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Research Article

Effect of Gorlin's Sign as an active distraction technique on pain and behavioral response in pediatric patients during intravenous cannulation

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ABSTRACT

Introduction: Managing pain in hospitalized children is crucial, especially during painful procedures like intravenous cannulation. Distraction, both active and passive, has been employed as a nonpharmacological intervention. This study explores the efficacy of Gorlin's sign, an active distraction technique involving touching the tip of the nose with the tongue, in mitigating pain during venous cannulation in pediatric surgical patients.

Materials and Methods: A prospective observational study with 100 children (5-10 years) undergoing elective surgery was conducted. The Gorlin sign was demonstrated before cannulation, and its impact on pain levels was assessed using the Wong Baker FACES Pain Scale. Vital signs, FLACC Behavioral Response Scale, and demographic data were recorded.

Results: The mean age was 8.4±2, with 52.57% male and 47.43% female participants. The majority (96.91%) had successful first attempts at cannulation. Vital signs showed minimal variations. As per FLACC, 65.98% had mild behavioral responses, and 45.36% experienced mild pain according to the Wong Baker FACES Pain Scale. The Gorlin's sign was highly acceptable, with 97.93% of children liking and enjoying the method.

Conclusion: Gorlin's sign emerges as a simple, safe, and cost-effective distraction technique, significantly reducing pain during intravenous cannulation in children aged 5 to 10 years. Its high acceptability makes it a valuable addition to non-pharmacological interventions for pediatric pain management.

Keywords: *Pediatric pain management, Distraction techniques, Intravenous cannulation, Gorli'sn sign, Active distraction.*

INTRODUCTION

The management of pain, which is also referred to as the vital fifth sign, is recognised as a key element of providing excellent patient care [1,2,3]. Hospitalized children experience numerous painful procedures regularly, and intravenous cannulation is associated with significant discomfort, pain, anxiety and distress [8].

Several factors have been implicated in the reaction to pain, like a previous bad experience, the type of procedure, caregiver anxiety and distress [11]. Insufficient pain management has been linked in the literature to both long-term consequences like fear and higher susceptibility to pain in the future, as well as short-term consequences like anxiety, avoidance behaviors, and somatic symptoms [9,10].

To address the pain and discomfort associated with venous cannulation, various pharmacological and non-pharmacological interventions are utilized [12,13]. Distraction is a simple, effective, inexpensive, and safe non-pharmacological approach for diverting a child's attention away from high stress. It has been used to reduce the impact of pain and behavioral problems following painful procedures [14,15]. Distraction techniques can be either active or passive. Children are asked to engage in another activity when the active distraction technique is used (examples include the use of interactive objects, toys,

gadgets, breathing exercises, guided meditation and relaxation, and virtual reality) [16]. In the passive distraction technique, however, most children remain silent. Passive distraction strategies involve viewing/listening to a stimulant instead of active engagement. (e.g. videos and music) Numerous studies have been done to determine how well different distraction strategies work while dealing with pain, anxiety, and discomfort during painful pediatric procedures [17,18,19]. "Gorlin's sign", an ability to touch the tip of the nose with the tongue, has never been used as a distraction method. This sign is performed by 5-10% of the general population and 50% of patients with Ehler-Danlos syndrome [20].

We conducted this study to determine the efficacy of the Gorlin's sign as an active distraction technique, during venous cannulation in pediatric surgical patients.

MATERIAL AND METHODS

This prospective observational descriptive study was conducted in the operating room of a teaching hospital. Following approval from the institutional ethics committee and parents'/caregivers' informed consent, 100 children between the age of 5 and 10 years admitted for an elective surgery of both genders with a pain score of zero before cannulation, and not taken analgesic during last 24hours or had applied topical local anesthetic, over a period of from June to November, 2023 were included in the study through convenience sampling technique.

Exclusion criteria:
1. Consent not given
2. History of developmental delays
3. Previous history of neurological conditions, including epilepsy

