

VIRTUAL SEDATION AS A SUBSTITUTE TO PHARMACOLOGICAL SEDATION DURING PICC PLACEMENT IN PEDIATRIC PATIENTS: A RETROSPECTIVE ANALYSIS

(Sanna G¹, Camporesi A², Diotto V², Abbiati G¹, Restivo A³, Torri A³, Gemma M¹)

¹ASST Fatebenefratelli Sacco - Fatebenefratelli Hospital, Milan - Anesthesia and Intensive Care Unit
²ASST Fatebenefratelli Sacco - "Vittore Buzzi" Children's Hospital - Anesthesia and Intensive Care Unit
³Becton Dickinson Srl - Specialist on Vascular Access

AIMS OF STUDY

PICCs placement is associated with pain and anxiety, especially within the pediatric population, hence it's a widespread practice to provide procedural sedation to children. Sedation in pediatric patients has been associated with risks such as laryngospasm, apnea and hypoxia. Preventive measures, like intensive provider training, can reduce but not completely eliminate said risks. Also, sedation requires healthcare personnel with specific training in pediatric anesthesiology, therefore increasing the costs for the providing facility. Therefore we are looking for a safe and effective alternative to pharmacological sedation, which could reduce both risks and costs.



METHODS AND MATERIALS

We adopted a commercially available VR headset (Oculus Quest 2, Facebook Technologies LLC, Menlo Park, CA 94025, USA) that came together with two handheld controllers. The dedicated software we used is called "TOMMI" (Softcare Studios Srls - Immersive Technologies for Wellbeing - 00137, Rome, Italy) and was developed as a "VR gaming experience designed [...] to counteract the feelings of anxiety and pain experienced by pediatric patients during stressful medical treatments". Patients find themselves in an immersive virtual space where they can play different games, based upon the procedure they need to undergo. In the game we chose, patients see three different drums they can beat with a "magic wand" they can control by moving the handheld controller. Geometric shapes in different colors fall from above indicating which drum to beat at which time.

