North Staffordshire Clinical Commissioning Group

Stoke-On-Trent Clinical Commissioning Group

University Hospitals of North Midlands NHS Trust

Midlands Partnership NHS Foundation Trust

North Staffordshire Combined Healthcare NHS Trust

New Medicines Committee Briefing

Date of submission: 4th September 2019

Drug: Droperidol 2.5mg/1ml injection

is to be reviewed for use within:

Primary care	
Secondary care	X

Summary:

Droperidol® 2.5mg/1ml injection is licensed for

1.Treatment and prevention of post-operative nausea in and vomiting in children and adolescents (aged 2 years to 18 years old)

2. Prevention of nausea and vomiting induced by morphine derivatives during post-operative patient controlled analgesia (PCA) in adults (not recommended for children for this indication).

The UHNM paediatric anaesthetics team propose that droperidol is prescribed as rescue therapy (3rd line antiemetic) for children and adolescents who do not respond adequately to dexamethasone or ondansetron (as monotherapy or in combination).

Currently, paediatric patients who do not respond adequately to dexamethasone or ondansetron or a combination of both, or who have a strong history of post operative nausea do not have a licensed 3rd line option or rescue therapy available at UHNM. These patients are therefore likely to have longer admissions (or if booked in as a day case patient, an overnight ward admission) due to their post-operative nausea and vomiting.

Droperidol has been prescribed for several decades in adults and children as an antiemetic and antipsychotic. Droperidol is recommended as a 3rd line option in current national guidelines for the prevention of post-operative nausea and vomiting in children (The Association of Paediatric Anaesthetists of Great Britain & Ireland (APA) Guidelines on the Prevention of Post-operative Vomiting

in Children 2016). Droperidol is also recommended in regional paediatric and adolescent guidance for treatment of persistent post-operative nausea and vomiting where ondansetron and dexamethasone are contraindicated or not clinically effective.

Droperidol, though more expensive than ondansetron or dexamethasone, is still relatively inexpensive.

It is predicted that introduction of droperidol to the formulary will prevent the overnight ward admission of day case paediatric patients with post operative nausea and vomiting. This is predicted to improve patient's and carer's experience plus minimise post-operative complications and reduce overall cost of treatment for paediatric patients at high risk of post-operative nausea and vomiting.

Formulary application

Consultants submitting application: Dr Catherine Stewart, consultant paediatric anaesthetist, UHNM

Clinical Director supporting application: Dr Charles Baker, consultant anaesthetist, UHNM

Dr Stewart (consultant submitting application) has prescribed droperidol successfully at other Trusts, either pre-emptively for children with a history of severe post-operative nausea and vomiting, or as a rescue treatment for established post-operative nausea and vomiting. Dr Charles Baker (clinical director) supports droperidol's inclusion in the North Staffordshire Joint Formulary for patients with a strong history of post-operative nausea and vomiting, or who have established post-operative nausea and vomiting refractory to dexamethasone and ondansetron.

Background

Post-operative vomiting is estimated to be twice as frequent amongst paediatric patients compared to adult patients. Incidence rates amongst paediatric patients are estimated at 13-42%.

Severe post-operative vomiting can result in complications which extend hospital admission or can lead to unanticipated hospital admission following day-case surgery. Complications can include wound dehiscence, dehydration, pulmonary aspiration and electrolyte imbalance.

Risk factors for post-operative vomiting include

-Age

-History of post-operative vomiting and/or motion sickness

-Gender (female patients are at greater risk of post-operative vomiting from puberty onwards)

-Duration of surgery (> 30 minutes under general anaesthetic)

-Type of surgery eg strabismus surgery

Currently, paediatric patients who do not respond adequately to dexamethasone or ondansetron or a combination of both, or who have a strong history of post operative nausea do not have a licensed 3rd line option or rescue therapy available within North Staffordshire

Droperidol has been used as an antipsychotic and antiemetic for several decades in adults and children. Droperidol was withdrawn from the UK market by Janssen Cilag in March 2001 due to concerns regarding use in chronic conditions and droperidol's potential to increase QTc. Droperidol was re-introduced to the UK market in May 2009 after further scrutiny of evidence showed that droperidol's effect on QTc is modest, reversible and of short duration.

Droperidol is recommended as rescue therapy for paediatric and adolescent patients aged 2-17 years old who do not respond to or for whom ondansetron and/or dexamethasone are contraindicated, by national and regional paediatric anaesthetics guidance.

