

**A DISSERTATION ON
THE EFFICACY OF CAUDAL DEXMEDETOMIDINE
ON STRESS RESPONSE AND POST OPERATIVE
PAIN IN PAEDIATRIC CARDIAC SURGERY
(A PROSPECTIVE, RANDOMIZED,
DOUBLE BLINDED STUDY)**

Submitted to

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In partial fulfilment for the award of degree of

**DOCTOR OF MEDICINE
IN
ANAESTHESIOLOGY
BRANCH X**



**INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE,
MADRAS MEDICAL COLLEGE
CHENNAI**

APRIL 2018

CERTIFICATE

This is to certify that that the dissertation entitled , **“THE EFFICACY OF CAUDAL DEXMEDETOMIDINE ON STRESS RESPONSE AND POST OPERATIVE PAIN IN PAEDIATRIC CARDIAC SURGERY”(A PROSPECTIVE, RANDOMIZED, DOUBLE BLINDED STUDY)”** submitted by **DR.R.VINOTHKUMAR** in partial fulfilment for the award of degree of doctor of medicine in Anaesthesiology by the Tamilnadu Dr.M.G.R. Medical university ,Chennai.,is a bonafide record of the work done by him in the **CARDIOTHORACIC DEPARTMENT, INSTITUTE OF CHILD HEALTH, Madras Medical college and government hospital ,during the academic year 2015 to 2018.**

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This is to certify that that the dissertation entitled , “**THE EFFICACY OF CAUDAL DEXMEDETOMIDINE ON STRESS RESPONSE AND POST OPERATIVE PAIN IN PAEDIATRIC CARDIAC SURGERY**” (A PROSPECTIVE, RANDOMIZED, DOUBLE BLINDED STUDY) submitted by **DR.R.VINOTHKUMAR** in partial fulfilment for the award of degree of doctor of medicine in Anaesthesiology by the Tamilnadu Dr.M.G.R. Medical university ,Chennai.,is a bonafide record of the work done by him in the CARDIOTHORACIC DEPARTMENT, INSTITUTE OF CHILD HEALTH, Madras Medical college and government hospital,during the academic year 2015 to 2018

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PLAGIARISM CERTIFICATE

This is to certify that this dissertation work titled “THE EFFICACY OF CAUDAL DEXMEDETOMIDINE ON STRESS RESPONSE AND POST OPERATIVE PAIN IN PAEDIATRIC CARDIAC SURGERY (A PROSPECTIVE, RANDOMIZED, DOUBLE BLINDED STUDY)” of the candidate Dr.VINOTH KUMAR.R with Registration Number 201520009 for the award of M.D ANAESTHESIOLOGY. I personally verified the urkund.com website for plagiarism check. I found that the uploaded file containing from introduction to conclusion pages shows a result of 2% plagiarism in this dissertation.

Guide and supervisor sign with seal

DECLARATION

I here by, declare this dissertation entitled **“THE EFFICACY OF CAUDAL DEXMEDETOMIDINE ON STRESS RESPONSE AND POST OPERATIVE PAIN IN PAEDIATRIC CARDIAC SURGERY”(A PROSPECTIVE, RANDOMIZED, DOUBLE BLINDED STUDY)** is a bonafide record of the work done by me in the **CARDIOTHORACIC DEPARTMENT, INSTITUTE OF CHILD HEALTH, MADRAS MEDICAL COLLEGE** ,during the academic year 2015 to 2018 under the guidance of **DR. SUGANTHARAJ ANURADHA M.D,D.A** ,professor of anaesthesiology , Institute of child health ,Chennai .,and submitted to Tamilnadu**Dr.M.G.R. Medical university** ,Chennai, in partial fulfilment for the award of degree of **M.D. Anaesthesiology** ,examinations to be held on April 18 . I have not submitted this dissertation previously to any university for the award of degree or diploma .

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Date :

Place :

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INTRODUCTION

The stress response associated with cardiac surgery in children may cause changes in hormonal secretion .Enhanced cortisol level and suppressed anabolic hormones may have deleterious effect during perioperative period and if not attenuated may result in higher post operative morbidity and increase the length of ICU stay.

The stress response hormone levels can be used as an objective to assess the analgesic efficacy of anaesthetic techniques used in children since the assessment of pain in children is difficult and unreliable. It has been suggested that regional anaesthesia can reduce the stress response associated with surgical trauma .

Caudal epidural anaesthesia with additives has been shown to inhibit the stress response to surgery and can influence post operative outcome. It is also an effective method for control of post operative pain in children undergoing open heart surgery . Though single shot caudal anaesthesia technique has shorter duration of action , it can be prolonged by addition of various adjuvant like dexmedetomidine and Fentanyl.

