

Melatonin ABR: Efficacy and feasibility as an alternative to general anesthesia.

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Background

Recent surge in referral for children undergoing developmental assessment

- Less success using the behavioral assessment
- Need for multiple appointment leading to
 - Parental stress
 - Referral for ABR under General Anesthesia
- Long waiting time for ABR under General Anesthesia (GA)(1)

General anesthesia (GA)

- Is traditionally used for ABR testing in difficult to test children
- Carries significant risks and costs
- In our department, the waiting list for GA ABR is ≈ 3 years

Sedation?

- Requires monitoring from an anesthetist/trained Nurse
- Risk of airway compromise
- Prolonged recovery time

Melatonin?

- Safe
- No monitoring required
- Validated (2)

Aims of this protocol:

To obtain reliable testing (ABR)

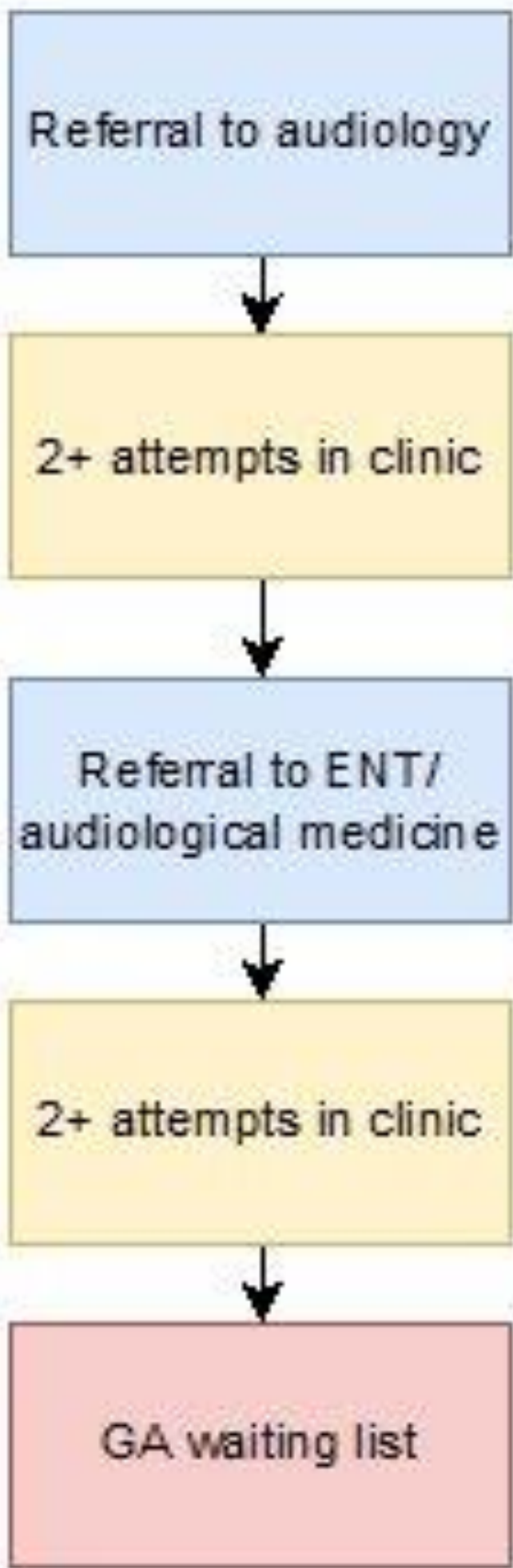
in a cost effective manner (compared to GA route)

