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**Effect of Dexmedetomidine Infusion on Surgical Pleth Index in
Pediatrics Undergoing Hypospadias Repair; a Prospective
Observational Study**

By

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Summary

Hypospadias surgery is one of the most common urologic surgical procedures done in children. It is very painful leading to many perioperative adverse outcomes like anxiety, stress response, pain, agitation, nausea, and affect wound healing up to prolonged hospitalization.

Recently, nociception monitoring and the degree of postoperative pain can be assessed using the surgical pleth index (SPI).

This non-invasive dimensionless score index -SPI-reflects the Patients' sympathetic response to surgical stimulation. Its effectiveness in detecting the balance between nociceptor activation and analgesia was not only reported but also, was reported to be superior to the other parameters like blood pressure and heart rate. SPI value is correlated to pain and ranges from 0 to 100, higher values indicate strong surgical stimulus. Its value is obtained from photoplethysmographic amplitude (PPGA) and heart rate (HR) data from pulse oximetry measurement.

Dexmedetomidine is a α_2 -adrenergic receptor agonist that has an opioid-sparing effect that has been used in children for many anesthetic purposes in different doses with or without a bolus dose. It has been used in urethroplasty surgeries either for sedation, decreasing postoperative agitation, pain relief, or as an adjunct to caudal block anesthesia.

So, we hypothesize that dexmedetomidine infusion without giving a bolus dose may affect the SPI in pediatrics undergoing hypospadias repair.

The study aimed to show the effect of dexmedetomidine infusion without giving a bolus dose on SPI in pediatrics undergoing hypospadias repair intraoperative and at PACU discharge.

This study conducted at Fayoum University, 90 patients aged 1 to 7 years old scheduled for hypospadias repair was randomly assigned into 2 groups, Group D-dexmedetomidine group (45), Group C-control group (45).

The main results of the study revealed that:

- ❖ The age ranged from 2 to 7 years with a mean value (\pm SD) of 5.31 (\pm 1.6) years. Weight ranged from 10 to 25 kg with a mean value (\pm SD) of 18.22 (\pm 4.27) kg. Height ranged from 70 to 105 cm with a mean value (\pm SD) of 90.27 (\pm 10.7) cm.
- ❖ SPI, HR, SBP and MABP had the highest value at baseline and the lowest value after intubation while DBP had the highest value at PACU discharge.
- ❖ Surgical time ranged from 125 to 140 minutes with a mean value (\pm SD) of 131.69 (\pm 5.42) minutes. Anesthesia time ranged from 125 to 165 minutes with a mean value (\pm SD) of 141.73 (\pm 12.89) minutes. Extubation time ranged from 7 to 40 minutes with a mean value (\pm SD) of 23.77 (\pm 11.88) minutes.
- ❖ RAMSAY sedation score at PACU ranged from 1 to 6 with a mean value (\pm SD) of 3.18 (\pm 1.4) while after 24 hours of the operation ranged from 0 to 3 with a mean value (\pm SD) of 0.5 (\pm 1.12).
- ❖ Use of fentanyl ranged from 20 to 30 with a mean value (\pm SD) of 24.78 (\pm 4.62) and use of paracetamol ranged from 0 to 60 with a mean value (\pm SD) of 19.22 (\pm 20.12).
- ❖ Need of vasoactive drugs was needed in 41 (45.6%) patients, incidence of hypotension occurred in 14 (15.6%) patients and incidence of bradycardia occurred in 14 (15.6%) patients.
- ❖ The general satisfaction score of parents was 2 in 8 patients (8.9%), 3 in 36 patients (40.0%) and 5 in 46 patients (51.1%).
- ❖ There was no statistically significant difference between both groups regarding characteristics.

Summary

- ❖ MABP in all timepoints was not significantly different in both groups.
- ❖ Consumption of paracetamol was significantly lower in dexmedetomidine group compared to control group, ($P<0.001$).
- ❖ SPI, regarding blood pressure, SBP, DBP and FLACC in all timepoints were significantly lower in dexmedetomidine group compared to control group, ($P<0.001$).
- ❖ HR at baseline, after intubation, skin incision and at PACU discharge was significantly lower in dexmedetomidine group compared to control group, ($P<0.05$).
- ❖ Anesthesia time and extubation time were significantly higher in dexmedetomidine group compared to control group, ($P<0.001$).
- ❖ Incidence of hypotension and incidence of bradycardia were significantly higher in dexmedetomidine group compared to control group, ($P<0.001$).
- ❖ In all time intervals, mean SPI in Dexmedetomidine was lower than mean SPI in control group, ($P<0.001$).
- ❖ At baseline, after intubation, skin incision and at PACU discharge, mean HR in Dexmedetomidine was lower than mean HR in control group, ($P<0.05$).
- ❖ At baseline mean SBP in Dexmedetomidine was lower than mean SBP in control group, ($P<0.001$).
- ❖ At baseline mean DBP in Dexmedetomidine was lower than mean DBP in control group, ($P<0.001$).
- ❖ After skin incision mean MABP in Dexmedetomidine was higher than mean MABP in control group, ($P= 0.041$).
- ❖ In all time intervals mean FLACC score in Dexmedetomidine was lower than mean FLACC score in control group, ($P<0.001$).