Alpha 2-adrenoreceptor agonist have been used effectively as an adjuvant in Regional anaesthesia .DEXMEDETOMIDINE is a highly specific and selective alpha 2 adrenoreceptor agonist with high ratio of alpha 2/alpha 1 activity [1620:1 as compared with 220:1 for clonidine]. Dexmedetomidine action is Selective for the CNS without unwanted cardiovascular effects from receptor activation .

This study is to compare the efficacy of single shot caudal DEXMEDETOMIDINE OR FENTANYL which is added to 0.25% bupivacaine in attenuating the stress response and post operative pain in paediatric patients undergoing open heart surgery. The primary outcome is to assess the stress hormone levels and secondary outcome is to assess the post operative pain scores and early extubation.

AIM OF THE STUDY

To compare the stress response and post operative analgesia using bupivacaine (0.25%) with dexmedetomidine and bupivacaine(0.25%) with fentanyl after general anaesthesia in paediatric cardiac surgery.

SECONDARY OBJECTIVES

- 1) To assess the intra operative and post operative hemodynamic stability.
- 2) Post operative FACES pain score.
- 3) Extubation time
- 4) Time taken to initiate post operative rescue analgesia.
- 5) To know the complications rate

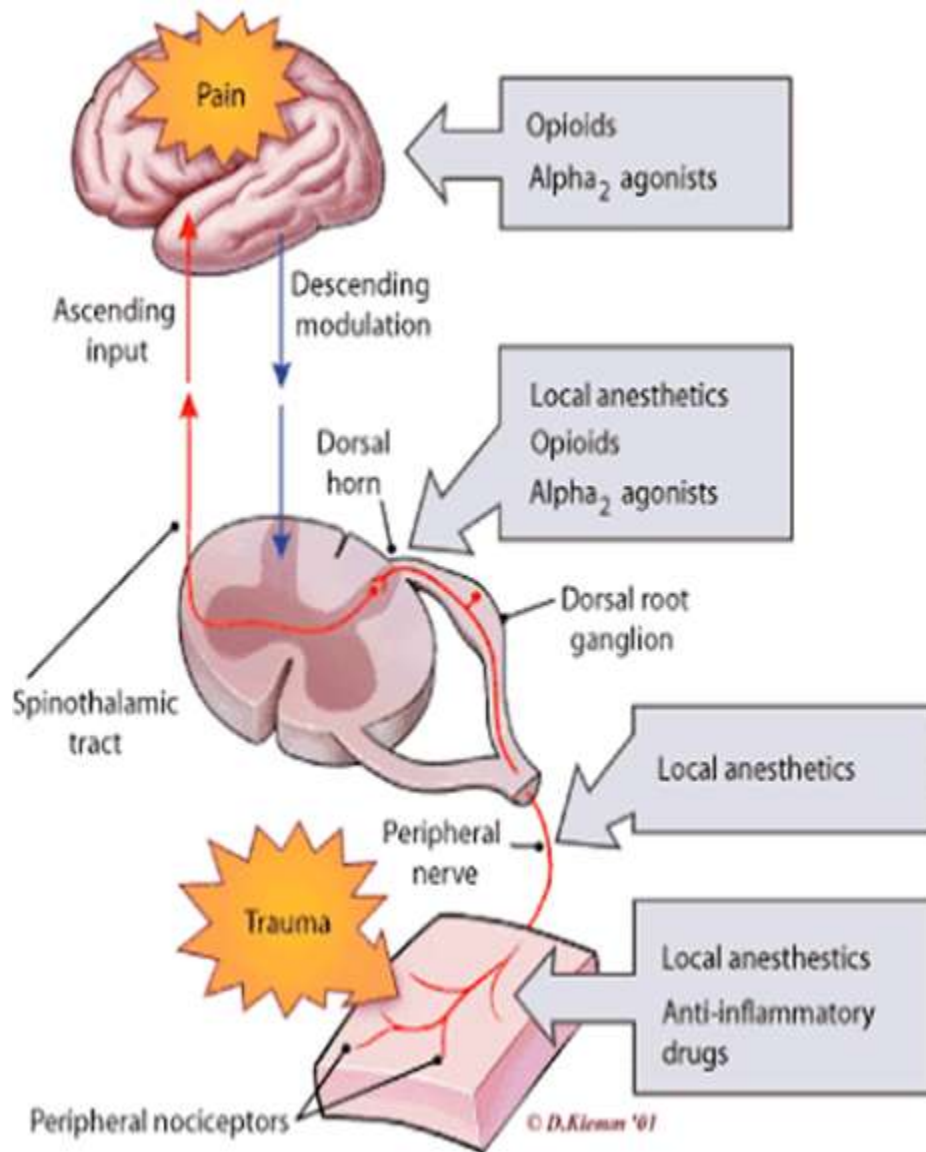
ANATOMY AND PATHOPHYSIOLOGY OF PAIN

INTRODUCTION

The term PAIN derived from the term poena .it is unpleasant emotional or sensory experience with tissue damage.

