

Systemic Anti-Cancer Therapy Care Pathway

Treatment Induced Mucositis and Stomatitis

Guidance Document

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1.0 INTRODUCTION

The mouth provides a reflection of general health and may reveal some of the toxicities of cancer treatments (*Haas & McBride, 2011*).

It is therefore the responsibility of the multi-professional team to anticipate, and attempt to minimise oral side effects in all patients undergoing care and treatment for cancer.

The early detection of potential and actual problems, correct assessment, and treatment plans with active intervention are paramount, in order to avoid or minimise oral problems, prevent delays or interruptions to cancer treatment plans and to maximise patient safety and comfort. (*Haas & McBride, 2011*)

1.1 Definition of Oral Health

In 2016 the World Dental Federation (FDI) updated the definition of oral health to emphasise the relationship to general health: “Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex”.

1.2 Oral Mucositis (OM)

Oral mucositis secondary to cancer therapy is an acute inflammation of the oral mucosa in response to systemic chemotherapy and/or radiation to fields involving the oral cavity.

The clinical presentation ranges from a general erythematous stomatitis to erosive lesions and overt ulceration. Lesions are often very painful, may compromise nutrition and oral hygiene, and can increase the risk of local and systemic infection.

In addition, oral mucositis can lead to difficulties in swallowing and talking.

Furthermore, severe oral mucositis may necessitate an undesirable chemotherapy dose-reduction and/or a break in radiotherapy. Therefore, mucositis is a highly significant complication of cancer therapy, with a potential impact on patient prognosis.

Mucositis can limit the patient’s ability to tolerate either systemic anti-cancer therapy or radiotherapy. This may lead to delays in planned treatment and limit the effectiveness of systemic anti-cancer therapy.

1.3 Stomatitis

Stomatitis is the inflammation of the mucous membrane of the mouth such as gums, cheeks, lips and palate. The tongue is also at risk of inflammation. It is a common debilitating complication of cancer, systemic anti-cancer therapy and radiotherapy. Dry mouth due to the lack of saliva is caused by radiation induced stomatitis and causes symptoms such as, diffuse erythema, ulceration, taste alteration, pain, dysphagia, difficulty in speaking and mouth odour. (*The Oral Cancer Foundation 2014*)

Symptoms range from pain, discomfort and bleeding, to an inability to tolerate food or fluids. Patients with damaged oral mucosa and reduced immunity resulting from systemic anti-cancer therapy and radiotherapy are also prone to opportunistic infections in the mouth. This condition may affect the patient’s gum, dental condition and speech. (*Xavier, 2000*) “Patients can also be prone to low self-esteem which can impact on their, response to treatment and / or palliative care”.

It is therefore extremely important that mucositis be prevented whenever possible, and promptly treated to reduce its severity and possible complications. Healthcare professionals should receive education and training in the management of mucositis and stomatitis to ensure consistent and individualized oral care is provided. (Quinn et al 2008)

1.4 Oral Care

Oral Care includes both education and assessment, oral care is an essential part of personal care and many patients will require some level of support to prevent their oral health deteriorating during their admission (Essence of Care, 2010).

1.5 Oral Assessment

All patients at risk of developing mucositis should receive a standardised oral care regime as an ongoing component of their care. The aim of this regimen is to achieve and maintain a clean mouth and to limit opportunistic infection via the damaged mucosa. Oral assessment should be undertaken by trained healthcare professionals using a recognised grading system. (Quinn et al 2008). Refer to Table 1.0

1.5.1 Table 1

Assess the condition of the patient’s mouth daily where appropriate i.e. an inpatient, or at each treatment visit. Whilst there is no evidence to suggest any one assessment tool is better than others, below is the World Health Organisation grading of mucositis as an example of a typical tool. (LCA 2013)

WHO Grade Oral Mucositis	Clinical Presentation
0	No Symptoms
1	Soreness +/- erythema, no ulceration
2	Erythema, ulcers. Patient can swallow solid diet
3	Ulcers, extensive erythema. Patient cannot swallow solid diet
4	Oral mucositis to the extent that alimentation is not possible.

