

Management of croup: A quality improvement project

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Introduction:

Croup is a common presentation in early childhood. Treatment is guided by the severity of symptoms, with most guidelines advising steroids for mild/moderate cases and nebulised adrenaline in severe presentations. In 2019, following anecdotal reports of high numbers of croup admissions receiving nebulised adrenaline, we carried out a QI project of acute croup management in the Oxford Children's Hospital. Whilst the use of single dose nebulised adrenaline is not associated with clinically significant adverse effects, superfluous use may be associated with patient distress and lengthier hospital stays.

There is significant variation in croup severity classifications and management guidelines at a local and national level. This was identified as a major factor in varied adherence to guidelines and high levels of unnecessary adrenaline administration. Interventions were developed to 1) improve clinical knowledge of croup management and 2) enhance support structures for staff treating croup patients. This involved education of multi-professional staff by increasing awareness of national and Trust guidelines. There was also a focus on ensuring a structure of senior support to promote the sustainability of the intervention.

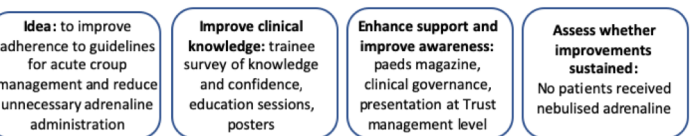
Methods

Retrospective data in electronic patient records for children presenting to ED or children's clinical decision unit (CDU) with croup over a 3-month period in 2019 was assessed.

394 patients were seen with croup. In total, 31 (7.8%) received nebulised adrenaline. In October, only 56% (9/16) met the criteria for adrenaline, while in November it was only 43% (6/14). A total of 128 patients (32%) were admitted.

Interventions were then developed through multiple PDSA cycles to improve adherence to guidelines for acute croup management. These focused on improving clinical knowledge of symptom severity assessment and management guidelines, as well as promoting sustainability through senior staff awareness of the programme.

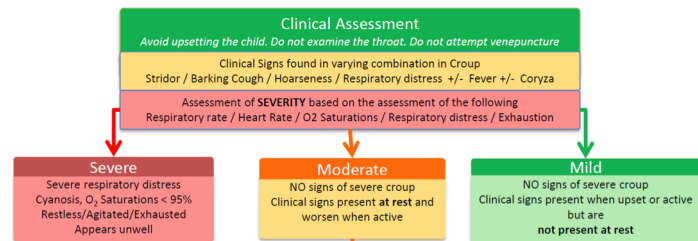
Following intervention, data collection was repeated in autumn 2020 to review the sustainability of the project.



Autumn 2019 **Autumn 2020**

Trainee surveys showed that confidence and knowledge of managing croup was low amongst junior staff, which was identified as a main cause of unnecessary administration of adrenaline and hospital admission. Interventions to improve clinical knowledge (teaching sessions and posters) were targeted at trainees in both ED and paediatrics to ensure consistency and the educational sessions were provided frequently to maximise coverage. Teaching focused on accurate assessment of the severity of croup as per local guidelines (see below), as the trainee survey suggested the severity of croup was often overestimated during clinical assessment of the child.

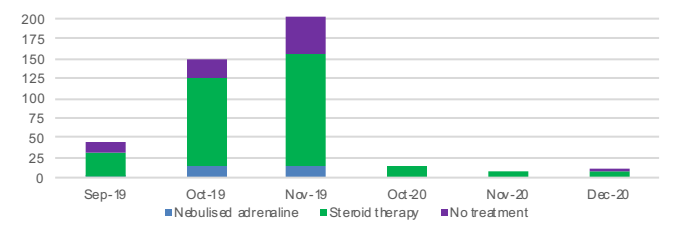
Improvements in guideline adherence were observed in winter 2020. The next PDSA cycle focused on sustainability of the intervention due to the regular cycling of junior staff through the department. Clinical governance and Trust level presentations raised awareness of the QI programme at the senior level to encourage sustained good practice.



Results

2019	Total croup	Nebulised adrenaline	Steroid therapy	Admission
September	44	1	31	18
October	149	16	110	56
November	201	14	140	54
Total	394	31	281	128

2020	Total croup	Nebulised adrenaline	Steroid therapy	Admission
October	15	0	15	1
November	7	0	7	1
December	10	0	9	0
Total	32	0	31	2



Following intervention, in autumn 2020, 32 patients were seen with croup. None of these patients received nebulised adrenaline and only 2 were admitted. 97% were treated appropriately with oral steroids.

Trust policy advises admitting patients who received nebulised adrenaline for an 8-hour period of observation. This equated to 11 bed days over 3 months in 2019. This waste of resource has been eliminated since the introduction of our QI programme.

Limitations of the project included the effects of COVID-19 leading to staff redeployment and disruption of the educational programme. Furthermore, fewer than expected croup presentations were seen in 2020 due to the effects of national lockdowns.

Conclusion

This QI project aimed to improve clinical management of acute croup at a major children's hospital. Variations in croup severity classification and management guidelines can lead to unnecessary adrenaline administration, lengthier hospital stays and patient distress. Following implementation of our QI programme, all patients received treatment in line with guidelines in 2020. Improved clinical knowledge of guidelines promoted patient safety and reduced unnecessary hospital stays. Sustainability was ensured through targeting interventions at multi-professional staff of all grades.

It is reassuring that improvements were sustained into 2020 and were not adversely affected by the pandemic. Limitations due to COVID-19 included fewer hospital presentations, less transmission of parainfluenza virus and disruptions due to staff redeployment. Further cycles of data collection should be undertaken to ensure efficacy of the programme.