VIRTUAL SEDATION AS A VALID ALTERNATIVE TO PHARMACOLOGICAL SEDATION WHEN PLACING PICCs IN CHILDREN

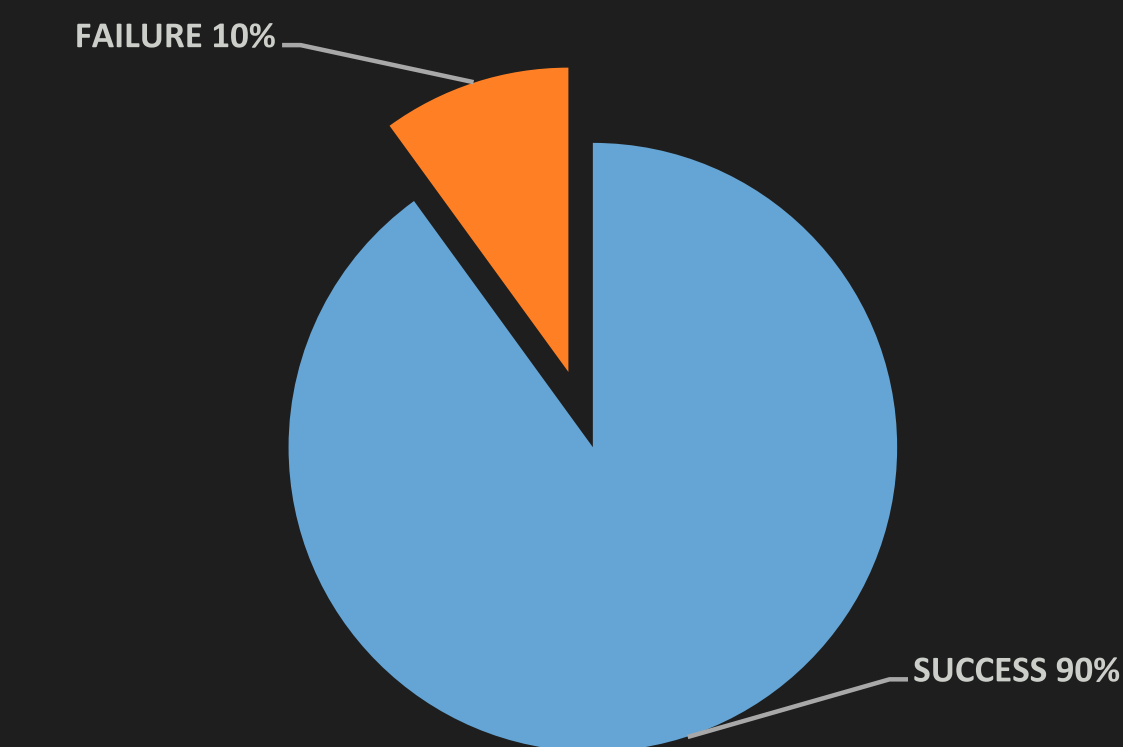
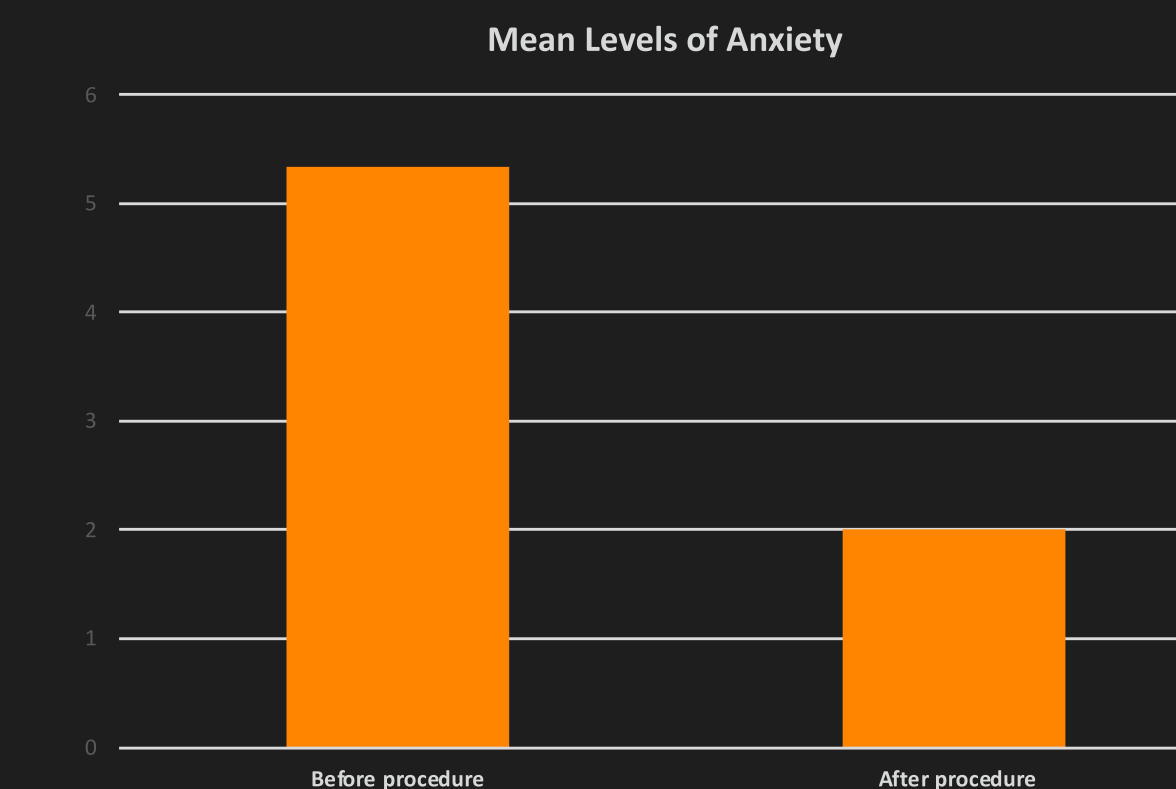


WATCH THE VIDEO OF THE PROCEDURE

RESULTS

During the observation time, we recorded data for ten patients. In all cases, the subjects had previously been hospitalized and had received at least one other vascular access. Subjects were referred to the vascular access team because of poor peripheral veins or because they needed multiple infusions, repeated blood draws or needed drugs that couldn't be safely administered over peripheral access.

Out of the ten patients, only in a single case, we had to interrupt the attempt with the VR technique and alert the anesthesiologist. From the immediate beginning said patient had trouble adapting to the virtual environment and tried to remove the headset. That's why the VAT provider decided not to proceed with the venipuncture and opted for traditional sedation. In all the other cases, we noticed a drop in the anxiety level of the patient. We didn't record cases of increased pain and every patient reported the pain level as acceptable. Every asked caregiver reported that she or he would suggest this technique to other people who should need a PICC. The mean satisfaction recorded was 9.3 out of 10.



CONCLUSIONS

Virtual reality seems a valid alternative to traditional sedation in pediatric patients under going a PICC placement procedure. By definition, a reduction in the number of cases where anaesthesia is needed is an achievement: it is self-evident that avoiding sedation reduces anaesthesia-related risks and costs. However, additional studies on larger pools of patients are necessary to assess the proportion of patients who may benefit from this new approach, as well as its impact on the overall procedure length, a factor that plays a critical role in determining the economic cost. The success rate we encountered was, shown, very high. Our VAT providers reported slightly longer procedures, though an exact length was not recorded. We think that this might be related to the provider's little experience in setting the headset. This could easily be solved through more training.

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