifts in the way advanced and / or metastatic disease is managed. Adjusted sequencing to provide systemic therapy or radiotherapy preoperatively has demonstrated improved outcomes and fewer side-effects.[9]

Learning activities	
Completed	Activities
☐	1 Access some evidence based clinical practice guidelines for a cancer with surgical treatment options and: • Outline the definitive surgical approach/es used for this disease • Identify the survival outcomes for definitive surgery at different stages of the disease.
☐	2 Discuss the role of cytoreductive surgery for one cancer type.

Rehabilitative (or reconstructive) surgery

Surgical techniques are being refined to enhance reconstruction and rehabilitation after definitive therapy. The ability to reconstruct anatomic defects can substantially improve function and cosmetic appearance.[2] Reconstructive and rehabilitative surgery has been associated with:[2]

- enhanced self-image
- improved sexuality
- improved physical functioning
- a sense of well-being.

The specific reconstructive procedure depends on the type of primary surgery performed, the condition of the remaining tissue and the need for post-operative adjuvant therapy. Reconstruction may be immediate or delayed, depending on circumstances. The individual affected by cancer may require considerable psychological support during the period of adaptation to their physical loss, especially before completion of surgical reconstruction or prosthetic restoration.[10]

Learning activities	
Completed	Activities
☐	1 Access the Cancer Australia webpage Breast reconstruction, and outline the advice an SCN may provide for a woman who asks for information to decide whether to have breast reconstruction surgery.
☐	2 Access a current text or journal article and discuss the role of rehabilitative and/or reconstructive surgery in the treatment of: • Colorectal cancer • Maxillofacial cancers.

Palliative surgery

Surgery to relieve distressing symptoms in an individual with no hope of cure or intent to lengthen their lifespan is considered palliative.[2] Five main purposes have been described for palliative surgical procedures:[11]

- evaluation of the extent of the disease
- control of locoregional spread
- control of a fungating tumour, discharge or haemorrhage
- control of pain
- surgical reconstruction or rehabilitation to improve quality of life.

Examples of palliative interventions include:[2]

- neurolytic blockade of the mandibular or sphenopalanine nerves in head and neck disease
- radical mastectomy or surgical debulking for a fungating malodorous breast lesion
- salvage cystectomy or pelvic exenteration for advanced prostate or cervical cancers
- insertion of a self-expanding vascular stent for the alleviation of spinal cord compression and superior vena cava obstruction.

The decision-making process involves identifying goals, recognising values, acknowledging alternatives, and weighing risks and burdens.[12] Good communication is vital and SCNs have a valuable role in information provision and supportive care.[2, 13] Challenges identified by clinicians in this field include maintaining hope in the face of communicating an honest assessment of the person's health status.[12]

Learning activities	
Completed	Activities
☐	1 Describe clinical examples of the use of palliative surgery for: • Control of locoregional spread • Control of a fungating tumour • Control of haemorrhage • Control of pain • Rehabilitation.
☐	2 Access the article Patient and surgeon decision making regarding surgery for advanced cancer[12]. Review Figure 1: Clinical decision making in palliative surgery, and discuss how this conceptual model can be used in practice to support people affected by cancer considering palliative surgery.

Factors influencing the use of surgery

Numerous variables impact on the indications and outcomes of surgical approaches in cancer control.

Tumour related factors

The nature and extent of surgery relies on accurate histology, staging, and grading of the tumour.[2] Factors indicating whether a solid tumour is amenable to surgery include its:[2]

- location
- histology
- growth rate
- invasiveness
- metastatic potential.

Slow-growing tumours with a long cell cycle, low growth fraction and low metastatic potential are the most amenable to definitive surgical treatment.

Factors related to the person affected by cancer

Individual factors which influence decisions about surgery in the management of cancer include:[2]

- the staging and grading of cancers at presentation
- an individuals' health status
- disease trajectory
- treatment history.

