Royal Cornwall Hospitals
NHS Trust

Initiation of Clonidine for the Treatment of Dystonia in Children with Cerebral Palsy

V1.0

January 2024

1. Aim/Purpose of this Guideline

1.1. To provide guidance to clinicians and children's community nursing team when commencing clonidine for the treatment of dystonia, with particular regards to dosing, blood pressure and heart rate monitoring, and guidance on how to switch to transdermal patches if appropriate.

1.2. Setting- Royal Cornwall Hospital and Community settings and Cornwall Foundation Trust Childrens Community Nursing Team

For Staff- Medical, Nursing and Community Nursing Teams.

Patients- cerebral palsy paediatric patients with dystonia requiring clonidine under neurology specialist advice.

Data Protection Act 2018 (UK General Data Protection Regulation – GDPR) Legislation.

The Trust has a duty under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed, and documented. We cannot rely on opt out, it must be opt in.

Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the Data Protection Act 2018 and UK General Data Protection Regulations 2016/679 please see the Information Use Framework Policy or contact the Information Governance Team.

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2. The Guidance

2.1. **Purpose**

To ensure that when oral Clonidine has been recommended as a treatment for management of dystonia that there is a consistent and supervised initiation of the medication and subsequent dose increases.

2.1.1. The decision to start oral clonidine will be made by the Consultant Paediatrician, in conjunction with Tertiary Paediatric Neurology input from Bristol Children's Hospital.

2.1.2. Oral clonidine dosing initiation can be started by any medical or nurse competent in measuring vital signs.

2.2. **Introduction**

Dystonia is a symptom of an abnormally functioning motor system[1]. It can occur singly as a result of a genetic mutation or as part of more complex motor disease in children with brain injury or neurodegenerative disease[1]. The investigation, identification and overall management plan of dystonia is not discussed in this guideline and is covered in the "Dystonia Investigation, Identification and Management" guideline from the Bristol Royal Hospital for Children. This clonidine guideline should be used in reference to the larger dystonia guideline[1]. (For Clinicians | University Hospitals Bristol NHS Foundation Trust (uhbristol.nhs.uk))

Dystonia is a fluctuating state and can be graded according to the Bristol guideline. Management will depend on type and grade of dystonia.

Clonidine is a second line oral medication in management of dystonia, usually after trihexyphenidyl or gabapentin.

Clonidine should always be used at the least sedating dose, and this is reached by gradual dose increases to monitor effect on dystonia and sedation in the individual patient.

2.3. Pharmacokinetics

Oral Clonidine is an alpha-agonist, primarily working on the alpha 2 receptors in the central nervous system. It is a sedative, anxiolytic, and also a centrally active antihypertensive[2]. It causes less respiratory depression than the benzodiazepines[3].

Clonidine has rapid absorption post oral administration (onset of effect 30-60 minutes[6, 14]).

Peak plasma concentration occurs 1-3 hours after oral administration. Half-life is 12-33 hours in adults.

In infants <12 months of age, clonidine clearance is reduced, and therefore for **all under 1 year olds requiring clonidine treatment, this should be initiated in a hospital setting.**

Half life is increased in renal impairment[14]- if there is a history of renal impairment, Community Paediatrician to please consider lower doses and discuss with pharmacist if needed for advice.

2.4. Side effects

The main potential side effects are bradycardia and hypotension[2, 3, 5] which appear to be dose dependent[5].

Toxbase reports incidence in overdose patients of 10% having bradycardia and 9% hypotension[16]. In a paediatric study of clonidine overdose (aged13-21years) 45% were found to be bradycardic and 44% were hypotensive[19]. However, it has been noted in adults that response to clonidine is not generally predictable on clinical grounds[18]. Toxbase reports that symptoms rarely develop if symptom free more than 4 hours after ingestion[16]. There is evidence than doses of <10micrograms/kg orally ingested are likely to only give mild side effects [(16)],

and IV infusions of 1microgram/kg/hr were not associated with significant changes on cardiovascular monitoring[11].

Other side effects e.g., dry mouth, constipation and nausea and vomiting have been reported. For a full list please refer to the BNFc.

2.5. Contraindications

Avoid clonidine in:

- Bradyarrhythmia secondary to 2nd or 3rd degree AV (atrioventricular) heart block or sinus syndrome[2].
- Raynaud's syndrome[6].
- Occlusive peripheral vascular disease[6].
- Patients receiving methylphenidate.
- For a full list of other potential drug interactions please see the BNFc or discuss with a pharmacist.

2.6. Cautions

- Anyone with a pre-existing cardiac conduction abnormality should have clonidine initiation and dose increases in a hospital setting with continuous ECG monitoring.
- Those patients receiving anti-hypertensive treatment may be more susceptible to the hypotensive effects of clonidine and should have blood pressure monitored closely when initiating clonidine.
- Renal impairment- Community Paediatrician to please consider lower doses and discuss with pharmacist if needed for advice.

