Quality Story 2

Impact of a high value care model using intranasal Dexmedetomidine for Auditory Brainstem Response testing:

Background:
At our institution prior to 2016, patients who could not complete auditory brainstem response (ABR) testing while awake or during natural sleep, either had to reschedule at a later date or had to complete the test under general anesthesia (GA). Patients who required multiple diagnostic procedures in the OR were directly referred to GA as well.
The Sedation Service at CHP began collaborating with the Pediatric Audiology Department in December of 2016 to perform ABR tests with the use of minimal sedation/anxiolysis (MSA) protocol with intranasal (IN) Dexmedetomidine (Dex), as an alternative to GA. This was a sedation physician assistant (PA)/Nurse practitioner (NP) run protocol that did not require intravenous line placement or the patient to be nil per os (NPO) for the test.

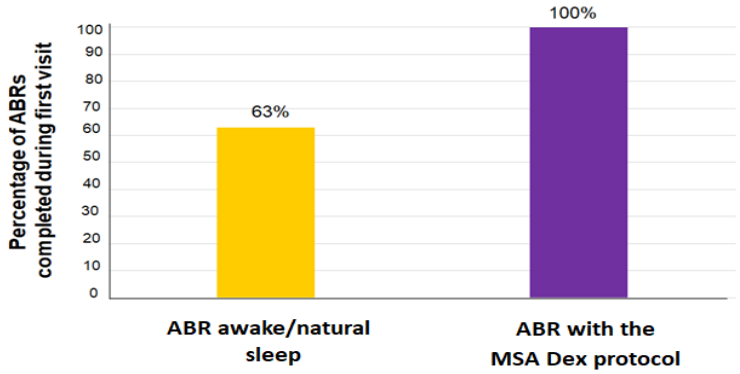
Goals:
To implement an MSA protocol using IN Dex that would allow us to:
1. Improve efficacy (successful test completion) of ABR during the first visit with a consequent decrease in GA use for ABR testing.
2. Decrease the cost of performing an ABR .
3. Maintain safety
4. Increase timeliness: by reducing the time to successful completion of ABR and facilitate earlier diagnosis of hearing loss

Project Description:
The ABR MSA protocol involved a 2mcg/kg dose of IN Dex (considered a minimal sedation/anxiolytic dose at our institution) delivered via an atomizer. A second dose of 2mcg/kg IN Dex was repeated after thirty minutes for patients who were still unable to cooperate for the test. Patients did not need to be NPO and did not require IV placement. All patients were monitored with a pulse oximeter for heart rate and oxygen saturation. Blood pressure was monitored before and after the procedure and patients were recovered for 30-60 minutes until they met discharge criteria and were back to pre-sedation baseline. The procedure took place in the Radiology Department in the units where our sedation service is based. Of note, parents were allowed to stay with their child during the test.
All patients 4 months and older requiring an ABR and patients younger than 4months of age, who had failed awake/natural sleep ABR testing, were referred by the Audiology Department to receive the MSA Dex protocol. Patients who required multiple procedures along with ABR testing or had significant cardiac disease or contraindications to Dex administration were excluded from the Dex MSA protocol and were referred directly to GA.

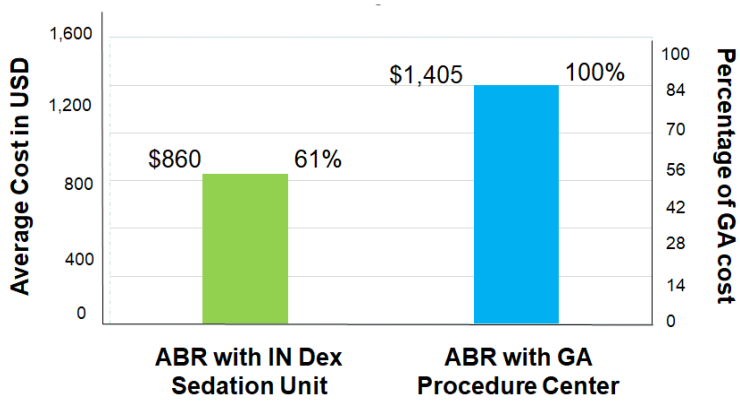
Metrics:
1. Efficacy: ABR completion rate during first visit with the use of the MSA Dex protocol compared to the same test in an awake state or under natural sleep.

2. Cost reduction per procedure: comparison of total cost of ABRs performed under Dex protocol vs GA. Cost analysis was performed by using our institution's Cost Management System data as of October of 2017.
3. Safety: rate of adverse events/complications with the MSA Dex protocol,
4. Improved timeliness: time to successful completion of ABR in patients who failed awake or natural sleep ABR testing.

Implementation and Outcomes: the MSA Dex protocol was implemented in 75 consecutive patients (age: 4 months to 10 years) from Dec 2016 to Oct 2017 who presented to the Audiology Department at our institution. Once Audiology identified a patient that required the MSA Dex protocol the parents were referred to the Sedation Service scheduler in order to coordinate their appointment. The sedation PAs/NPs reviewed the patient's electronic medical records to identify any contraindications or exclusion criteria to the use of the protocol as indicated above.
1. Efficacy of the MSA Dex Protocol for ABR testing:
The ABR completion rate during first visit, while awake or under natural sleep, was 63% prior to implementation of the protocol. Completion rate during first visit with then MSA Dex protocol was 100%. This reduced the over-utilization of GA in ABR cases that failed natural sleep.



2. Outcomes: Cost reduction
A 36% cost reduction was observed for an ABR with the MSA Dex protocol compared to an ABR with GA in the OR.



3. Outcome: Safety

- Only 1 of the 75 patients who received MSA Dex protocol had a complication which consisted of transient bradycardia and hypoxia that required a brief intervention to resolve. There were no other complications or adverse events.

4. Improved timeliness: time to first available appointment for a failed awake or natural sleep ABRs improved from 7 weeks pre-protocol implementation to 2 weeks post-protocol implementation.

Challenges:

- During the initial implementation period the audiology staff had some difficulties explaining the protocol to the patient's families, because they were not yet familiar with intranasal Dex usage and specifics of the protocol
- Coordination and clarification of proper billing for this new process took some time. Several of the initial encounters were billed inappropriately.

Lessons Learned:

The MSA Dex protocol for ABR testing is successful model which is efficacious, contains costs, is family centered and reduces overutilization of resources.

The decrease in wait time to complete a non-natural sleep ABR has led to an earlier diagnosis and subsequent treatment for childhood hearing loss without subjecting these children to deeper levels of sedation or GA.

This is a high-value care model that can be easily replicated at other centers and hospitals.

Current practice and CQI: We continue to survey and monitor this protocol for efficacy, provider and family satisfaction, adverse events. Any issues or difficulties are reported within 48hours to the Sedation Service lead PA and addressed by the Sedation Service. The process is discussed on a regular basis with the Audiology Service to continually identify areas of improvement.