All mouth care strategies are dependent on four key principles, accurate assessment of the oral cavity, and individualised plan of care, initiating timely preventative measures and correct treatment.

The oral cavity should be reviewed when a patient visits the hospital for any chemotherapy, targeted therapy, radiotherapy to the head and neck or following head and neck surgery. (Quinn et al 2015). Assessments should also contain continuing patient education.

Another tool that is used by Clinicians and other Healthcare professionals is the Common Terminology Criteria for Adverse Events (CTCAE).

In CTCAE, an adverse event (AE) is defined as “any abnormal clinical finding temporarily associated with the use of a therapy for cancer” (Cancer Therapy Evaluation Programme 2006).

The NCI Common Terminology Criteria for Adverse Events is a descriptive terminology which can be utilised for adverse event reporting. A grading (severity) scale is provided for each adverse event term. For the purpose of this policy, all AE for mucositis, stomatitis and other oral adverse events can be found in the gastrointestinal category. These are listed below:

The criteria tool incorporates 5 attribution categories for adverse events. especially for clinical trials.

Table 2

Adverse Event	Short Name	Grade 1	Grade 2	Grade3	Grade 4
Dental: Dentures or prosthesis	Dentures	Minimal discomfort, no restriction in activities	Discomfort preventing use in some activities (e.g. eating) but not others (e.g. speaking)	Unable to use dentures or prosthesis at any time	
Dental: Periodontal disease	Teeth	Surface stains: dental caries: restorable without extractions	Less than a full mouth extraction: tooth fracture or crown amputation or repair indicated	Full mouth extractions indicated	
Dry Mouth/Salivary gland (xerostomia)	Dry mouth	Symptomatic (dry or thick saliva) without significant dietary alteration: unstimulated saliva flow > 0.2ml/min	Symptomatic and significant oral intake alternation (e.g., copious water, other lubricants diet limited to purees and/or soft, moist foods); unstimulated saliva 0.1 to 0.2 ml/min	Symptoms leading to inability to adequately aliment orally; IV fluids, tube feedings, or TPN indicated; unstimulated saliva <0.1ml/min	
Mucositis/Stomatitis (clinical exam) Oral Cavity Esophagus	Mucositis (functional/ Symptomatic)	Erythema of the mucosa	Patchy ulcerations or pseudo membranes	Confluent ulcerations or pseudo membranes; bleeding or minor trauma	Tissue necrosis; significant spontaneous bleeding; life-threatening consequences
Mucositis/Stomatitis (functional/ symptomatic) Upper aero digestive tract sites:	Oral cavity	Minimal symptoms, normal diet, minimal respiratory symptoms but not interfering with function	Symptomatic but can eat and swallow modified diet, respiratory symptoms interfering with function but not interfering with ADL	Symptomatic and unable to adequately aliment or hydrate orally; respiratory symptoms interfering with ADL	Symptoms associated with life-threatening consequences.

Salivary gland changes/saliva	Salivary gland changes	Slightly thickened saliva; slightly altered taste (e.g. metallic)	Thick, ropy, sticky saliva; markedly altered taste; alteration in diet indicated; secretion-induced symptoms not interfering with ADL	Acute salivary gland necrosis; severe secretion-induced symptoms interfering with ADL	Disabling
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REMARK: Dry mouth/salivary gland (xerostomia) includes descriptions of grade using both subjective and objective assessment parameters. If salivary flow measurements are used for initial assessment, subsequent assessments must use salivary flow.

REMARK: Mucositis/Stomatitis (functional/symptomatic) assessment criteria may be used for mucositis of the upper aero-digestive tract caused by radiation, agents, or GVHD.

2.0 EXAMINATION GUIDELINES AS PART OF THE PRE-CHEMO NURSE ASSESSMENT

- Gain consent from the patient.
- Give adequate information, explanation and reassurance prior to, during and after procedure.
- Provide appropriate education at the end of the examination to the patient and where appropriate their carer.
- Ensure that patients have access to equipment to perform their own care.
- Ensure that findings and recommendations for further treatment are documented in the patients' notes.