2.7. Management of oral clonidine initiation and dose increases

2.7.1. Pre-initiation requirements:

- >1 year of age (under 1 year to start in hospital) over 1 in the community.
- Check no family history of cardiovascular sudden death.
- Check no personal history of cardiac disease.
- Give family information leaflet from Medicines for Children.

2.7.2. Consultant to initiate plan with Community Advanced Clinical Practitioner (ACP)

- Consultant to E-mail Community ACP to then instigate with Childrens community nursing team to take vital signs and monitor clonidine commencement.

- Any adverse reactions Childrens Community Nursing Team or ACP (Advanced Clinical Practitioner) to inform Consultant.

2.7.3. Dosing- Oral Clonidine

Spasticity / Movement Disorder:

Child > 1 month: 1mcg to 5mcg/kg/dose three times a day[1].

Doses can be split to be given more frequently, up to 4 hourly if required, but the total daily dose should remain the same.

Frequency of dosing may need to be increased and/or alternative route of administration considered if there are issues with absorption from enteral route[6].

2.8. Monitoring

2.8.1. First dose:

1) Take pre dose blood pressure and heart rate 24 hours before commencement.

There is no need for continuous ECG monitoring.

Blood pressure ideally to be taken on right upper limb if unable to then to be documented in care plan which Limb it was taken on and then same limb used consistently.

2) Take baseline blood pressure and pulse rate and take an average.

BP is variable by age and height, and so to give the best safe range for each individual this should be calculated on a patient by patient basis.

Normal blood pressure is a systolic and/or diastolic blood pressure >5th centile and <90th centile for age and height[12, 13].

3) Give clonidine dose.

4) Blood pressure and heart rate reading 1 hour post dose and then for 2 hours post dose.

If >20mmHg drop- contact medical team for review, and continue to monitor HR and BP.

If no >20mmHg drop AND- Then to repeat Blood Pressure 24 hours later if this remains okay, then no further monitoring.

2.8.2. Dose escalation

Doses need to be increased with assessment of symptom response and with BP and pulse monitoring for each dose increase[6].

1) **Take Pre dose blood pressure and heart rate.**

2) **Give clonidine dose.**

3) **Monitoring.**

If no vital signs instability on initial dose.

- Recheck BP and heart rate at 1 and 2 hours post dose.

If >20mmHg drop – contact medical team for review, and continue to monitor HR and BP.

If no >20mmHg drop- Then to re-check 24 hours later and if BP and HR remain stable, then no further monitoring needed for this dose increase.

If significant BP or heart rate drop on initial dose, then dose increases to be done in hospital.

- Check BP and heart rate every 30mins for 2 hours, or as per individualised plan.

If >20mmHg drop- contact medical team for review, and continue to monitor HR and BP.

If no >20mmHg drop- no further monitoring needed for this dose increase.

2.9. **Administration via feeding tube**

There is a liquid available, but where this is not suitable or unavailable, the injection may be given via the tube, or the tablets may be crushed. If tablets are used, experience suggests that the 100microgram tablets disperse better than the 25 microgram tablets[6].

There is limited evidence regarding the administration of clonidine via tubes terminating in the jejunum, and therefore if this route is necessary it is advised to monitor efficacy and blood pressure closely.

Further information, if needed, can be obtained from the paediatric pharmacy team or Medicines Information.

2.10. **Clonidine patches**

Once established on least sedating effective dose, clonidine can be switched to transdermal patches. Patches may also be used as an alternative if oral clonidine will not be absorbed.

NOTE: **Patches must be removed for MRI as the contents heats up and can cause skin burns**[6].

2.10.1. Initiating patches (children > 10kg)[1]:

- Calculate the total daily dose of oral/IV clonidine and round down to the nearest patch. The patch sizes available can deliver 100, 200 or 300 micrograms/day. Please see conversation instructions below. Information for when prescribing:
    - 2.5 mg clonidine patch delivers 100 micrograms/day.
    - 5mg clonidine patch delivers 200 micrograms/day.
    - 7.5 mg clonidine patch delivers 300 micrograms/day.
- Replace the patch every 7 days- rotate sites to reduce risk of localised skin irritation.
- The maximum daily dose recommended is equivalent to 2micrograms/kg/hour[1]. (higher doses may occasionally be used under guidance from Bristol neurology team)
- Therapeutic plasma clonidine levels are achieved 2 to 3 days after initial application of the patch.
- If more than 2.5 mg patch to be used i.e. 200 micrograms/day, consider using 2 smaller patches that are changed on different days of the week to reduce end of dose effect.
- Larger doses can be used, in conjunction with discussions with Bristol neurology team. If multiple patches are required, never use two different size patches as this can cause administration issues and errors in application of patches.