Current formulary status

Droperidol has not previously been reviewed by the North Staffordshire New Medicines Committee

Droperiodol (Xomolix®) is non-formulary in South Staffordshire, however is included in University Hospitals of Derby and Burton's (UHDB) formulary (see below)

Droperidol is not included in the Birmingham Children's Hospital Formulary (last updated January 2018) and is non-formulary for Birmingham, Sandwell, Solihull and environs APC Formulary

Droperidol is included in UHDB's formulary for third-line management of post-operative nausea and vomiting. It is contraindicated in known or suspected prolonged QT interval, hypokalaemia, hypomagnesaemia, and bradycardia. UHDB guidelines state continuous pulse oximetry should be performed for 30 mins following a single IV dose in patients with identified or suspected risk of ventricular arrhythmia. This is as per SPC recommendations

Droperidol is included in Central and East Cheshire Joint Formulary (Leighton Hospital formulary) for specialist use only.

Droperidol is not included in the Wolverhampton Joint Formulary

Droperidol is included in Sheffield Children's NHS Foundation Trust Formulary

Droperidol is included in the Manchester University NHS Foundation Trust Formulary for consultant-initiation only, for post-operative nausea and vomiting.

Therapeutic class and mode of action

Droperidol is a butyrophenone neuroleptic. Its pharmacologic profile is characterised mainly by dopamine-blocking and weak α1-adrenolytic effects. Droperidol is devoid of anticholinergic and antihistaminic activity.

Droperidol's inhibitory action on dopaminergic receptors in the chemotrigger zone in the area postrema, gives it a potent antiemetic effect, especially useful for the prevention and treatment of postoperative nausea and vomiting and/or induced by opioid analgesics.

Licensed indications

- Prevention and treatment of post-operative nausea and vomiting (PONV) in adults and, as second line, in children (2 to 11 years) and adolescents (12 to 18 years).
- Prevention of nausea and vomiting induced by morphine derivatives during post-operative patient controlled analgesia (PCA) in adults.

Dosage and administration

Droperidol is administered intravenously either via IV injection (adults and paediatrics) or IV infusion via PCA (licensed in adults only)

The IV injection should be administered slowly over 3-5 minutes. The rate of injection for the IV injection is the same for adult and paediatric patients

If administered via a PCA (licensed for adult patients only), droperidol and morphine should be drawn into a syringe and diluted to a suitable volume with NaCl 0.9%. Due to droperidol's low pH, it may cause venous irritation and tissue damage in the case of extravasation. If a central venous access device is unavailable, administration is recommended via a large peripheral vein, and it is recommended that the insertion site is monitored closely using a recognised phlebitis scoring tool. The cannula should be resited at the first signs of inflammation.

<u>Prevention and treatment of post-operative nausea and vomiting (PONV).</u>

Adults: 0.625 mg to 1.25 mg (0.25 to 0.5 ml).

Elderly (over 65 years): 0.625 mg (0.25 ml)

Adult Renal/hepatic impairment: 0.625 mg (0.25 ml)

Children (2 to 11 years) and adolescents (12 to 18 years): 10 to 50 microgram/kg (up to a maximum of 1.25 mg).

Children (below the age of 2 years): not recommended.

Administration of droperidol is recommended 30 minutes before the anticipated end of surgery. Repeat doses may be given every 6 hours as required.

The APA guidelines advises a maximum paediatric and adolescent dose (age 2- 17 years old) of 25mcg/kg (maximum 1.25mg) is administered

The dosage should be adapted to each individual case. The factors to be considered here include age body weight, use of other medicinal products, type of anaesthesia and surgical procedure.

Prevention of nausea and vomiting induced by morphine derivatives during post-operative patient controlled analgesia (PCA).

Adults: 15 to 50 micrograms droperidol per mg of morphine, up to a maximum daily dose of 5 mg droperidol.

Elderly (over 65 years), renal and hepatic impairment: no data in PCA available.

Children (2 to 11 years) and adolescents (12 to 18 years): not indicated in PCA.

Safety and adverse effects

The most frequently reported adverse effects are drowsiness and sedation (reported as common side effects, with an incident rate of ≥1/100 to < 1/10). Hypotension is reported as a less frequent side effect, but with an incident rate of ≥1/100 to < 1/10. Symptoms associated with extra-pyramidal side effects (akasthesia, dystonia) have been reported as uncommon side effects (≥1/1,000 to < 1/100) but incidences of extra pyramidal side effects are reported as occurring very rarely (< 1/10,000). Tachycardia, anxiety and agitation are reported as uncommon side effects (≥1/1,000 to < 1/100).

