Nivolumab monotherapy

Indication
Advanced (unresectable or metastatic) melanoma.

(NICE TA384)

ICD-10 codes
Codes prefixed with C43

Regimen details

Day	Drug	Dose	Route
1	Nivolumab	240mg every 2 weeks or 480mg every 4 weeks	IV infusion

Cycle frequency
Every 14 or 28 days (see above)

If patients need to switch from 2 weekly dosing to 4 weekly dosing, the first 480mg dose should be administered 2 weeks after the last 240mg dose. If patients need to switch from the 4 weekly dosing to the 2 weekly dosing, the first 240mg dose should be administered 4 weeks after the last 480mg dose.

Number of cycles
Continued until disease progression or unacceptable toxicity.

Administration
Nivolumab may be administered without dilution as a 10mg/mL solution or in sodium chloride 0.9% or glucose 5% at a concentration between 1-10mg/mL over 30 minutes (240mg dose) or 60 minutes (480mg dose). Nivolumab should be administered via an infusion set with an in-line sterile, non-pyrogenic, low protein binding filter (pore size 0.2 – 1.2µm).

Patients should be monitored (blood pressure, pulse and temperature) every 30 minutes during the infusion for infusion related reactions. For mild to moderate reactions, decrease the infusion rate and closely monitor. Premedication with paracetamol and chlorphenamine should be used for further doses. For severe infusion related reactions discontinue treatment.

Pre-medication
Nil

Emetogenicity
This regimen has low emetogenic potential

Additional supportive medication
Loperamide if required.

Extravasation

Nivolumab is neutral (Group 1)

Investigations – pre first cycle

Investigation	**Validity period** (or as per local policy)
FBC	7 days
U+E (including creatinine)	7 days
LFT	7 days
Thyroid function	7 days
Calcium	7 days
Glucose	7 days
Cortisol	7 days

Investigations – pre subsequent cycles

Investigation	**Validity period** (or as per local policy)
FBC	72 hours
U+E (including creatinine)	72 hours
LFT	72 hours
Calcium	As clinically indicated
Thyroid function*	72 hours
Glucose*	72 hours
Cortisol*	72 hours

* every cycle for the first 24 weeks, then every other cycle.

Patients should be monitored for up to 5 months after last dose for adverse reactions.

Standard limits for administration to go ahead

If blood results not within range, authorisation to administer **must** be given by prescriber/ consultant.

Investigation	**Limit**
Neutrophil count	≥ 1.0 x 10^9/L
Platelets	≥ 75 x 10^9/L
Creatinine Clearance (CrCl)	≥ 30mL/min
Bilirubin	≤ 1.5 x ULN
ALT/AST	< ULN
Alkaline Phosphatase	< 5 x ULN

Dose modifications

Dose reductions are not recommended. Doses should be delayed until an adverse reaction resolves to ≤ grade 1.

- **Haematological toxicity**

Discuss with the consultant if:
WBC <2.0 x 10^9/L
Neutrophils <1.0 x 10^9/L
Platelets <75 x 10^9/L

- **Renal impairment**

No dose modifications required in mild-moderate renal impairment. Use with caution in severe renal impairment.

- **Hepatic impairment**

Nivolumab has not been studied in moderate to severe hepatic impairment. Use with caution if bilirubin > 1.5 x ULN – consultant decision.

- **Other toxicities**

Severe pneumonitis and interstitial lung disease

Severe pneumonitis or interstitial lung disease, including fatal cases, have been observed with nivolumab monotherapy. Patients should be monitored for signs and symptoms of pneumonitis including radiographic changes, dyspnoea, and hypoxia. Infectious and disease-related aetiologies should be ruled out.

Grade 2 pneumonitis: withhold treatment, initiate corticosteroids (equivalent to 1mg/kg/day methylprednisolone). Once improved and corticosteroids tapered, treatment may be recommenced.

≥ Grade 3 pneumonitis: permanently discontinue treatment and initiate corticosteroids (equivalent to 2-4mg/kg/day methylprednisolone). If doses > 2mg/kg/day methylprednisolone are required consider alternative immunosuppressive agents, discuss with the consultant.

Immune-related adverse reactions

Immune-related adverse reactions can be severe or life-threatening and may involve the gastrointestinal, liver, skin, nervous, endocrine, or other organ systems. While most immune-related adverse reactions reported occurred during the induction period, onset months after the last dose have also been reported. Unless an alternate aetiology has been identified, diarrhoea, increased stool frequency, bloody stool, LFT elevations, rash and endocrinopathy must be considered inflammatory and treatment-related. Early diagnosis and appropriate management are essential to minimise life-threatening complications.