As with any treatment, the potential benefits of surgical intervention in people with cancer must be considered against the risks. The most common causes of death after surgery are bronchopneumonia, congestive heart failure, myocardial infarction, pulmonary embolism and respiratory failure.[1] Risk factors to consider include smoking, obesity, and cardiac and pulmonary comorbidities. Neo-adjuvant, concomitant, and adjuvant therapies may also complicate post-operative recovery, resulting in impaired secondary wound healing, infection or electrolyte imbalance.[2]

It has been demonstrated that short and long term outcomes after surgical treatment of cancer do not differ according to the person's age.[14] However, older people with cancer may not be offered standard surgery and may be more likely to undergo palliative procedures or have no surgery at all due to a presumed fear of increased post-operative morbidity and mortality.[15, 16]

Health service related factors

Improved surgical outcomes have, in part, been attributed to the subspecialisation of the team looking after the person affected by cancer before, during and after surgery.[9] Volume is one proxy indicator for improved outcomes[17] For example, one study of Australians with colorectal cancer reported that those seen by high volume surgeons were less likely to be given a permanent stoma or have macroscopic residual tumour and were more likely to receive a colonic pouch, be seen by a stoma therapist and undergo a laparoscopic procedure.[18] It has been acknowledged that, ‘ensuring that all patients have access to treatment by the

appropriate team in the appropriate setting remains a challenge for the clinicians, the colleges and state and federal institutions'.[9]

Learning activities		
Completed		Activities
☐	1	Review the surgical record of a person affected by cancer and identify factors which were taken into account in determining the decision to undergo surgery.
☐	2	Access a current text and Effect of smoking on early complications after elective orthopaedic surgery[19] and Temporary abstinence from smoking prior to surgery reduces harm to smokers[20] (free resource, but you must register and login to access it), and: • Outline the increased risks posed to a surgical candidate who smokes • Describe the benefits of temporary cessation of smoking before surgery.
☐	3	Access Special needs of older adults undergoing surgery[21] and Surgical considerations for elderly oncology patients[22], and: • Summarise current trends in mortality associated with surgery in older adults • Outline factors associated with higher surgical risk in older adults.
☐	4	Access the article Treatment patterns for cancer in Western Australia: does being Indigenous make a difference?[23] and relevant statistical data at the AIHW website and: • Describe any disparities in the surgical management of cancer in Indigenous and non-Indigenous populations in Australia • Summarise the possible reasons for the disparities • Discuss recommendations to reduce disparities.
☐	5	Access Quality of care in surgical oncology[24], and summarise the reported impact of the following health service outcome measures on quality in surgical oncology: • Accreditation • Volume-outcomes relationship • Specialisation • Multidisciplinary teams • Surgical technique.

Care of the person affected by cancer having surgery

The care pathway for individuals undergoing surgery for cancer can be associated with significant information, support and care coordination needs. The SCN works in close collaboration with the treating surgical team, and the MDT, in the planning and coordination of the individual's cancer journey.

The pre-operative management of an individual with cancer can be complex. While people with cancer can be similar in many ways to those without cancer, the direct and indirect effects of the cancer, and the effects of adjuvant cancer therapy, can influence pre-operative evaluation and management. Pre-operative evaluation involves:

- individual assessment
- site specific assessment
- pre-operative education.

Following pre-operative evaluation, specific care requirements are associated with the:

- intra-operative period
- post-operative period
- discharge from hospital.

Individual assessment

The severity of underlying illnesses and co-morbid conditions needs to be considered during the pre-surgical workup. An individuals' cardiac, pulmonary, haematologic and nutritional status have been implicated in post-operative morbidity.[25] The pre-operative evaluation of people with cancer should include an assessment of:[25]

Nutritional status

Nutritional intake can be impaired by pain, nausea, stomatitis, or tumours involving the oropharynx or gastrointestinal tract, and metabolic aberrations may cause anorexia and weight loss. If time permits, malnourished individuals could be treated with parenteral or enteral nutrition before major head and neck surgery.

Performance status

A general prognostic indicator for surgical outcome and mortality.

Symptom control

Individuals need an opportunity to verbalize fears and discuss their previous experiences with surgery. Providing information on current approaches to symptom management may assist in allaying fears or concerns.

Cardiopulmonary considerations

Some individuals are not surgical candidates or face higher peri-and post-operative risks due to underlying cardiac or pulmonary disorders.

Smoking history

There is evidence to suggest that cessation of smoking before surgery can positively impact the individual's cardiac and pulmonary function in the peri-operative period.