Symptoms potentially associated with neuroleptic malignant syndrome (reported as a rare side effect with an incident rate of ≥1/10,000 to < 1/1,000) have occasionally been reported i.e. changes in body temperature, stiffness and fever. An alteration in mental status with confusion or agitation and altered consciousness, have been seen. Autonomic instability may manifest as tachycardia, fluctuating blood pressure, excessive sweating/salivation and tremor. In extreme cases NMS may lead to coma, or renal and/or hepato-biliary problems.

Isolated cases of amenorrhoea, galactorrhoea, gynaecomastia, hyperprolactinaemia, and oligomenorrhoea have been associated with prolonged exposure in psychiatric indications. In practice, a single stat dose is usually sufficient to treat PONV, though doses can be repeated every 6 hours.

Cases of venous thromboembolism, including cases of pulmonary embolism and cases of deep vein thrombosis have been reported with antipsychotic medicinal products - frequency unknown

In 2001, droperidol was withdrawn from clinical use due to concerns about QTc interval prolongation and risk of *torsades de pointes* leading to sudden death and also for commercial reasons since usage was declining following these concerns. The FDA issued a warning to this effect. This was criticised since some considered there to be a lack of evidence of a cause-effect relationship. The effect of low dose droperidol for PONV has since been studied and it has been rationalised that its effect on QTc interval is modest, reversible and of short duration. One comparison study involving a paediatric cohort (Mehta et al, 2010) found that both droperidol and ondansetron were associated with modest

increases in QTc intervals when administered at therapeutic antiemetic doses. The study authors concluded that ondansetron and droperidol, in therapeutic anti-emetic doses, produce equivalent, clinically insignificant QT prolongation and negligible Tp-e prolongation, suggesting that neither is torsadogenic in healthy children at these doses. Furthermore many general anaesthetics are also associated with an increased QTc interval so it is difficult to differentiate the effects of that and therapy for PONV.

Warnings and precautions

Central Nervous System

Droperidol may enhance CNS depression produced by other CNS-depressant drugs. Any patient subjected to anaesthesia and receiving potent CNS depressant medicinal products or showing symptoms of CNS depression should be monitored closely.

Concomitant use of metoclopramide and other neuroleptics may lead to an increase in extrapyramidal symptoms and should be avoided

Use with caution in patients with epilepsy (or a history of epilepsy) and conditions predisposing to epilepsy or convulsions.

Cardiovascular

Mild to moderate hypotension and occasionally (reflex) tachycardia have been observed following the administration of droperidol. This reaction usually subsides spontaneously. However, should hypotension persist, the possibility of hypovolaemia should be considered and appropriate fluid replacement administered.

Patients with, or suspected of having, the following risk factors for cardiac arrhythmia should be carefully evaluated prior to administration of droperidol:

- a history of significant cardiac disease including serious ventricular arrhythmia, second or third
- degree atrio-ventricular block, sinus node dysfunction, congestive heart failure, ischemic heart disease and left ventricular hypertrophy;
- family history of sudden death;
- renal failure (particularly when on chronic dialysis);
- significant chronic obstructive pulmonary disease and respiratory failure;
- risk factors for electrolyte disturbances, as seen in patients taking laxatives, glucocorticoids, potassium-wasting diuretics, in association with the administration of insulin in acute settings, or in patients with prolonged vomiting and/or diarrhoea.

Patients at risk for cardiac arrhythmia should have serum electrolytes and creatinine levels assessed and the presence of QT prolongation excluded prior to administration of droperidol.

Continuous pulse oximetry should be performed in patients with identified or suspected risk of ventricular arrhythmia and should continue for 30 minutes following single I.V. administration.

General

To prevent QT prolongation, caution is necessary when patients are taking medicinal products likely to induce electrolyte imbalance (hypokalaemia and/or hypomagnesaemia) e.g. potassium-wasting diuretics, laxatives and glucocorticoids

Patients who have, or are suspected of having, a history of alcohol abuse or recent high intakes, should be thoroughly assessed before droperidol is administered.

In case of unexplained hyperthermia, it is essential to discontinue treatment, since this sign may be one of the elements of malignant syndrome reported with neuroleptics.

Cases of venous thromboembolism (VTE) have been reported with antipsychotic drugs. Since patients treated with antipsychotics often present with acquired risk factors for VTE, all possible risk factors for VTE should be identified before and during treatment with droperidol and preventive measures undertaken.