with aim of reducing waiting times compared to theatre procedure

and is acceptable to parents

Methods

Old protocol



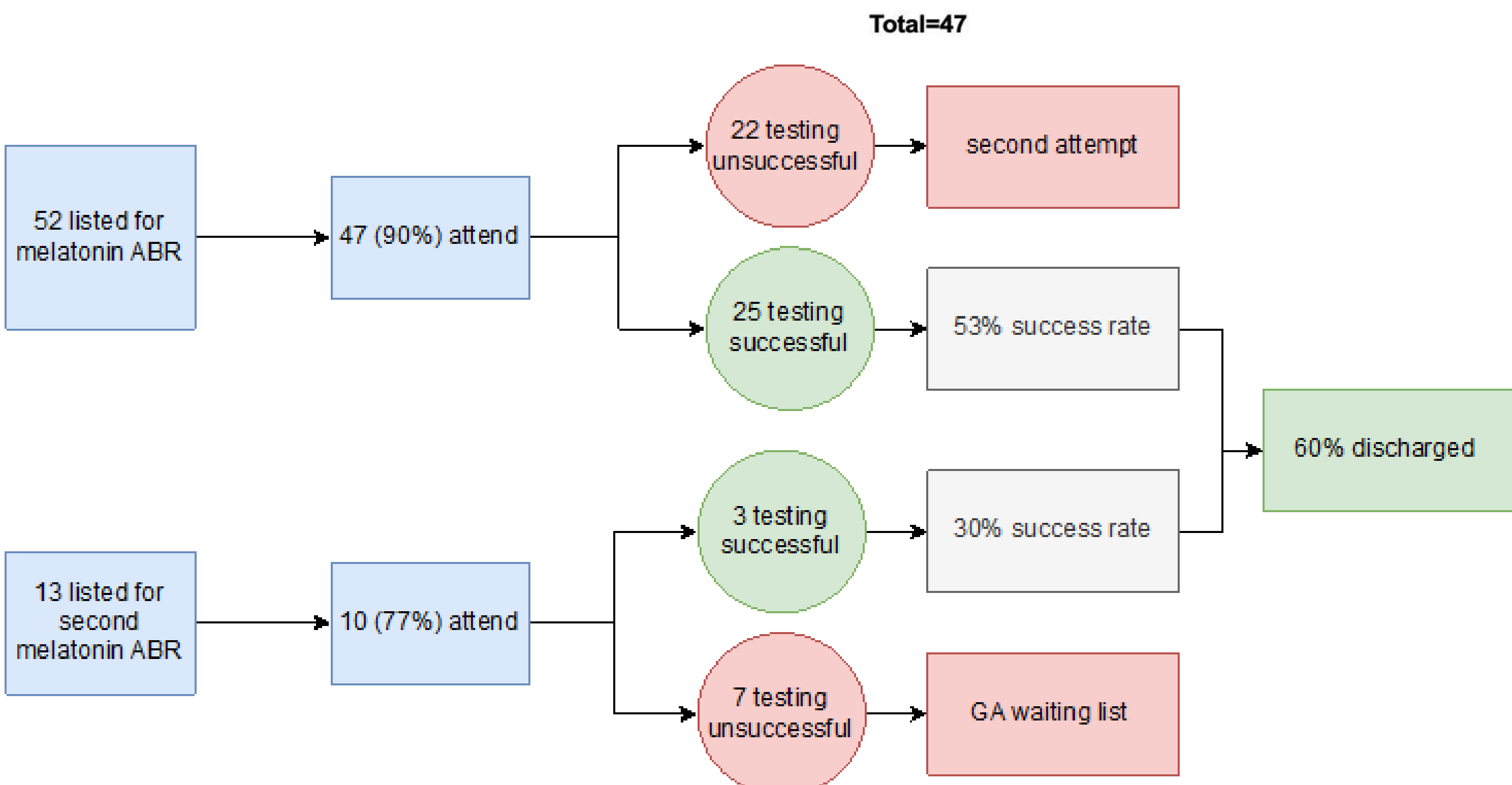
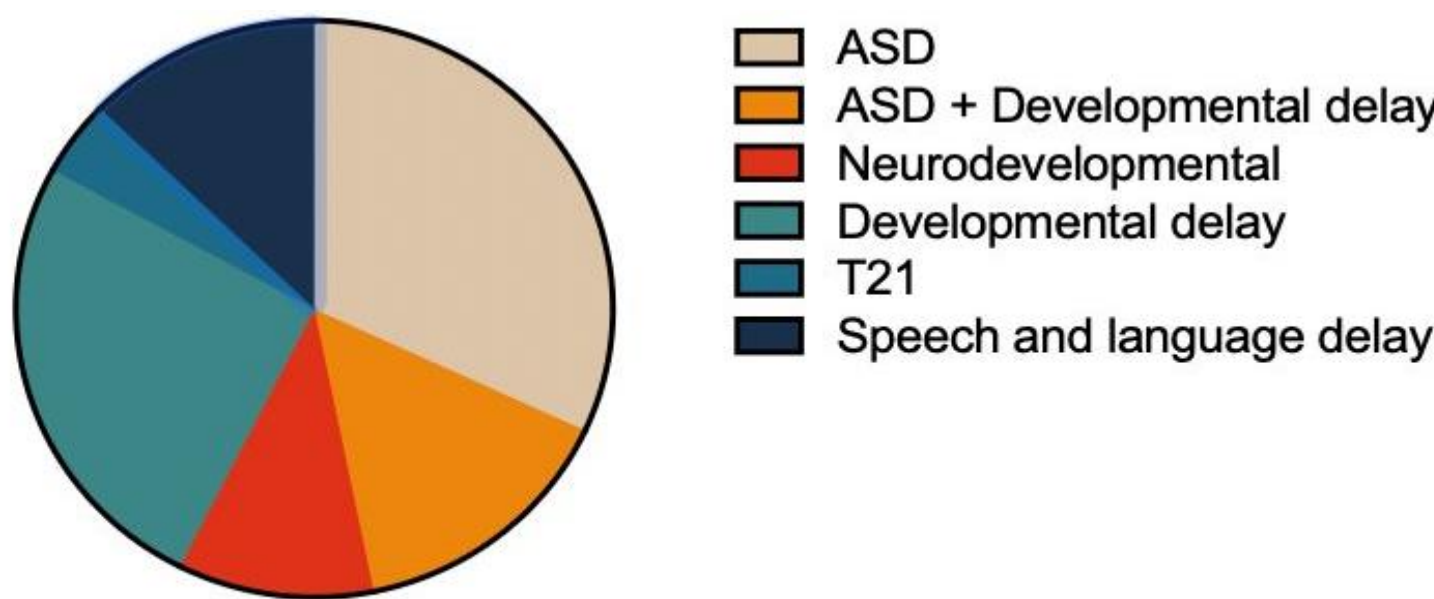
New protocol