2.10.2. Conversion to patches for patients stabilised on IV or oral clonidine[6].

- For patients on IV/oral dose less than 150 micrograms/day, select the clonidine 2.5mg patch. Then follow IV/oral tapering dose below.
- For patients on IV/oral dose between 150 micrograms and 250 micrograms/day, select the 5 mg clonidine patch.

IV/Oral tapering doses:

- Apply patch on day 1.
- Day 1 give 100% of oral/IV dose.
- Day 2 give 50% of oral/IV dose.
- Day 3 give 25% oral/IV dose.
- Day 4 patient will only need patch.

2.11. Stopping Clonidine

Clonidine carries the risk of rebound hypertension if stopped abruptly. It should be withdrawn gradually with blood pressure checks[6,12].

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Compliance with guideline/ key changes to practice.
Lead	Community and Acute Medical Paediatric team.
Tool	Use of Datix to monitor any incidents with the prescribing and administration of Clonidine.
Frequency	As per frequency of incident reports.
Reporting arrangements	Incidents will be shared at monthly business meetings.
Acting on recommendations and Lead(s)	Community and Acute Medical Paediatric team.
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within 3 months, immediately if required. A lead member of the team will be identified to take each change forward where appropriate. Lessons will be shared with all the relevant staff/ stakeholders.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion and Human Rights Policy' or the Equality and Diversity website.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Initiation of Oral Clonidine for the Treatment of Dystonia in Children with Cerebral Palsy V1.0.
This document replaces (exact title of previous version):	New Document.
Date Issued/Approved:	January 2024.
Date Valid From:	January 2024.
Date Valid To:	January 2027.
Directorate / Department responsible (author/owner):	Dr Catriona Bowman; Paediatric Registrar. Dr Rebecca Garland; Consultant Community Paediatrician. Gemma Allen; Trainee Advanced Clinical Practitioner for Paediatric Palliative Care.
Contact details:	rch-tr.communitypaediatricteam@nhs.net 01872 254518.
Brief summary of contents:	To provide guidance to clinicians and children's community nursing team when commencing clonidine for the treatment of dystonia, with particular regards to dosing, blood pressure and heart rate monitoring, and guidance on how to switch to transdermal patches if appropriate.
Suggested Keywords:	Clonidine. Dystonia.
Target Audience:	**RCHT:** Yes **CFT:** Yes **CIOS ICB:** No
Executive Director responsible for Policy:	Chief Medical Officer.
Approval route for consultation and ratification:	Child Health Audit and Guidelines Group.
General Manager confirming approval processes:	Caroline Chappell.

Information Category	Detailed Information
Name of Governance Lead confirming approval by specialty and care group management meetings:	Tamara Thirlby.
Links to key external standards:	Please see appendix 3.
Related Documents:	Please see appendix 3.
Training Need Identified?	No.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet.
Document Library Folder/Sub Folder:	Clinical / Paediatrics / Prescribing.

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
January 2024	V1.0	Initial issue.	Dr Catriona Bowman; Paediatric Registrar. Dr Rebecca Garland; Consultant Community Paediatrician. Gemma Allen; Trainee Advanced Clinical Practitioner for Paediatric Palliative Care.

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus 6 years.

This document is only valid on the day of printing.

Controlled Document.

This document has been created following the Royal Cornwall Hospitals NHS Trust The Policy on Policies (Development and Management of Knowledge Procedural and Web Documents Policy). It should not be altered in any way without the express permission of the author or their Line Manager.

Appendix 2. Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity and Inclusion Team rcht.inclusion@nhs.net

Information Category	Detailed Information
Name of the strategy / policy / proposal / service function to be assessed:	Initiation of Oral Clonidine for the Treatment of Dystonia in Children with Cerebral Palsy V1.0
Directorate and service area:	Paediatrics
Is this a new or existing Policy?	New
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Child Health Audit and Guidelines Group
Contact details:	rch-tr.communitypaediatricteam@nhs.net 01872 254518

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	Clinicians and children's community nursing team when commencing clonidine for the treatment of dystonia.
2. Policy Objectives	To support the initiation of clonidine in community settings (but is also relevant to hospital settings).
3. Policy Intended Outcomes	As above.
4. How will you measure each outcome?	Audit/Multidisciplinary team weekly discussion/incidents/risk management.
5. Who is intended to benefit from the policy?	Children with complex neurodisability, children's community nursing team, paediatric medical team, (and paediatric neurology team in Bristol by decreasing queries and therefore workload).