The dose should be reduced in the elderly and those with impaired renal and hepatic function

This medicinal product contains less than 1 mmol sodium (23 mg) per 1 ml, i.e. essentially 'sodium-free'.

Contraindications

Droperidol is contraindicated in patients with:

- Hypersensitivity to droperidol or to any of the excipients;

- Hypersensitivity to butyrophenones;

- Known or suspected prolonged QT interval (QTc of > 450 msec in females and > 440 msec in males). This includes patients with congenitally long QT interval, patients who have a family history of congenital QT prolongation and patients treated concomitantly with medicinal products known to have a risk of torsades de pointes through QT prolongation (see section 4.5);

- Hypokalaemia or hypomagnesaemia;

- Bradycardia (< 55 heartbeats per minute);

- Known concomitant treatment leading to bradycardia;

- Phaeochromocytoma;

- Comatose states;

- Parkinson's Disease;

- Severe depression

Drug Interactions

Substances inhibiting the activity of cytochrome P450 iso-enzymes (CYP) CYP1A2, CYP3A4 or both could decrease the rate at which droperidol is metabolised and prolong its pharmacological action. Hence, caution is advised if droperidol is given concomitantly with strong CYP 1A2 and CYP3A4 inhibitors.

Substances which can cause torsades des pointes through QT interval prolongation are contraindicated (eg amiodarone, sotalol, cisapride, macrolide antibiotics etc)

Substances which can cause extrapyramidal side effects should not be administered concurrently with droperidol. Examples include metoclopramide and other neuroleptics.

Alcohol (in beverages or in medicines) should be avoided

Presentation

Excipients (Panpharma)

Mannitol (E 421), Tartaric acid (E 334), Sodium hydroxide (for pH adjustment) Water for injections. Available as box of 10 (£8 per box excl VAT) Type I amber glass ampoules containing 1 ml solution for injection, in packs of 10 ampoules. Store in original package to protect from light. Once diluted, use immediately

NB: Chemical and physical in-use stability of 5 mg droperidol with 100 mg morphine sulphate in 50 ml of 0.9% sodium chloride has been demonstrated in plastic syringes for 14 days at 25°C and at 2 to 8°C. From a microbiological point of view, the diluted product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8 °C, unless dilution has taken place in controlled and validated aseptic conditions.

Excipients Xomolix® (Kyowa Kirin)

Mannitol, Tartaric acid, Sodium hydroxide (for pH adjustment), Water for injections

NB: Compatibility of droperidol with morphine sulphate in 0.9% sodium chloride (14 days at room temperature) has been demonstrated in plastic syringes. From a microbiological point of view, the diluted product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8 °C, unless dilution has taken place in controlled and validated aseptic conditions

Type I amber glass ampoules containing 1 ml solution for injection, in packs of 10 ampoules

Patent Status

Generic 2.5mg/1ml formulations are available.

Guidance and Evidence Summary

Droperidol is listed as a third line option for post-operative nausea and vomiting in children and adolescents aged 2-17 years old, in the Partners in Paediatrics Bedside Clinical Guidelines 2018-2020. Droperidol 25mcg/kg IV (maximum 1.25mg) is recommended if patient is experiencing persistence nausea and at least 1 episode of vomiting after receiving ondansetron within the last 8 hours, and if dexamethasone (2nd line treatment) is not clinically appropriate. The Partners in Paediatrics consists of the following NHS Trusts:

Birmingham Community Healthcare NHS Foundation Trust

Birmingham Women's and Children's NHS Foundation Trust

Black Country Partnership NHS Foundation Trust

Dudley Clinical Commissioning Group

East Cheshire NHS Trust

George Eliot Hospital NHS Trust

Midlands Partnership NHS Foundation Trust

Robert Jones & Agnes Hunt Orthopaedic Hospital NHS Foundation Trust

South Warwickshire NHS Foundation Trust

The Dudley Group NHS Foundation Trust

The Royal Orthopaedic Hospital NHS Foundation Trust

The Royal Wolverhampton NHS Trust

The Shrewsbury & Telford Hospital NHS Trust

University Hospitals Birmingham NHS Foundation Trust

University Hospitals Coventry & Warwickshire NHS Trust

University Hospitals of Derby and Burton Hospitals NHS Foundation Trust

University Hospitals of North Midlands NHS Trust

National Guidance	Y

The APA Guidelines on the Prevention of Post-operative Vomiting in Children 2016 states droperidol can be effective for both prophylaxis and treatment of post-operative vomiting, particularly in situations where dexamethasone is contraindicated. The APA Guidelines recommend droperidol should be considered as monotherapy or as combination therapy with ondansetron. Combination therapy is recommended if patient is at high risk of post-operative vomiting or where monotherapy as failed.