3.0 ASSESSMENT

Using the WHO Grade Oral Mucositis tool, inpatients receiving SACT should be assessed on a daily basis and ambulatory patients should be assessed prior to the commencement of each cycle of treatment. Each patient should have a dental assessment prior to commencement of treatment. *Elad et al (2014)*

Area	Action
Use a Pen torch to examine mouth	
Lips	Examine externally and internally.
Teeth	Ask the patient to part lips keeping teeth together. Examine both upper and lower teeth and examine their biting surface of the teeth (check with patient when last had an examination with their dentist, consider referral to local community dentist).
Gums	Examine for bleeding. Ask the patient if their gums are bleeding when cleaning their teeth.
Dentures	Ask patient to remove dentures to check soft tissues and gums. Check dentures are visibly clean.
Tongue	Ask the patient to stick out his or her tongue. Check top of the tongue under the tongue, both sides of the tongue.
Saliva	Observe and using the dry mouth Challacombe scale.
Mucous membranes	Examine the inside of both cheeks, roof of mouth, floor of mouth and soft palate.
Pain	This may be localised within the patient's mouth or they may have pain, which limits their ability to attend to their own mouth care needs. Do not forget to ask patient regarding pain as some feel it is inevitable whilst having treatment.
Nutrition	The MUST (Malnutrition Universal Screening Tool) should be referred to in order to determine a score (consider referral to a dietician).
Other factors	
Mobility	Consider the environment which the patient is in, have they got easy access to washroom facilities i.e. downstairs or upstairs, are they able to get upstairs (Consider referral to Occupation Therapy).
Drugs	Steroids and antibiotics can also have an effect on the oral mucosa. Health care practitioners should apply their specialist knowledge regarding side effects accordingly.
Diabetes	Diabetics are at a higher risk due to an increase in blood sugars.
Exclusion Criteria	
<ul style="list-style-type: none"> ● Swallowing difficulties should be referred to the Dietician and SALT (Speech and Language Therapist). ● Loose teeth/dentures should be referred to their dentist. If a patient doesn't have a dentist, advise them to contact a local dentist to arrange an appointment. Sign post to NHS choices. Consider referral to community dental service if a patient unable to access a local GDP. 	

4.0 ORAL COMPLICATIONS OF SYSTEMIC ANTI-CANCER THERAPY

4.1 Infection

As mucositis breaks down the lining of the mouth, this can allow germs and viruses to get into the bloodstream. If the immune system has been weakened by systemic anti-cancer therapy, even the good bacteria in the mouth can cause infections. If the white blood cell count is low, patients will be more susceptible to infection in the mouth. This is especially true of patients receiving high dose chemotherapy for leukaemia, lymphoma or radiotherapy for head, neck and oral cancers. (*LCA 2013*)

Bacterial infections in patients who have gum disease may be treated with a solution of salt water. Some patients may prefer to use medicated mouth rinse, however there is no evidence to suggest that this is more effective than salt water. Chlorhexidine is one of the most commonly used mouthwash solutions, however evidence does not support whether it is any better than saline mouthwashes.

If infection is present medical advice should be sought with regards management. Analgesia must always be considered in the first instance to discourage a decrease in fluid and nutritional intake.

There is weak evidence that antifungal agents may cure fungal infection in the mouths of people receiving systemic anti-cancer therapy. However, drugs such as fluconazole, which are absorbed fully or partially in the gastrointestinal tract are more effective than those which are not absorbed systemically such as Nystatin, but more research is required (*Clarkson JE et al 2004*).

If oral thrush is present on the tongue, cleaning the tongue at least once a day with a soft small headed toothbrush should be done alongside administering antifungal medication as part of treatment plan.

If prescribing fluconazole, care must be taken to assess any potential drug interactions (see BNF or contact pharmacist for advice).