General medical issues

All individuals with cancer should be screened with pre-operative serum blood urea nitrogen (BUN), creatinine, sodium, calcium and full blood count. Individuals who are myelosuppressed as a result of chemotherapy or haematologic malignancy are at an increased risk of infection and bleeding, and whenever possible, surgery should be postponed.

Psychosocial, cognitive and educational needs

The psychological impact of surgery may be intensified with the added stress of a cancer diagnosis and the individual's perception of the meaning of cancer. In the pre-operative period, psychological preparation has been linked to shortened hospital stay and a decreased need for analgesia.[26] The MDT shares responsibility for pre-operative teaching, including surgeons, anaesthesiologist, pain management teams, pharmacists, social workers and nurses. Referrals to Allied Health Services should be considered at this time.

Decision making processes undertaken by older people with cancer is complex and requires careful assessment of physiological changes related to age, comorbidities and nutritional and functional status. A thorough and detailed assessment enables individualised treatment decisions to be made and development of a relevant education plan.[27] Further information on treatment decision making may be found in the module Part 1: Cancer treatment planning.

Learning activities		
Completed	Activities	
☐	1	Access the website Risk prediction in surgery[28] and calculate an individual's operative risk. Outline the limitations and benefits of risk prediction tools.
☐	2	Access a current text and Anesthetic implications for cancer chemotherapy[29] and, if available: Preoperative evaluation of the oncology patient[30] and: • summarise the anatomic and physiologic effects of cancer chemotherapy which have implications for the peri-operative management of the person affected by cancer. • appraise the capacity of the pre-operative assessment tool at your facility to effectively assess the person affected by cancer who has received neoadjuvant chemotherapy.
☐	3	Access Special needs of older adults undergoing surgery[21] and Surgical Considerations in Older Adults with Cancer[31] (institutional access may be required), and summarise the recommended pre-operative assessment and preparation of the older adult.
☐	4	Access the article Tools for assessing elderly cancer patients[32] , and discuss how the geriatric assessment tool may facilitate pre-operative assessment of elderly people affected by cancer.

Site specific assessment

Some site specific considerations need to be taken into account before surgery.

Surgery for cancers that occur within the pelvis can significantly affect fertility, either by resection of the reproductive organs or as a result of damage to the autonomic nervous system or vascular changes. Fertility preservation is greatly important to many people diagnosed with cancer. An increased risk of emotional distress has been identified in those who become infertile as a result of treatment.[33]

With careful assessment and planning, fertility preservation is often possible in people undergoing surgery for cancer. Timely referral to a fertility specialist is important. Early communication about potential threats to fertility is recommended to allow for the widest array of options for fertility preservation. Sperm, oocyte, and embryo cryopreservation are standard practice and widely available.[34]

Surgery for colorectal cancer may require a stoma and represent a group with special needs. A stomal therapist should see the person before surgery to provide reassurance and information about the stoma/ostomy, its function and care. The stomal therapist can assist the surgeon to identify the best location for the stoma to ensure it can be easily self-managed and away from where clothes and body folds sit.[35]

Learning activities		
Completed	Activities	
☐	1	Discuss the aspects of an individual's pre-operative assessment which would indicate the need for a referral for fertility preservation.
☐	2	Identify the sperm and embryo preservation measures available in your health care facility for people affected by cancer before surgery.
☐	3	Describe the referral processes and procedures the person may experience during sperm and embryo preservation.
☐	4	Discuss the aspects of an individual's pre-operative assessment which would indicate the need for referral to a stomal therapist.

Pre-operative education

The comprehensive pre-operative preparation of individuals includes information provision. It has been suggested that effective pre-operative education positively influences an individual's post-operative pain, anxiety and recovery. Information may also empower individuals in their self-management which in turn facilitates recovery. Comprehension of information is central to ensuring consent is informed.[36] Key principles of pre-operative education include:[36]

- consideration of the individual's coping style
- tailored information which suits their general level of comprehension, education and cultural background
- communication of the risks involved in their surgery
- consideration of the timing of education to avoid times of elevated anxiety, such as immediately preceding surgery.