- Prior to the melatonin ABR appointment, parents are instructed to sleep deprive their child.
- During the appointment the child is administered 9mg melatonin orally.

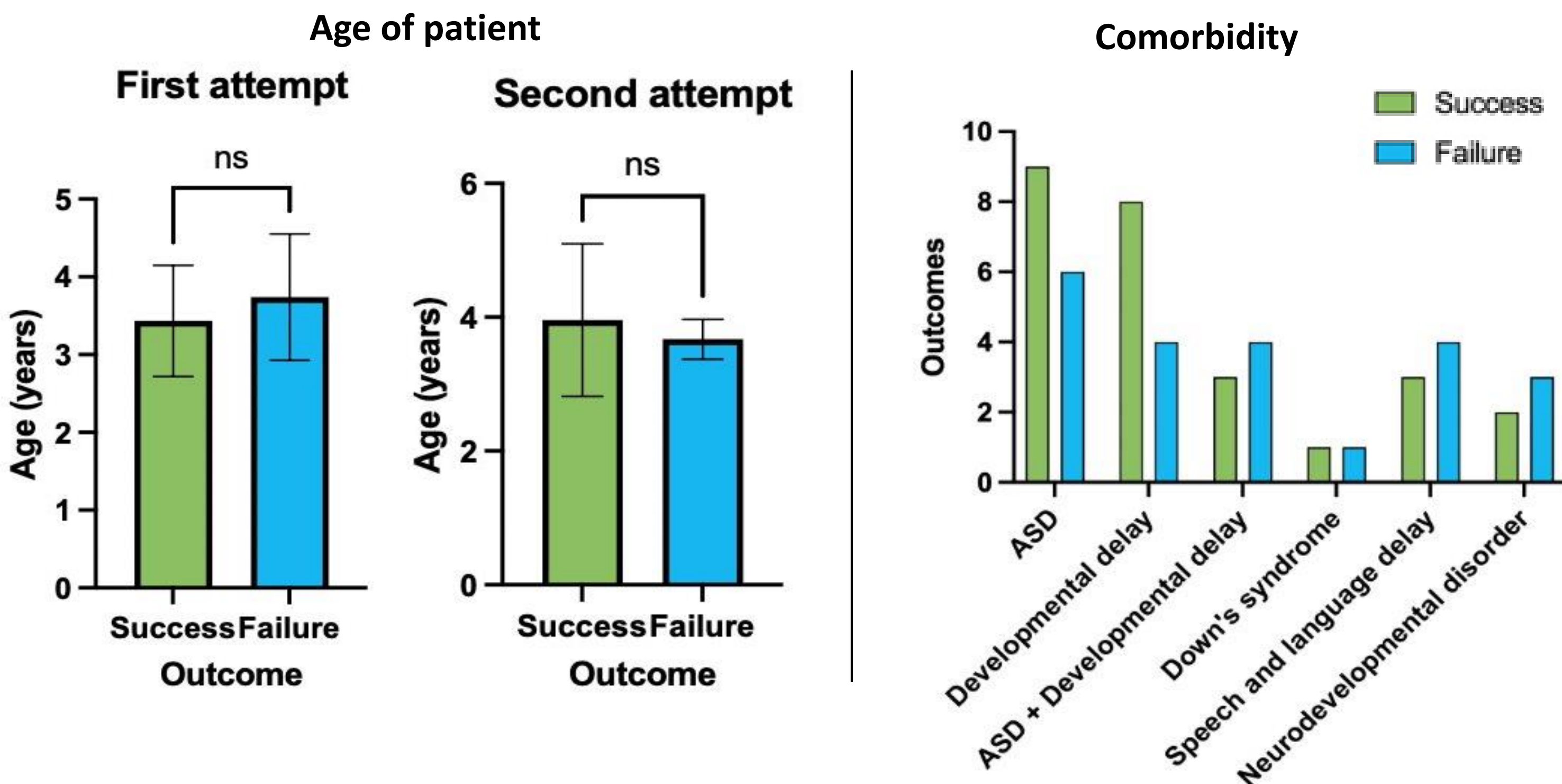
Results

- Our cohort consists of 47 children who attended their melatonin ABR appointment between 07/2023-11/2024