The herpes simplex virus may cause infections such as cold sores in patients with a lowered immune system, and these may recur frequently. Oral anti-viral medication should be prescribed such as acyclovir with the addition of a topical cream.

Osteonecrosis of the jaw can be a severe complication in patients being treated with bisphosphonates. See section 7 for further information.

4.2 Dry Mouth

Saliva is needed for taste, swallowing and speech. It helps prevent infection and tooth decay by neutralizing acid and cleaning the teeth and gums. A drop in saliva production can lead to cuts or cracks in the lips or at the corners of the mouth and changes in the surface of the tongue. If severe and affecting the patients' ability to speak and swallow, then saliva substitutes or medications to stimulate the salivary glands should be considered.

4.2.1 What are the signs and symptoms of a dry mouth?

A dry mouth ranges in severity, so signs and symptoms will vary.

Signs: Frothy or stringy tenacious sticky saliva, absence of saliva, dry, crusted and cracked lips, lips sticking together, tongue sticking to palate, teeth sticking to cheeks, increase in decay, gums are shiny and red, dried secretions, food debris or coatings in mouth, tongue can feel rough and fissured.

Symptoms: Sensation of dryness, pain with eating food, swallowing medication or speaking, dry cough or a burning sensation.

4.2.2 What are the causes of a dry mouth?

→ Dehydration

Conditions that lead to dehydration, such as fever, excessive sweating, vomiting, diarrhoea, blood loss and burns can cause a dry mouth.

→ Medication

A dry mouth can be a side effect of over 400 medications. Among the more likely types to cause problems are some of the drugs used to treat depression, nerve pain (neuropathy) and anxiety, as well as some antihistamines, decongestants, muscle relaxants and pain relieving medications.

→ Systemic health conditions

Conditions such as diabetes, cystic fibrosis, rheumatoid arthritis and Alzheimer's can lead to a dry mouth.

→ Sjögren's disease

A medical condition that causes dry mouth, dry eyes and sometimes presents a secondary autoimmune disease such as rheumatoid arthritis or lupus.

→ Radiotherapy

Radiotherapy to the head and neck can affect the functioning of salivary glands leading to a reduction in saliva production.

→ Chemotherapy

Chemotherapy drugs can change the nature of saliva and the amount produced. This may be temporary with normal salivary flow returning after treatment has been completed.

→ Mouth breathing

Breathing through the mouth can cause the mouth to dry out and becomes more common in older people.

→ Oxygen therapy

Short or long term oxygen therapy can lead to a sensation of dryness in the mouth and throat.

4.2.3 Management of a dry mouth

- Frequent sips of cold water (need to check with the speech and language therapist team if the patient has swallowing problems).
- Chewing sugar-free chewing gum or sucking on sugar free sweets can help some patients who have functioning salivary glands to secrete saliva.
- Water based mouth moisturising gels or sprays can be used as often as required. These can be applied before mouth cleaning and eating so that it is less painful for patients with a severe dry mouth.
- Regular oral assessments to checks for signs of oral thrush and mouth ulcers.
- Use of mild flavoured sodium lauryl sulphate (SLS) free toothpaste to cause less irritation to a dry sore mouth.
- Avoid dry food that will be difficult and painful to eat like crackers.
- Advice on the frequency of sugar intake to prevent dental decay. In the long term, these patients may be prescribed high fluoride toothpastes by a dentist. Encourage patients to keep their regular dental appointment with the advice of their consultant and specialist nurse if treatments are needed.
- Considering humidified oxygen for those on oxygen therapy.

4.2.4 Saliva substitutes / moisturising agents

There is a move away from calling products 'saliva substitutes' as it is extremely difficult to produce a substance that replaces saliva. More recently, products tend to be marketed as dry mouth products or mouth moisturising products and include gels, sprays, and toothpastes. Not all patients will find them effective.

Some gels may contain animal products or ingredients derived from milk and staff need to be aware of this when prescribing and administering these products.

The gels can be applied to all parts of the mouth including the lips, tongue and cheeks. Gels can be applied with a finger and slowly massaged into the soft tissues and gums (as if you were massaging a cream to treat dry skin).