Prophylactic antiemetic therapy for all patients is not recommended due to unnecessary exposure to possible side effects. The Association of Paediatric Anaesthetists of Great Britain and Ireland (APA)

recommend that only patients identified as high risk of post-operative vomiting should be offered prophylaxis.

NICE Guidance	**N**

There is no NICE guidance published in regards to droperidol.

Scottish Medicines Consortium (SMC)	**N**

Not reviewed

All Wales Medicines Strategy Group (AWMSG)	**N**

Not reviewed

Regional Drug and Therapeutic Centre (RDTC)	**N**

Not reviewed

Midlands Therapeutics Review and Advisory Committee (MTRAC)	**N**

Not reviewed

Efficacy

Droperidol has been used as an antipsychotic and antiemetic for several decades in adults and children.

Until March 2001, droperidol was available in the UK in the following licensed formulations

- Droleptan® 10mg tablets, licensed for tranquilisation and emergency control in mania
- Dropleptan® 1mg/1ml oral liquid, licensed for tranquilisation and emergency control in mania
- Droleptan® 5mg/ml injection (IM or IV injection), licensed for
    - Tranquilisation and emergency control in mania
    - Cancer chemotherapy-induced nausea and vomiting
    - Pre-medication prior to surgery

Droperidol was reintroduced to the UK market in 2009 as a 2.5mg/1ml injection for IV injection or infusion, licensed as an antiemetic.

A 1999 meta-analysis of published double blinded, randomised controlled trials compared the efficacy and safety of ondansetron, metoclopramide and droperidol. 58 studies were included (4 were excluded for methodological reasons). Ondansetron was more effective than droperidol in preventing vomiting in children, but ondansetron and droperidol were equally effective in adults. Ondansetron and droperidol were more effective than metoclopramide in preventing vomiting.

A 2000 systematic review including 29 trials in paediatrics concluded that the NNT for droperidol in paediatric patients (number needed to treat) was 4.2 at a dose of 75mcg/kg, which is above the licensed maximum dose. At a dose of 10-20 mcg/kg, the NNT to prevent early vomiting was 7.8. For a dose of 40-50 mcg/kg, the NNT to prevent early vomiting in children decreased to 6.6. All outcomes showed an improvement in early onset PONV (0-6 hours post operative) with droperidol compared with placebo. The same systematic review (Henzi et al) stated that all outcomes showed that droperidol showed a statistically significant improvement in PONV in children. There was evidence of dose-responsiveness for late anti-vomiting efficacy with IV doses. For the lowest dose-range, 5-20 mcg/kg, the NNT to prevent late vomiting was 7.3. For 50 mcg/kg, the NNT decreased to 4.4. For the most frequently used dose used in reviewed trials, 75 mcg/kg (which is above the current maximum licensed dose in children), the NNT further decreased to 3.8. Confidence intervals overlapped, however, NNT point estimates improved by 92%. The NNH (number needed to harm) for extrapyramidal symptoms was 91 for children (in any patient NNH was 408). The review also concluded that drowsiness and sedation are dose dependant

The combination of ondansetron and droperidol may be synergistic. Chan et al (2006) studied 400 adult patients scheduled for laparoscopic gyaneacologic surgery who were randomly assigned to receive 1) saline IV; 2) ondansetron 4 mg IV; 3) droperidol 1.25 mg IV; or 4) a combination of droperiodol 1.25 mg and ondansetron 4 mg IV five minutes before induction of anaesthesia. Patients were reviewed regularly for 48 hours. Changes in the heart rate adjusted QTc interval were measured from electrocardiograms recorded before and 5 minutes after study drug administration. In a subgroup of 160 patients, QTc intervals were measured again at 2–3 h after surgery. During the first 48 h after the surgery, the proportion of patients experiencing PONV was 68% (95% CI 58–77) in the control group. A single dose of ondansetron or droperidol decreased the incidence of PONV to 30% (95% CI 21–40) and 28% (95% CI 20–38), respectively. The predicted incidence of PONV after drug combination, 11.8% (7.1–11.9), was similar to that observed, 12.1% (6.4–20.2), P = 0.94. The corresponding predicted and observed treatment responses in the combination group were 88.2% and 87.9%, respectively. There was a modest and transient increase in QTc interval after administration of ondansetron, droperidol, or their combination. The changes were however similar among groups. The authors concluded that the interaction between ondansetron and droperiodol was additive. Both drugs acted independently of each other through their specific mechanisms of action. The incidence of QTc prolongation did not increase with the drug combination.