- They had a median age of 3.56 (1.45-5.43)
- All children had a neurodevelopmental comorbidity (right)
- The success rates are shown below



Results

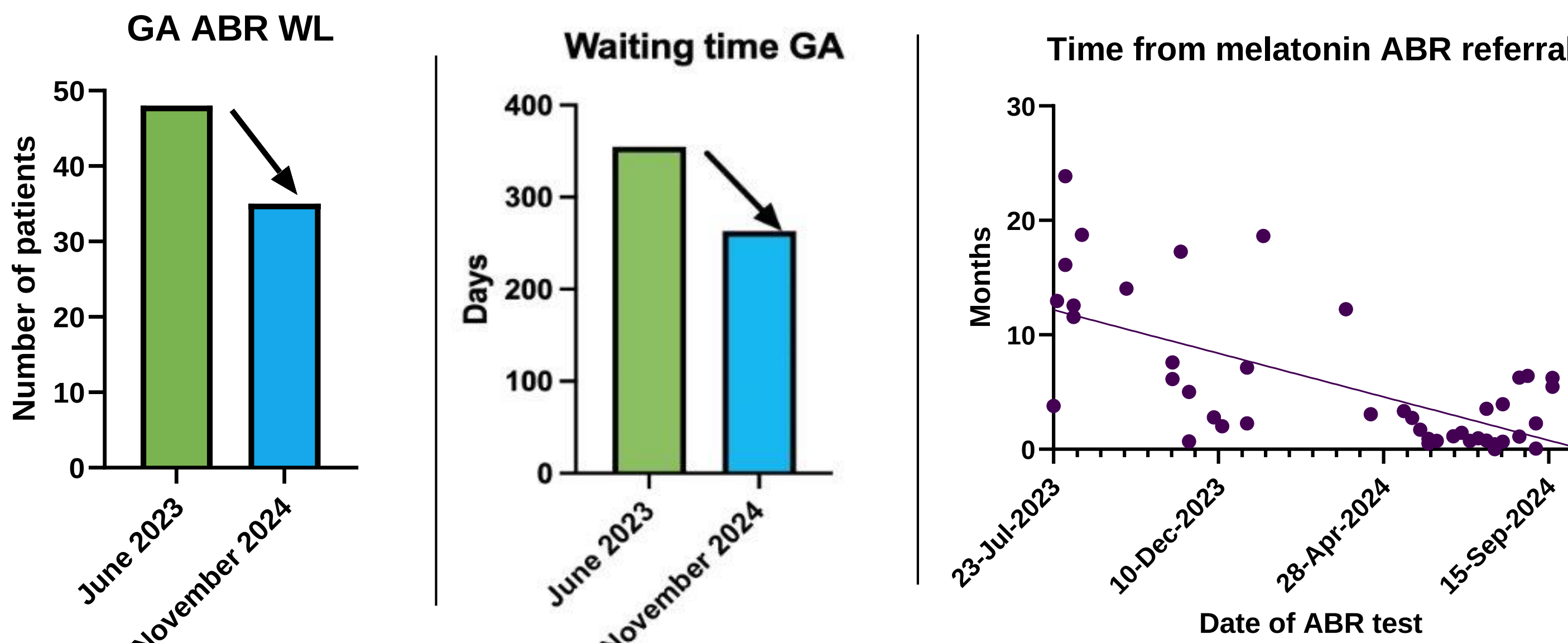
Factors influencing success rate



The literature has identified the age and co-morbidity of the child as factors influencing success rate