Those that have low platelets may have some bleeding when massaging the gel into their gums, so a dry mouth spray, which is sprayed directly into their mouth could be considered to moisten.

When a patient has dried secretions that are difficult to remove the gels can be massaged into the surfaces of the mouth and left for a few minutes to make them easier to remove and cause less discomfort to the patient. When dry mouth gels are not massaged into the mouth they can form a further sticky layer making the mouth more uncomfortable. **Correct application is very important to reduce this.**

4.2.5 Dry mouth products

Dry mouth products	Notes
Oralieve mouth moisturising gel & toothpaste	Contains traces of whey protein derived from milk
Bioxtra gel/spray and toothpaste	Contains traces of products extracted from milk and eggs
Biotene products	No animal products
Saliva Orthana spray	Contains animal products (porcine mucin)
Aquoral spray	No animal products
Xeroxin spray	No animal products
Glandosane spray	Acidic so do not use long term in patients with natural teeth
Saliveze oral spray	

4.3 Bleeding

Bleeding may occur during systemic anti-cancer therapy when anticancer drugs affect the ability of the blood to clot. Areas of gum disease may bleed on their own or when irritated by eating, brushing or flossing. Continuing regular oral care will help prevent infections. Patients must be educated in managing oral hygiene: recommendations such as the use of a soft toothbrush, mild toothpastes and avoidance of flossing are essential. This teaching is best done prior to the patient commencing chemotherapy or radiotherapy.

When brushing teeth, brush teeth using small circular motion to remove plaque and food build up. Brush teeth in the mouth in sections, such as brush teeth in the upper right quadrant and then after a few minutes brush the remaining upper teeth in right quarter of the mouth.

All patients should be educated and encouraged to maintain good oral hygiene (any changes to the oral mucosa must be documented and reported to the Medical Team. Equally blood counts should be monitored. *(Rubenstein et al 2004)*

4.4 Tooth Decay

Dry mouth and changes in the balance of oral bacteria increase the risk of tooth decay. Good, consistent oral hygiene can help prevent tooth decay. There are also artificial saliva sprays, lozenges and gels that may help. Many patients undergoing treatment for cancer from using a higher fluoride content (over 1500ppm) to prevent caries. *(Macmillan 2016)*

In osteonecrosis, the cells in the jaw bone die, which can lead to problems with healing. If your patient has a history of dental problems, and are being prescribed bisphosphonates they may be susceptible to osteonecrosis. All patients should have a dental check-up before starting treatment with bisphosphonates. NHS UK June2019. See section 7 for further information.

4.5 Taste Changes

Changes in the sense of taste (dysgeusia) are a common side effect of systemic anti-cancer therapy. These taste changes are caused by damage to the taste buds, dry mouth, infection and /or dental problems. Systemic anti-cancer therapy patients may experience unpleasant taste related to the systemic effect of the drug within the mouth.

In most patients receiving systemic anti-cancer therapy taste returns to normal a few months after therapy ends, although if they have received combination therapy including radiotherapy the change maybe prolonged.

4.6 Pain

Regular pain assessment and control of pain is essential, to reduce the risk of compromising fluid and nutritional intake. The use of patient-controlled analgesia is recommended, with morphine being the analgesic of choice (*MASCC 2007*).

Dentate individuals should be advised to avoid acidic pH preparations due to increased risk of decay. A fluoride containing preparation is preferable for these individuals. (*UK medicines information 2013*)

Edentulous individuals (absence of teeth) should take care in preventing infections and mucositis. Dentures should be cleaned thoroughly at least twice a day by brushing with unperfumed soap with a small medium toothbrush (*The Oral Health Foundation 2020*)

If dentures become uncomfortable or mouth becomes sore they should be removed and soaked overnight in water. (*NHS Health Scotland 2013*)

Fungal infections warrant the dentures to be cleaned thoroughly and soaked in chlorhexidine mouthwash if no metal components are present. (*Scottish Dental Clinic Effectiveness Programme 2011*)

Oral care assessment should be performed routinely. Patients should be encouraged to observe their mouths and report early as changes in the patient's oral condition may require changes in oral care interventions.