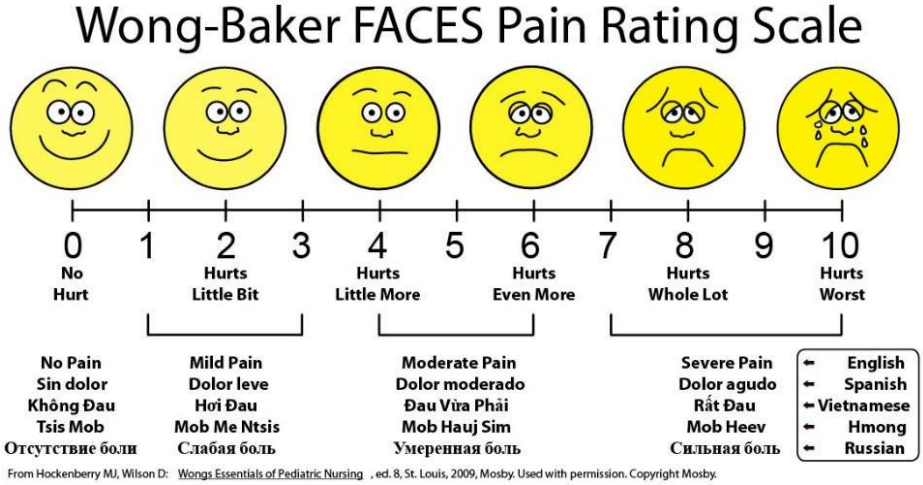
The intravenous (IV) cannula was inserted in the OT by an expert pediatric anesthesiologist after explaining the procedure to the children in simple terms. The Gorlin's sign was demonstrated by the anesthesiologist and the children were asked to perform it three times till prepping of the skin at the insertion site was done. The IV cannula was kept out of sight of the children. The children were then again asked to perform the Gorlin's sign, while a 22-gauge cannula was inserted quickly. Following cannulation, the children were shown the Wong Baker FACES Pain Scale (WBFPS) and asked to choose the face that best represented their pain. The child's behavioral response was noted by a trained observer. All the children had their cannula inserted in the forearm or dorsum of the hand. Children were also enquired about the acceptability of this distraction method for cannula insertion.

Demographic characteristics such as age, gender, previous experience, and number of attempts were recorded. One minute before and after the placement of the intravenous cannula, vital signs including heart rate, respiration rate, and SpO2 were recorded.

FLACC Behavioral response scale (Face, Legs, Activity, Cry, Consolability; where each variable receives a score of 0,1 or 2) was employed to record the child's behavior during the process. Score ranges from 0–10, where "score 0" represented no pain/Relaxed, "score 1–3" mild pain, "score 4–7" moderate pain, and "score 8–10" severe pain.

The Wong Baker FACES Pain Rating Scale (WBFPS) is used to assess children's pain. The WBFPS enables the user to rate pain by combining images and numbers.

From left to right, the Wong-Baker FACES Pain rating scale (WBFPS) shows six faces with varying degrees of pain. Each face was given a score ranging from 0 to 10 on a scale. After cannulation, the children were told to pick the face that most accurately depicted their pain. Children were told that each face represents a child who is in no pain, has some pain, or has a lot of pain. Face 0 is completely painless, Face 2 is slightly painful, Face 4 is slightly more painful, Face 6 is significantly more painful, Face 8 is extremely painful, and Face 10 is as painful as you can imagine.
Mild pain is with "score 1–2," moderate pain "score of 3–4," and severe pain "score 5–6."



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Statistical Analysis

Statistical analysis was done with the Statistical Package for the Social Sciences (SPSS version 30). Descriptive statistics such as frequency, per cent, mean, and standard deviation were used along with inferential tests. Statistical tests were considered significant at a p-value less than 0.05.

RESULTS

Demographic characteristics

Mean age was 8.4±2. About gender,51of them (52.57%) were male children and 46 (47.43) were female children. 8(8.25%) children had a history of previous cannulation, 89 (91.75%) were never cannulated before. In 94(96.91%) children, a cannula was inserted on the first attempt.

Vital Signs

Before and after the procedure, the mean heart rate ranged from 92.2±10.9 to 94±11.1, and the mean respiratory rate varied from 18.9±4.3 to 20.1±4.7, respectively. Mean SpO2 before and after the procedure were (98.3±1.33 to 98.2±1.47), respectively.

Behavioral response and pain

As per FLACC, 64 children (65.98%) had a mild behavioral response, 22 (22.68%) had a moderate response, and 1 child (1.03%) had a severe response. As per FACES, 44 of the children (45.36%) experienced mild pain during intravenous cannula insertion. 30 children (30.92%) had moderate pain, and 8 (8.25%) had severe pain

Acceptability of Gorlin's sign

The majority of the children, 95 (97.93%), liked the method and enjoyed performing it. They would use the same method in future as well.

OBSERVATION TABLES

Table 1. Demographic characteristics

	N (97)	%
Age in years (5-10)	8.4±2	
Gender Male /female	51/46	52.57/47.43
Previous cannulation experience present/absent	8/89	8.25/91.75
1st Cannulation attempt Successful	94	96.91

Table 2 Vital Signs

	Mean	SD	P value
Heart rate			
Before cannulation	92.2	10.9	>0.05
After cannulation	94	11.1	
Respiratory rate			
Before cannulation	18.9	4.3	>0.05
After cannulation	20.1	4.7	
Spo2			
Before cannulation	98.3	1.33	>0.05
After cannulation	98.2	1.47	

P value of Paired t-test *P < 0.05 (significant).