- We did not find any significant difference in age (p0.18, 0.19) or co-morbidity (p0.52)

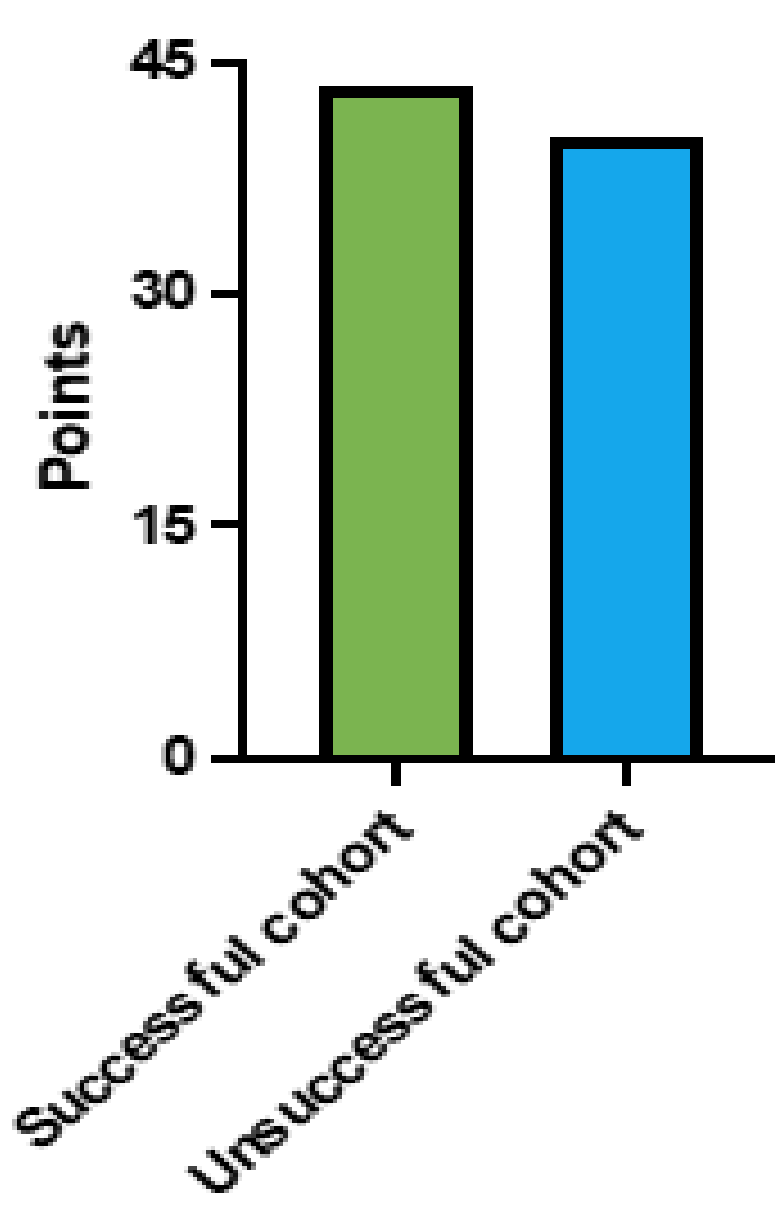
Impact on waiting times



- Since implementing this protocol, with the children waiting for GA ABR, there has been a 27.1% decrease in the number of patients waiting for GA ABR
- The average time spent on the GA ABR waiting list has fallen by 25.8%
- The waiting time for melatonin ABR is just under 4 weeks (at the time of study).
 - **Currently, Melatonin ABR has a wait time of about 3 month.