A large gap exists between what research indicates as an increased risk for the surgical candidate who smokes and the education actually provided to these individuals. Pre-operative education on the side effects of smoking and the benefits of smoking cessation has been identified as poorly managed in many instances. While an individual's smoking habits are assessed, responses are not followed up with treatment plans.[37]

Peri-operative nurses and the SCN are well positioned to support and help people accomplish a smoke-free period before surgical intervention. Suggested strategies include:[37]

- creating and encouraging a smoking cessation program that begins before the surgical intervention and focuses on education regarding the effects of smoking on surgical outcomes
- providing smokers with knowledge that enables them to make an informed decision about smoking abstinence
- providing this education during the pre-operative period
- undertaking further research to determine if the surgical outcome education provided reduces people's pre-operative and post-operative smoking habits.

Learning activities	
Completed	Activities
☐	1 Choose a surgical procedure for a person affected by cancer and: • Outline the information and resources which would be provided in a pre-operative education session • Role-play the education session with a peer.
☐	2 Access Taking care of smoker cancer patients: a review and some recommendations[38], and: • Describe factors influencing a person's attitude to smoking cessation before surgery • List the reported benefits of smoking cessation before surgery to the individual and the health system.
☐	3 Appraise your local policy and procedure on smoking cessation pre-operatively and discuss approaches used to facilitate pre-operative cessation or abstinence from smoking.

Intra-operative period

Two key issues in the intra-operative management of the person affected by cancer include:

- coagulopathies
- cytotoxic precautions.

A hypercoagulable state is common in people with cancer, particularly those with advanced disease and primary brain tumours, and may be due to increased plasma levels of clotting factors, cytokines, or to increased tissue plasminogen activator (tPA).[25]

The risk for peri-operative deep vein thrombosis (DVT) must be considered and an appropriate level of prophylactic treatment administered. The risk of post-operative DVT is as high as 29% among all patients with cancer, and is even higher among individuals with additional risk factors such as obesity, advanced age, orthopaedic or neurologic surgery and impaired mobility. The use of Low Molecular Weight Heparin (LMWH), graduated compression stockings and Sequential Compression Devices should be considered in all individuals undergoing surgery for cancer.[25]

The use of neoadjuvant and intra-operative systemic cytotoxic therapy protocols raises unique challenges for the coordination of care and maintenance of safety. Substantial preplanning, multidisciplinary teamwork, protocol development and education are required.[39, 40] A risk assessment needs to be undertaken in each unique circumstance to identify and mitigate any risks to safety. Issues identified related to intra-operative cytotoxic risk include:[39, 40]

- cytotoxic waste management
- use of personal protective equipment cytotoxic fluid disposal (may be several litres)
- cytotoxic laboratory specimens
- cytotoxic blood samples
- communicating with the pathologist regarding post-mortem handling of a corpse
- the need for cytotoxic safety posters on theatre door during procedure
- cytotoxic linen management
- cytotoxic spill management
- communication with pre- and post-operative care providers
- staff education.

Learning activities	
Completed	Activities
☐	1 Access your relevant state or territory guide for handling cytotoxic drugs and related waste, such as the Queensland guidelines, and: • Complete a risk assessment for the management of a person undergoing a surgical procedure in your facility 48 hours after receiving cytotoxic therapy • Appraise your local policy and procedure for managing cytotoxic risk in the operating theatre.
☐	2 Access Perioperative care of the immunocompromised patient[41], and Special needs of older adults undergoing surgery[21], and describe the intra-operative challenges faced by the following populations and the implications of these on intra-operative staff and: • A person affected by a haematological malignancy • An older person • A person receiving combined chemotherapy and surgery.

Post-operative period

Post-operative support for the person affected by cancer is imperative for well-being across all domains of health. There are significant implications for overall survival. Individuals who navigate a post-operative complication successfully are more likely to commence adjuvant therapies with less toxicity and thus complete therapy in a timely manner, ensuring effective dose intensity.[42]

Increased risks of post-operative complications have been identified in oesophageal, pancreatic and lung cancers. Conditions frequently observed in individuals who died within a 30-day post-operative period include atelectasis, hypokalaemia, dehydration, hypotension and hypovolemia.[42] Identification and adoption of evidence based interventions, based on prevalence and risk of complications, may reduce morbidity and mortality post-operatively.[42]

Other potential nursing care issues and considerations in the care of individuals having surgery for cancer include:[43]

- ARDS (Acute respiratory distress syndrome)
- aspiration pneumonia
- infection
- bleeding
- poor wound healing
- stomatitis.