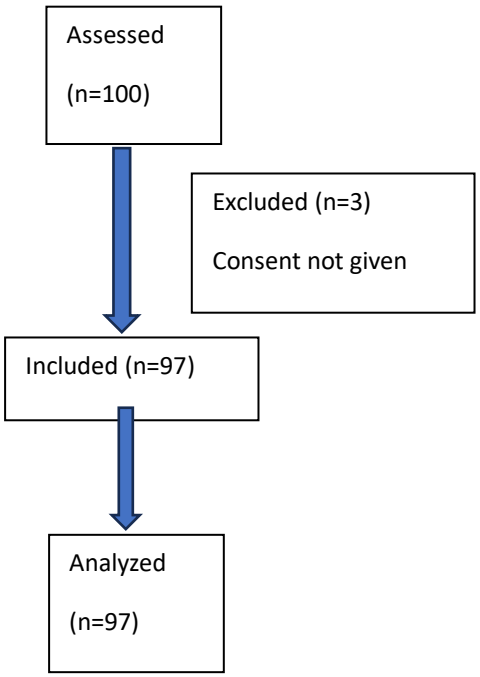
Table 3. Behavioral response and pain

	N (97)	%
FLACC		
No pain	10	10.31
Mild	64	65.98
Moderate	22	22.68
Severe	1	1.03
FACES		
No pain	15	15.46
Mild	44	45.36
Moderate	30	30.92
Severe	8	8.25

Table 4. Acceptability of Gorlin's sign

Did the children like the method? Y/N	95/2	97.93/2.06%
Did they enjoy it? Y/N	95/2	97.93/2.06%
Will they use it in future? Y/N	95/2	97.93/2.06%

STROBE DIAGRAM



DISCUSSION

For children, invasive treatments and hospitalization are distressing experiences. Pain, worry, tension, and discomfort can impede a child's recovery. According to Abd El-Gawad and Elsayed, the most prevalent intrusive procedure that causes pain, anxiety and stress in children is venous puncture [8,21].

Negative emotions like fear and pain render it difficult to heal completely, as they can prolong hospital stays, delay the healing process, and make children suffer [22].

Thus, it is recommended to use both pharmacological and nonpharmacological pain management techniques.[12]. For brief painful processes, distraction seems to be the most popular strategy. The results of this study revealed that, as per FLACC 66% had a mild behavioral response and 24% had a moderate response. The findings are consistent with those of Kuo et al, who found that distraction therapies can assist young children who are undergoing a painful procedure to feel less distressed [15]. Similarly, Abu-Elenen et al. reported that before the intervention, two-thirds of the children were frightened, while less than a quarter of them were fearful after the procedure [23] and as per FACES, 45% of the children experienced mild pain during intravenous cannula insertion. This result is in line with that of Abdolalizadeh et al., who discovered that engaging in a game before venipuncture decreases the child's pain.[24]

Distraction strategies decrease the stimulation of the sympathetic nervous system and boost endorphin production, which promotes parasympathetic activity, helps the body relax, and reduces blood pressure, heart rate, and breathing rate. The findings of Abu-Elenen et al. using distraction techniques reduced the mean pain scores measured by heart rate and respiratory rate.[23]. However, in the present study, we observed that an Increase in HR, RR &Spo2 was not significant before and after cannulation. Active Distraction strategies were discovered to enhance children's participation and enhance their coping abilities. These findings are consistent with those of Hasan pour et al., who reported similar findings in terms of breathing and heart rates [25].

Gorlin's sign was sufficiently engaging and diverted children's attention, and it was observed that they were oblivious to the pain and reported mild pain during the procedure [26].

After the procedure, the children were asked about the acceptability of the distraction technique. 98% liked the method. They enjoyed performing it and would use the same technique in the future.

The distraction of touching the tip of the nose with the tongue is a cost-effective and appealing strategy for reducing a child's pain and uncomfortable behavioral responses because it distracts the child's focus from the opposing sensory signals of pain while inserting the IV catheter.

Limitations of the present study are that it is single-centric, observational study with no control group. It can be used only with children who can understand the instructions.

CONCLUSION

Our study suggests that the Gorlin's sign, due to its ease of application and safety, can be considered as a distraction technique for reducing pain during intravenous cannulation in children aged 5 to 10 years, as Active distraction promotes the child's involvement and tends to involve several sensory components. Gorlin sign as a distraction technique is time and cost-efficient.

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