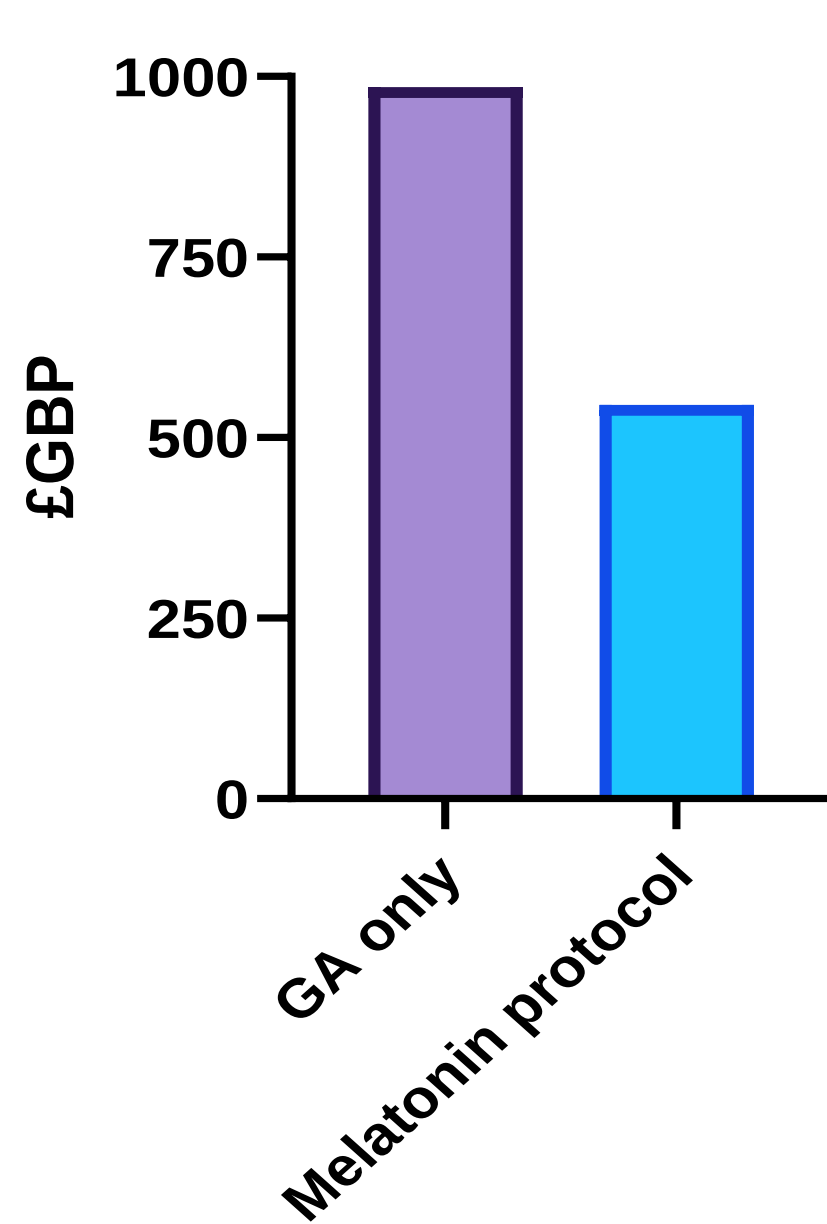
Acceptability

Parent satisfaction



Cost analysis

Cost estimation



Based on the NHS tariffs

- ENT day case £985
 - Melatonin ABR £150 appointment
- Utilizing the success rates from our study:
- We estimate that the cost the melatonin protocol is ≈ £586
 - This represents a 44% saving

- We designed a questionnaire to ascertain the suitability of the protocol
- It consisted of 9 questions, each with a maximum score of 5 points
- We contacted 12 parents
 - 6 whose child was successful in testing
 - 6 whose child was not successful
- We did not find a significant difference between each group

Conclusions

- A comparable study found a success rate for melatonin ABR of 57% (3)
- Overall, 60% of patients were able to avoid a GA and were discharged
- The low success rate at 2nd attempt suggests a sub-cohort in whom melatonin is less effective
- We did not identify a factor which could be influencing success rates
- This protocol reduces the strain on GA waiting lists, and can be delivered quickly
- It is acceptable to parents, and is cheaper to deliver than GA, with minimal risk.

Limitation & Future Direction

- Smaller sample size with variable age, due to long wait for GA ABR post covid pandemic
- Looking into feasibility of sedation of ABR with vision of two tier system
 - Melatonin ABR → Sedation ABR → GA ABR

References

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- 2 Behrman DB, Bishop JL, Godsell J, Shirley B, Storey S, Carroll WW, et al. Efficacy of melatonin for auditory brainstem response testing in children: A systematic review. Int J Pediatr Otorhinolaryngol [Internet]. 2020 Apr 1
- 3 Schmidt CM, Knief A, Deuster D, Matulat P, Am Zehnhooff-Dinnesen AG. Melatonin is a useful alternative to sedation in children undergoing brainstem audiometry with an age dependent success rate--a field report of 250 investigations. Neuropediatrics