Pain and anxiety in the person with cancer may be a result of the cancer disease process as well as a potential post-operative complication, requiring astute assessment and targeted interventions to manage.[43]

Surgery can cause mechanical or physiological barriers to adequate nutrition. Such complications are most notable and severe in malignancies which involve the alimentary canal. A person's ability to chew, salivate, swallow, smell or taste may be impaired. Surgery for upper gastrointestinal cancers can result in gastric paresis, early satiety, malabsorption, and hyperglycaemia. Curative or palliative surgery for head and neck cancer can alter fluid and electrolyte imbalance, dumping syndrome and vitamin and mineral deficiencies.[44]

Individualised nutrition plans need to consider the person's pre-existing nutritional status and function and provide aggressive management to prevent associated complications including pneumonia, ileus, sepsis, wound dehiscence, and diminished tolerance of subsequent antineoplastic therapies.[43]

Learning activities	
Completed	Activities
☐	1 Prepare an in-service on the key principles of post-operative nursing care for new staff in the area in which you work.
☐	2 Outline the components of a nutritional assessment post-operatively.
☐	3 Describe signs and symptoms of pulmonary embolism and outline the nursing and medical management of pulmonary embolism.
☐	4 Define anastomotic leak and: • Describe clinical examples • Identify signs and symptoms • Outline prevention strategies

		• Outline management strategies.
☐	5	Access Special needs of older adults undergoing surgery[21], and outline the key issues associated with post-operative pain assessment and management in the older person with cancer.
☐	6	Outline the pre- and post-procedural considerations for a person who is thrombocytopenic (platelets 35) and who is to have a Hickman's catheter inserted under radiology guidance.

Discharge from hospital

Post-discharge, people affected by cancer may have questions, concerns and/or physical symptoms requiring interventions. Issues could include poor adjustment related to altered body image, inability to function as they did before surgery, and depression related to their cancer diagnosis.[45] Fear of recurrence and anxiety is prominent in the immediate post-operative period.[46] Fast track surgery, supported by SCN coordination and follow-up, can help people to manage successfully at home.[47]

Learning activities	
Completed	Activities
☐	1 Outline how you would coordinate the care and address the needs of a person with cognitive impairment who is to have major surgery in your unit from the point of treatment planning to preparation for discharge.
☐	2 Outline the key components of a discharge plan for the person who has had surgery for cancer.
☐	3 List referral processes and support services available to a person discharged home following surgery for cancer.

Recovery and rehabilitation

SCNs are well placed in the MDT to coordinate interventions and programs to address post-operative rehabilitative needs.[48] Key effects requiring supportive care post-operatively include:

- bladder and bowel dysfunction
- sexuality
- lymphoedema.

Bladder and bowel dysfunction

Bladder and bowel dysfunction are common complications following resections for prostate, colorectal, and gynaecological cancers. Post-operative dysfunction is mainly the result of damage to the autonomic pelvic nerves and occurs predominantly at the pelvic nerve plexus. Damage to these nerves can cause a need to strain to initiate voiding, constipation and urinary and faecal incontinence.[49] Such physical sequelae represents a constant reminder of the surgery and impacts significantly on daily activities and social functioning.[50]

Ostomy formation is an intrusive operation that results in significantly altered bodily function and body image and creates challenges for personal care. The most commonly reported stomal concerns are painful or irritated peristomal skin, pouch leakage, odour and noise from the appliance, fear of running out of supplies, and difficulties disposing of a full pouch.[51] Such difficulties may significantly affect lifestyle, work, travel and intimate relationships. The SCN is in an ideal position to address these issues.

Access the EdCaN colorectal cancer case-based learning resource for information and learning activities relevant to stomal therapy.

Learning activities	
Completed	Activities
☐	1 Discuss the effects a urinary or faecal stoma may have on an individual's physical, psychological, and social functioning.
☐	2 Access the Australian Government Department of Health and Ageing Stoma Appliance Scheme [52] website and outline the government assistance available to ostomates.
☐	3 Identify who, post-surgery for cancer, is at risk of: • Constipation • Faecal incontinence • Urinary incontinence.
☐	4 Describe nursing interventions to minimise the impact of the above post-surgical symptoms.