Osteonecrosis can be a known complication for patients with dental problems or patients receiving bisphosphonates. Oral mouth examination should be completed regularly by healthcare professionals for patients receiving cancer treatment. Patients typically complain of pain which is often related to infection, soft tissue swelling, drainage, and exposed bone. It is important to eliminate the diagnosis of Osteonecrosis, to avoid further complications. Marcy Bolster 2019.

See [section 7](#) for further information on osteonecrosis of the jaw.

5.0 BEFORE COMMENCEMENT OF THERAPY

Once all assessments have been performed on patients we should then ensure we are aware of the treatments that are known to cause oral damage as it may well be that the patient will benefit from being given prophylactic mouth washes throughout their treatment starting prior to their 1st cycle.

The most common mouthwashes that are used for cancer patients are benzydamine and chlorhexidine (this is not recommended for head and neck patients). There is evidence that some therapies can benefit from steroid mouthwashes e.g 'SWISH' regimen ref, however at present the only drug that has been highlighted as benefiting from this mouthwash is everolimus and PIK3CA inhibitors e.g. Alpelisib.

Despite numerous trials there is no mouthwash that has proven to be superior to any other in chemotherapy patients. Frequency of mouth washing is considered the most important factor, although the optimum frequency has not been defined.

If preferred normal saline mouthwashes may be used instead. Ready-made saline is available from pharmacy as a one litre bottle of sodium chloride 0.9% for irrigation. Alternatively, patients can be advised to make their own solution by adding a little salt which can be a teaspoon to a cup of warm water.

5.0.1 Table 3

Please see below examples of systemic cancer treatment agents known to cause oral damage, this list is not exhaustive refer to individual agents SPC:

Targeted Agents	Chemotherapy	
Alpelisib	Docetaxel	Melphalan
Bevacizumab	Capecitabine	Methotrexate
Erlotinib	Carboplatin	Mitomycin
Everolimus	Cisplatin	Mitoxantrone
Gemtuzumab	Daunorubicin	Oxaliplatin
Pazopanib	Doxorubicin	Paclitaxel
Pertuzumab	Epirubicin	Pemetrexed
Sorafenib	Etoposide	Pentostatin
Sunitinib	Fluorouracil	Thiotepa
Temsirolimus	Idarubicin	Topotecan
Trastuzumab	Irinotecan	Vinblastine
Trastuzumab Emtansine	Lomustine	Vincristine
		Vinorelbine

Boers-Doets et al 2011, Johnson 2017, Haanen et al 2017

5.0.2 Table 3

Please see below examples of bone modifying agents that may affect teeth and oral cavity particularly osteonecrosis of jaw.

Bone Modifying Agents
Alendronic Acid
Denosumab
Ibandronic Acid
Pamidronate Sodium
Risedronate Sodium
Sodium Clodronate
Zolendronic Acid

Interventions that may be beneficial prior to the commencement of treatment include:

- Treatment of caries and dental disease.
- All patients should be provided instructions and encouraged to maintain good oral hygiene. Education should also include potential oral complications to enable patients to identify and report early (*Elad et al 2014*).
- Accurate oral assessment recorded in electronic records.

6.0 POST THERAPY

Interventions that may be beneficial following treatment include:

- Clean teeth and tongue with a soft bristle small headed toothbrush (electric or manual) 2 x a day, preferable after meals and before going to bed for 2 minutes as tolerated. (Peterson et al 2015).
- To prevent infection, toothbrushes should be stored with the brush head upwards and not soaked in disinfectant. Toothbrush should be changed regularly, every month or more frequently in relation to patient's infection risk.
- Choose toothpaste that is non-flavoured and non-foaming toothpaste containing 1350-1450 ppm fluoride. Many patients undergoing treatment for cancer from using a higher fluoride content (over 1500ppm) to prevent caries.
- Rinse the mouth regularly, using a saline mouthwash at separate times to toothbrush (5ml salt: 500ml tepid water).
- Avoid mouth rinses containing alcohol. The goal of using mouthwashes may include: oral hygiene, preventing/treating infection, moistening the oral cavity or providing pain relief. Antibacterial mouth washes for gum disease as prescribed by Doctor or dentist as separate times to tooth brushing.
- Lip salve/ cream is useful to prevent dryness and cracking – Water based lip balms can be used.
- If dentures are worn, remove and clean them daily and leave out at night, in a denture pot to give gums and soft tissues a rest. Dentures should be cleaned after every meal.
- Avoid painful stimuli such as hot food and drinks, spicy food, alcohol and smoking.
- Flossing and the use of interdental brushes / cleaners should be used with caution for patients with thrombocytopenia or clotting disorders; and those receiving radiotherapy for head and neck cancer.
- Regular inspection of mouth by the patient and health professionals;
 - Report any redness, tenderness or sores on the lips or in mouth
 - Provide comfort measures such as topical anaesthesia and analgesics
- Prompt treatment of mucositis symptoms and oral infections. In severe cases, more intense intervention may be required. These measures could include:
 - A full multi-disciplinary approach
 - If patient is unwell and unable to perform mouth care, nursing staff are to undertake these tasks with patient consent
 - Encourage oral fluids/consider intravenous therapy
 - Accurate fluid balance monitoring

Interventions which help reduce the mucosal toxicity of systemic anti-cancer therapy drugs include cryotherapy. Rapid cooling of the oral cavity using ice, causes local vasoconstriction and therefore reduces blood flow to the oral mucosa. For drugs such as 5-Fluorouracil, which have a short half-life and are sometimes administered as a bolus injection, the use of cryotherapy may help reduce the amount of drug reaching the oral mucous membranes and therefore reduce the local effects of these drugs. However, this is not effective for continuous infusions.

A range of antiseptic solutions have been used including Chlorhexidine and Benzylamine (Diffiam) being perhaps the most commonly used. Benzylamine significantly reduces OM even at doses >50 Gy in HNC patients. Its role in patients receiving concurrent chemotherapy further needs to be evaluated though. (*M Rastogi et al 2017*)

As there are no interventions that have conclusively been shown to be effective, the recommendations for the prevention and management of oral mucositis is based on available evidence and supplemented by the opinion of clinical experts at local level.

7.0 NON-SYSTEMIC ANTI-CANCER RELATED ORAL COMPLICATIONS

If cancer has spread to the bones, some patients may be treated with bisphosphonates or denosumab. Bisphosphonates are also used in the treatment of hypercalcaemia.

Certain bisphosphonates are linked to a breakdown of the bones in the mouth, most commonly the jaw. It occurs in patients being administered intravenous bisphosphonates, but may also occur in patients taking the treatment orally. This is called osteonecrosis, and although a large number of patients receive bisphosphonates, only a small number develop this condition.

Prior to receiving treatment, these patients should have a baseline oral assessment carried out and documented; they should be given written and verbal information on the potential risks of bisphosphonates. They should be given advice about what to do if dental problems occur, the need to discuss their treatment with their dentist.

It occurs most commonly after dental procedures, such as a tooth extraction, when the area fails to heal. If not treated, the areas of bone loss can become very large and infected. It is less common for this to occur in patients who have not had a dental procedure carried out.

Nurses need to be aware of the importance of carrying out an oral assessment on this group of patients, as although they are not receiving systemic anti-cancer therapy, they can still develop issues with their mouth. Symptoms can include pain, swelling, gum problems, loosening of teeth, numbness or heaviness of jaw, and failure to heal of gums following dental work.

If osteonecrosis is suspected by the nurse following an oral assessment, it should be reported immediately to the consultant, who following discussion with the patient, may decide to discontinue their use based on the effect it would have on the patient's general health.