Cost Analysis

It is predicted that 20-40 patients per year may be prescribed droperidol.

Most patients will respond to a single dose peri-operatively (30 minutes before the anticipated end of surgery). Repeat doses may be given every 6 hours as required.

The maximum licensed single dose for children and adolescents aged 2-18 years old is 50mcg/kg or 1.25mg stat. In practice a maximum of 25mcg/kg (up to 1.25mg) is administered stat (as per APA guidelines) and a single dose is clinically effective.

Droperidol is more expensive compared to dexamethasone and ondansetron prescribed as monotherapy or in combination. However, annual expenditure for droperidol is expected to be off-set by savings made by preventing unplanned overnight admissions or extended hospital admissions.

Maximum cost per dose of antiemetics for post-operative nausea and vomiting in children and adolescents (aged 2-17 years old), inclusive of VAT	
Ondansetron (0.1mg/kg up to a maximum 4mg per dose)	4mg Orodispersible tablet - [redacted] per 4mg dose 4mg/2ml injection = [redacted] per 4mg dose (administered as IV injection over at least 30 seconds)
Dexamethasone (0.15mg/kg up to a maximum of 6.6mg)	3.3mg/ml injection = [redacted] per 6.6mg dose (administer as slow IV injection over 3-5 minutes)
Droperidol (maximum 1.25mg per dose)	2mg/ml injection = [redacted] per 1.25mg dose (administered as slow IV injection over 3-5 minutes)- NB prices based on Panpharma product

Predicted droperidol expenditure (based on Panpharma product prices)		
	Cost per patient (inclusive of VAT)	Predicted annual droperidol expenditure (inclusive of VAT) based on 40 patients per annum.
Droperidol 1.25mg stat dose (maximum licensed single dose)	[redacted]	[redacted]
Droperidol 1.25mg administered every 6 hours for up to 48 hours (8 doses)	[redacted]	[redacted]
SUMMARY OF PREDICTED ANNUAL EXPENDITURE FOR DROPERIDOL	Minimum annual droperidol expenditure is predicted to be [redacted] if all patients receive a single dose only. Maximum annual droperidol expenditure will be [redacted] if all patients received a maximum of 8 doses – in practice this is unlikely as most patients respond to a single dose.	

References

1. The Association of Paediatric Anaesthetists of Great Britain & Ireland Guidelines on the Prevention of Post-operative Vomiting in Children 2016. Contributing Authors: Simon Martin, David Baines, Helen Holtby, Alison S Carr
2. Bedside Clinical Guidelines Partnership Paediatric Guidelines 2018-2020. Post-operative Nausea and Vomiting aged > 2 years old.
3. BNF38 – September 1999
4. www.medicines.org.uk – Droperidol 2.5mg/ml solution for injection SmPC (PanPharma UK Ltd). Accessed August 2019
5. www.medicines.org.uk – Xomolix® 2.5mg/ml solution for injection SmPC (Kyowa Kirin Ltd). Accessed August 2019
6. BNFc. Droperidol monograph. Accessed August 2019 via www.nice.org.uk
7. Sneyd JR, Editorial. Droperidol: past, present and future, Anaesthesia, 2009; 64: 1161-1167
8. McKeage K, Simpson D, Wagstaff AJ, Intravenous Droperidol. A review of its use in the management of postoperative nausea and vomiting, ADIS Drug Evaluation, Drugs, 2006; 66 (16): 2123-2147
9. Mehta D, Sanatani S, Whyte SD. The effects of droperidol and ondansetron on dispersion of myocardial repolarization in children. Pediatric Anesthesia 2010;20:905–12
10. Henzi I, Sonderegger J, Tramèr MR. Canadian Journal of Anaesthesia. 2000 Jun;47(6):537-51. Efficacy, dose-response, and adverse effects of droperidol for prevention of postoperative nausea and vomiting
11. Chan MT, Choi KC, Gin T, Chui PT, Short TG, Yuen PM, Poon AH, Apfel CC, Gan TJ. Anesth Analg 2006;103:1155–62 The additive interactions between ondansetron and droperidol for preventing postoperative nausea and vomiting.

Produced by

Xin Wei Tan
Advanced Specialist Pharmacist –Secondary/Primary Care Interface
University Hospital of North Midlands
Telephone: 01782 674541
e-mail: xinwei.tan@uhnm.nhs.uk