Sexuality

A number of surgical procedures have a direct physiological effect on sexual function. The main cause of sexual dysfunction from surgical resection appears to be injury to the autonomic nerves in the pelvis.

In women, radical cystectomy is often associated with pain from reduced vaginal depth due to resection of the anterior vaginal wall. Women who undergo abdominoperineal resection may also report dyspareunia related to loss of cushioning from removal of the posterior vaginal wall. Surgically induced menopause in premenopausal women, associated with oophorectomy, will also cause oestrogen depletion.[53]

The SCN may assess for and identify sexuality concerns in the person affected by cancer. Appropriate referral to a clinical psychologist, psychiatrist or trained social worker for personal and/or couples counselling is recommended. An endocrinologist may also be consulted to assess and provide therapy if a hormonal basis for the problem appears likely.[54]

The sexual function of men may be impacted following surgical management of prostate cancer. Access the EdCaN prostate cancer case based learning resource for information and learning activities relevant to male sexual function and quality of life following surgery for prostate cancer.

Resource links

Psychosexual care of women affected by gynaecological cancers (PSGC)[55]
Learning resources for health professionals to develop the knowledge and skills to support people experiencing sexual concerns after a cancer diagnosis. Although this website focuses specifically on women suffering from gynaecological cancers, this website can be a valuable resource for helping SCNs develop skills to communicate confidently about sexuality to any person affected by cancer who are undergoing surgery.

Sexuality, intimacy, and cancer. Cancer Council Australia, 2013

Learning activities		
Completed		Activities
☐	1	Access the following resource and complete the learning activities: Psychosexual care of women affected by gynaecological cancers (PSGC)[55] • Describe the potential impact of cancer surgery on an individual's sexuality. • Appraise current assessment processes and information provision in your health care setting for the person affected by cancer who is a risk of sexual dysfunction.
☐	2	Prepare a teaching session to provide information and support for a woman at risk of premature menopause.
☐	3	Outline the advice you would provide to a woman who is experiencing symptoms associated with early menopause following an oopherectomy.

☐	4	Access a current text and/or literature and outline the assessment for and strategies to prevent and manage sexual concerns in people following surgery for: • Cervical cancer • Testicular cancer • Prostate cancer.

Lymphoedema

Lymphoedema is the regional accumulation of excessive amounts of protein rich fluid in body tissue causing swelling. It occurs when the demand for lymphatic drainage exceeds the capacity of the lymphatic circulation. The condition usually affects the limbs although it can also involve the trunk, breast, head and neck, or genital area. Secondary lymphoedema occurs as a result of removal or damage of lymph nodes and vessels during surgery or radiotherapy and may present at any time following treatment.[56]

The incidence of secondary lymphoedema associated with vulval cancer is estimated at 36-47%, breast cancer 20%, cervical cancer 24% and melanoma 9-29%.[56] Lower incidence rates are often associated with minimally invasive procedures such as sentinel node biopsy.

Learning activities	
Completed	Activities
	Access the following resources and complete the learning activities: • Lymhoedema. Cancer Australia, 2012 • Lymphedema PDQ. National Cancer Institute, 2014 • Understanding Lymphedema (for cancers other than breast cancer). American Cancer Society, 2014
☐	1 Identify risk factors associated with development of secondary lymphoedema.
☐	2 Develop an education session for a person at risk of lymphoedema who has been recently discharged post-surgery.
☐	3 Identify your local referral pathways for a woman 12 months post-treatment for vulval cancer who presents with right-sided leg oedema.

Future directions in surgery in cancer control

Future directions of cancer surgery include:

- fast track surgery
- minimally invasive surgery
- robotics.

Fast track surgery

Fast track surgery is a multimodal approach which requires successful organisation of the MDT, including surgeons, nurses and anaesthetists. It focuses on enhancing recovery and reducing morbidity by using evidence based care in the areas of:[57]

- anaesthesia
- analgesia
- reduction of surgical stress
- fluid management
- nutrition
- ambulation.