Resources are available from the UK chemotherapy board in relation to the management of medication related osteonecrosis of the jaw, see also KMCC SACT protocols:

<https://www.rcplondon.ac.uk/guidelines-policy/medication-related-osteonecrosis-jaw-guidance-oncologymultidisciplinary-team>

and

<http://www.sdcep.org.uk/published-guidance/medication-related-osteonecrosis-of-the-jaw/> is considered an acceptable tool for the guidance on ONJ.

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10.0 GLOSSARY

BNF	British National Formulary
BOPA	British Oncology Pharmacist Association
CNB	Cancer Network Board
COSHH	Control of substances hazardous to health regulations.
CYP	Children & Young People (in relation to the IOG)
DCCAG	Diagnostic Cross Cutting Advisory Group
DOG	Disease Orientated Group (NSSG/TSSG/TWG)
DVH	Darent Valley Hospital
DGT	Dartford and Gravesham NHS Trust
EK	East Kent
EKHUFT	East Kent Hospitals University Foundation Trust
EPS	Electronic Prescribing System
FP10(HNC)	Prescriptions issued by hospital doctors for dispensing in the community
GP	General Practitioner
HoP	High Level Operational Policy
IOSC	Improving Outcomes: A Strategy for Cancer
IV	Intravenous
K&C	Kent & Canterbury Hospital, Canterbury, (EKHUFT)
KMCC	Kent & Medway Cancer Collaborative
KMCRN	Kent & Medway Cancer Research Network
KOMS	Kent Oncology Management System
LSESN	London & South East Sarcoma Network
MFT	Medway Foundation Trust
MTW	Maidstone & Tunbridge Wells NHS Trust
NHS	National Health Service
NMP	Non-medical prescriber
NPSA	National Patient Safety agency
NOG	Non Surgical Oncology Group <i>(Permanent oncologist sub group of the DOGs with a specific responsibility for chemo/rad pathways and advice to the DOG, Network and GEOGRAPHICAL LOCATIONS on new drugs)</i>
PoC	Pathway of Care <i>(Network agreed disease site specific clinical guidelines)</i>
QEQM	Queen Elizabeth the Queen Mother Hospital, Margate (EKHUFT)
QoL	Quality of life
QSI	Quality service information system
QST	Quality Surveillance Team
RAT	Research and Trial Group <i>(Permanent sub-group of the DOGs with a specific responsibility for taking forward the clinical trials agenda)</i>
RMH	Royal Marsden Hospital
RNOH	Royal National Orthopaedic Hospital
SACT	Systemic Anti-Cancer therapy
SACT regimen	Systemic Anti-cancer prescription on the electronic prescribing system
SACT protocol	Systemic Anti-cancer protocol on KMCC website
TTO	Treatment to take home
QVH	Queen Victoria Foundation Trust Hospital East Grinstead

UCLH	University College Hospital London
WHH	William Harvey Hospital, Ashford (EKHUFT)
WK	West Kent

11.0 DOCUMENT ADMINISTRATION

The document is located in the Kent and Medway Cancer Network office, in hardcopy and in electronic format at www.kmcc.nhs.uk/kent-and-medway-cancer-collaborative-kmcc/	
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Date of Next Review:	October 2023

Revision History			
Date of revision	New Version Number	Nature of Revision	Author
1/04/09	V0.1	Words 'systemic anti-cancer therapy, cytotoxic and monoclonal' replaced by 'systemic anti-cancer therapy' to reflect NCEPOD report	Bryony Neame
11/05/09	V0.2	Spelling and amendments as suggested by Dr Waters – no operational changes	Bryony Neame
12/05/09	V0.3	Addition of Vaseline for mouth care as requested by Dr. Coltart	Bryony Neame
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2011-09	V2	Document reviewed and updated by group. Published	Collaborative Chemotherapy Nursing Group
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2021	V5.1	V5 Reviewed and updated	C.Handy Chemotherapy group Sarah Haslam Mouthcare specialist Nurse
August 2021	V5.2	Reformatted	R Patel M.Archer
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	V5.3	Updated by RP following comment to incorporate CTAE table	
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