Systemic high-dose corticosteroid with or without additional immunosuppressive therapy may be required for management of severe immune-related adverse reactions. Specific management guidelines for immune-related adverse reactions are described in full in the summary of product characteristics for nivolumab.

Management of immune-related adverse reactions may require a dose delay or permanent discontinuation of treatment and initiation of systemic high-dose corticosteroid or, in some cases, the addition of other immunosuppressive therapy. Dose reduction is not recommended.

<u>Permanently discontinue</u> treatment in patients with the following symptoms:

Management of these reactions may require high dose systemic corticosteroid therapy if suspected to be immune related:

Toxicity – severe or life threatening	**Definition**
Gastrointestinal	Grade 4 diarrhoea/colitis
Hepatic	Grade 3-4 elevation in AST/ALT and or bilirubin
Nephritis/renal dysfunction	Grade 4 elevation in serum creatinine
Skin	Grade 4 rash Grade 3 pruritus
Endocrine	Grade 4 hypothyroidism Grade 4 hyperthyroidism Grade 4 hypophysitis Grade 3-4 adrenal insufficiency Grade 4 diabetes
Neurological	Grade 3 or 4 motor or sensory neuropathy
Pneumonitis	Grade 3 or 4 pneumonitis
Other	Grade 4 Recurrent grade 3 Persistent grade 2-3 despite treatment modification; inability to reduce corticosteroid dose to 10mg prednisolone/day (or equivalent)

<u>Withhold</u> treatment in patients with the following symptoms:
Treat with corticosteroids.
Upon improvement and after steroid taper treatment may recommence.

Toxicity	Definition
Gastrointestinal	Grade 2-3 diarrhoea/colitis
Hepatic	Grade 2 elevation in AST/ALT and or bilirubin
Nephritis/renal dysfunction	Grade 2-3 elevation in serum creatinine
Skin	Grade 3 rash
Endocrine	Symptomatic grade 2-3 hypothyroidism Symptomatic grade 2-3 hyperthyroidism Symptomatic grade 2-3 hypophysitis Grade 2 adrenal insufficiency Grade 3 diabetes
Neurological	Grade 2 motor or sensory neuropathy
Pneumonitis	Grade 2 pneumonitis
Other	Grade 3 (first occurrence)

Adverse effects - for full details consult product literature/ reference texts

- **Serious side effects**

Immune reactions may occur during or after completion of treatment.
Colitis
Hepatitis
Peripheral neuropathy
Hypopituitarism
Hypothyroidism
Uveitis
Glomerulonephritis
Cardiac events
Thromboembolism
Interstitial lung disease

- **Frequently occurring side effects**

Pruritus
Rash
Nausea and vomiting
Diarrhoea
Fatigue
Decreased appetite
Hyperglycaemia
Abdominal pain
Anorexia

- **Other side effects**

Tumour pain
Headache
Raised transaminases

Significant drug interactions – for full details consult product literature/ reference texts

Anticoagulants: increased risk of haemorrhage – avoid or closely monitor.

Corticosteroids: use of systemic corticosteroids at baseline, before starting nivolumab, should be avoided because of their potential interference with the pharmacodynamic activity and efficacy of the agent. However,

systemic corticosteroids or other immunosuppressants can be used after starting nivolumab to treat immune-related adverse reactions.

Additional comments

The prescriber must discuss the risks of nivolumab therapy with the patient and provide the Patient Alert Card.

Contraception: Adequate methods of contraception should be used during therapy and for 8 weeks after last dose.

References

- National Institute for Health and Clinical Excellence TA384. Accessed 26 January 2017
- via www.nice.org.uk
- Summary of Product Characteristics Nivolumab (Bristol Myers Squibb) accessed 8 August 2018 via www.medicines.org.uk
- Robert et al. Nivolumab in previously untreated melanoma without BRAF mutation. N Engl J Med 2015; 372:320-330

Written/reviewed by: Dr C Herbert (Consultant Oncologist, UHBristol NHS Trust), Dr T Tillett (Consultant Oncologist, Royal United Hospital, Bath)

Checked by: Sarah Murdoch (Senior Oncology Pharmacist, SW Clinical Network)

Authorised by: Dr J Braybrooke (Consultant Oncologist, UHBristol NHS Trust, SW Clinical Network)

Date: January 2017 updated August 2018