Recent research has highlighted that many of the traditional approaches to surgical care, such as pre-operative bowel preparation, the use of nasogastric tubes, enforced bed rest and the use of graduated diets may be unnecessary or even harmful.[57] As these approaches to surgical management are reviewed, lengths of hospitalisation may be reduced. Prospective benefits of reduced hospitalisation may include reduced costs and morbidity.[26] Lengthy hospital stays have been associated with lower Quality of Life (QOL) scores and higher post-operative complication rates in individuals undergoing surgery for colorectal cancer.[26]

Several key elements contribute to a successful fast track surgery and enhanced recovery program. These include:[57]

- optimal participant selection
- establishing evidence based clinical protocols
- commencing coordination of care pre-operatively
- changing people's expectations of their hospital stay
- establishing referral pathways and clinical coordination between acute and primary health sectors to ensure access to specialist services in a timely manner
- maintaining quality clinical care.

While reduced hospital stay and improved use of healthcare resources is a desirable outcome, these factors do not eliminate the need for high level supportive care. An SCN is ideally positioned to take on this role, providing day to day coordination, triage, clinical care, information, and psychosocial support from the point of entry to service through to surgery, initial recovery and follow up, providing ongoing support and appropriate referral.

Learning activity	
Completed ☐	Activity 1 Review the fast track protocol at www.gynaecancer.org.au[58] and: • Describe the major challenges in implementing a fast track protocol • Discuss the implications of fast track protocols for nurses.

Minimally invasive surgery

Minimally invasive surgery is any surgical procedure that is less invasive than open surgery used for the same purpose. Minimally invasive procedures typically involve the use of laparoscopes and remote control manipulation of instruments with indirect observation of the surgical field through an endoscope. Anticipated benefits include less operative trauma for the individual, and consideration of the tissue and functional presentation, while accomplishing the same goals as equivalent invasive procedures.[59]

Major surgical procedures are being used less often in favour of minimally invasive procedures in conjunction with imaging processes.[2] This change has been possible due to:

- advances in surgical techniques
- an improved understanding of the patterns of spread of specific diseases
- the development of adjuvant therapies which can control microscopic disease.

In recent years, the role of laparoscopy has expanded to include diagnosing, staging, treating, monitoring and palliating a long list of malignancies. Some of the benefits of laparoscopic surgery are the reduction in post-operative pain, decreased healing time and decreased adhesion formation.[60] These may be attributed to the use of smaller incisions and avoidance of the need for retractors to hold incisions open for hours.

The major concerns regarding laparoscopic surgery for the treatment of cancer included:[60]

- maintenance of the integrity of the oncologic resection (margins of resection, removal of lymph nodes, evaluation of other intra-abdominal organs)
- demonstration of feasibility in improving outcome parameters for the resection without undue risk (decreased hospital stay, decreased pain, decreased cost, more rapid return to work)
- absence of any negative impact on survival (induction of metastases by laparoscopy, port-site recurrences).

Randomised trials in colon cancer and gastric cancer, have demonstrated the concerns are unfounded.[9]

Learning activity	
Completed ☐	Activity 1 Identify a laparoscopic procedure and the associated open procedure that is carried out in your health facility, and: • Compare the advantages and disadvantages of each procedure for the person affected by cancer • Compare the nursing care considerations associated with each procedure.

Robotics

A surgical robot is a computer controlled device that can be programmed to aid the positioning and manipulation of surgical instruments. Surgical robots are typically used in laparoscopic rather than open surgical approaches. Conventional and robotic laparoscopy share similar advantages over open surgery, including decreased morbidity, rapid recovery and improved aesthetics of incisions. Robotic surgery requires large investments in time and money for equipment and training of health professionals.

Advantages of robotic assisted over conventional laparoscopy include:[61, 62]

- superior visualisation - 3D versus 2D imaging of the operative field
- stabilisation of instruments within the surgical field - in conventional laparoscopy, small movements by the surgeon are amplified
- improved ergonomics for the operating surgeon
- mechanical improvements.

Limitations of robotic assisted over conventional laparoscopy include:[61, 62]

- additional surgical training and accreditation
- increased costs and operating theatre time
- costs of instruments and equipment
- bulkiness of devices
- risk of mechanical failure
- not designed for abdominal surgery involving more than one quadrant
- training and cost of dedicated staff including a robotics nurse and instrument nurse
- lack of outcome data.

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