Information Category	Detailed Information
6a. Who did you consult with? (Please select Yes or No for each category)	• Workforce: Yes • Patients/ visitors: No • Local groups/ system partners: No • External organisations: No • Other: No
6b. Please list the individuals/groups who have been consulted about this policy.	**Please record specific names of individuals/ groups:** Child Health Audit and Guidelines Group.
6c. What was the outcome of the consultation?	Approved- 18 January 2024.
6d. Have you used any of the following to assist your assessment?	**National or local statistics, audits, activity reports, process maps, complaints, staff or patient surveys:** No

7. The Impact

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	No	
Sex (male or female)	No	
Gender reassignment (Transgender, non-binary, gender fluid etc.)	No	
Race	No	Any information provided should be in an accessible format for the parent/ carer/ patient's needs- i.e., available in different languages if required/ access to an interpreter if required.

Protected Characteristic	(Yes or No)	Rationale
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	Those parent/ carer/ patients with any identified additional needs will be referred for additional support as appropriate- i.e., to the Liaison team or for specialised equipment. Written information will be provided in a format to meet the family's needs e.g., easy read, audio etc.
Religion or belief	No	All staff should be aware of any beliefs that may impact on the decision to treat and should respond accordingly,
Marriage and civil partnership	No	All staff should be aware of any marital arrangements that may have an impact on care (for example: separated parents, domestic abuse).
Pregnancy and maternity	No	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	No	

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Child Health Audit and Guidelines Group.

If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:
Section 2. Full Equality Analysis

Appendix 3- References

1. UHBW guideline Dystonia Investigation, Identification and Management" guideline from the Bristol Royal Hospital for Children.

2. Bristol PICU guideline IV clonidine in status dystonicus.

3. Nakou V, Williamson K, Arichi T, Lumsden DE, Tomlin S, Kaminska M, Lin JP. Safety and efficacy of high-dose enteral, intravenous, and transdermal clonidine for the acute management of severe intractable childhood dystonia and status dystonicus: An illustrative case-series. Eur J Paediatr Neurol. 2017 Nov;21(6):823-832. doi: 10.1016/j.ejpn.2017.07.007. Epub 2017 Jul 28. PMID:28844551.

4. C. Sayer et al Clonidine use in Outpatient management of severe secondary dystonia DOI:10.1016/j.ejpn.2017.03.00.

5. Basker S, Singh G, Jacob R. Clonidine in paediatrics - a review. Indian J Anaesth. 2009 Jun;53(3):270-80. PMID: 20640134; PMCID: PMC2900117.

6. The Association of Paediatric Palliative Medicine (appm.org.uk) Jassal SS, Aindow A, et al The Association of Palliative Care Formulary, 2017. https://www.appm.org.uk/guidelines-resources/appmmaster-formulary/

7. DAPA Measurement Toolkit (mrc.ac.uk)- knee height to estimate.

8. Chumlea WC, Guo SS, Steinbaugh ML. Prediction of stature from knee height for black and white adults and children with application to mobility-impaired or handicapped persons. Journal of the American Dietetic Association. 1994 Dec;94(12):1385-8, 1391; quiz 1389-90. DOI: 10.1016/0002-8223(94)92540-2. PMID: 7963188.

9. Pinto C, Borrego R, Eiró-Gomes M, et al. Embracing the Nutritional Assessment in Cerebral Palsy: A Toolkit for Healthcare Professionals for Daily Practice. Nutrients. 2022 Mar;14(6):1180. DOI: 10.3390/nu14061180. PMID: 35334837; PMCID: PMC8950259.

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12. **Cardiovascular Monitoring of Children and Adolescents Receiving Psychotropic Drugs** A Statement for Healthcare Professionals From the Committee on Congenital Cardiac Defects, Council on Cardiovascular Disease in the Young, American Heart Association **Originally published** 23 Feb.1999 https://doi.org/10.1161/01.CIR.99.7.979 Circulation.1999;99:979–982.

13. PICUOralRectalSedationMonograph.pdf (leedsformulary.nhs.uk)

14. clonidine hcl or CATAPRES Pediatric Drug Monograph (wellrx.com)

15. Meds info Clonidine 25mcg Tablets BP - Summary of Product Characteristics (SmPC) - (emc) (medicines.org.uk)

16. Toxbase.

17. Ambrose C, Sale S, Howells R, Bevan C, Jenkins I, Weir P, Murphy P, Wolf A. Intravenous clonidine infusion in critically ill children: dose-dependent sedative effects and cardiovascular stability. Br J Anaesth. 2000 Jun;84(6):794-6. doi: 10.1093/oxfordjournals.bja.a013594. PMID: 10895758.

18. Hanna J, Ghazi L, Yamamoto Y, Simonov M, Shah T, Wilson FP, Peixoto AJ. Excessive Blood Pressure Response to Clonidine in Hospitalized Patients With Asymptomatic Severe Hypertension. Am J Hypertens. 2022 May 10;35(5):433-440. doi: 10.1093/ajh/hpac004. PMID: 35038322; PMCID: PMC9088839.

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21. UHBW oral propranolol for haemangioma guideline.

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