PAIN PATHWAY

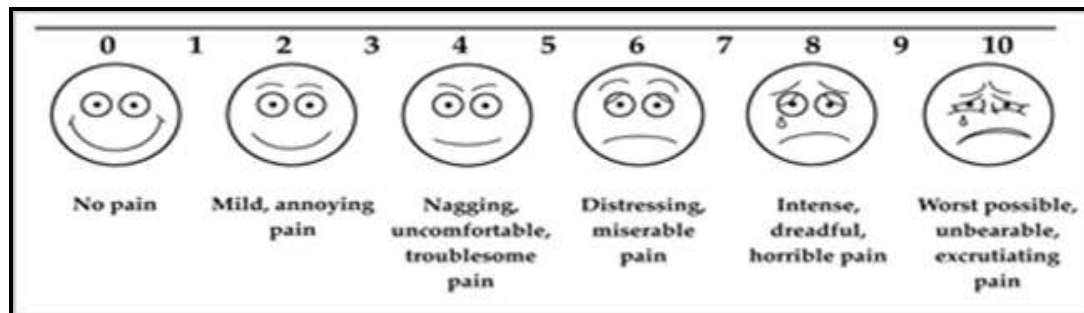
- 1) The unpleasant stimulus at the time of injury produces a local inflammatory reaction in the periphery
- 2) The unpleasant stimuli is then transferred to CNS by A delta and C fibres.This results in sequence of events i.e reflex withdrawal from the stimulus and pain perception .
- 3) Persistent noxious stimuli from C fibres produces central sensitisation which alters sensory process in the spinal cord resulting in allodynia and hyperalgesia at the site of injury



This picture shows drugs like local anaesthetics, opioids, alpha 2 agonist acting at spinal cord and cortical level.

PAIN ASSESMENT IN CHILDREN

VAS –Visual analog scale



FACES



2.OBSERVATIONAL BEHAVIORAL MEASURES

- ❖ FLACC-faces, legs, activity, cry and consolability
- ❖ CHEOPS –childrens hospital of eastern Ontario pain scale
- ❖ CRIES-crying requires increased oxygen administration, increased
- ❖ COMFORT
- ❖ OBJECTIVE PAIN SCORE

FLACC BEHAVIORAL PAIN SCORE 0 TO 10

CRITERIA	SCORE 0	SCORE 1	SCORE 2
Face	No particular expression or smile	Occasional grimace or frown withdrawn, uninterested	Frequent to constant quivering chin clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking ir legs drawn up
Cry	No cry (awake or sleep)	Moans or whimpers occasional complaint	Crying steadily ,screams or sobs ,frequent complaints
Activity	Lying quietly ,normal position Move easily	Squirming,shifting back and forth tense	Arched ,rigid or jerking
Consolability	Context relaxed	Reassured by occasional touching ,hugging or being talked to distractible	

DRUGS ACTING AT VARIOUS SITES OF PAIN PATHWAY

PERIPHERAL SITES –local anaesthetics (BUPIVACAINE, LIGOCAINE), NSAIDS,OPIODS SPINAL CORD –opioids, alpha 2 agonist (dexmedetomidine, clonidine), local anaesthetics.

CORTICAL LEVEL –opioids and alpha 2 agonist

Regional anaesthesia provides better and prolonged analgesia when compared to other modes of analgesia .it has several advantages which are as follows ,

- 1) Decreases the stress response associated with surgical trauma
- 2) Provides better intraoperative hemodynamic stability
- 3) Better intraoperative and post operative analgesia
- 4) Early extubation in PACU and decrease the duration of ICU stay
- 5) Decreased ventilator associated complications.
- 6) Decreased post operative parenteral opioid requirements.

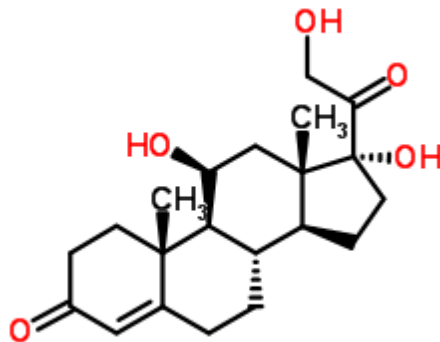
PHYSIOLOGY OF STRESS RESPONSE

It is state of threatened homeostasis caused by intrinsic and extrinsic adverse forces .Important components of stress system includes HPA axis and autonomic nervous system which interacts with other vital centersin central nervous system and tissue in the periphery to mobilize a succesful adaptive stress response against the stressor.

Central components of stress system located in the hypothalamus, brainstem and locus ceruleus and other catecholaminergic, norepinephrine synthesis cell groupsof medulla and pons .(central sympathetic neuron system).

Parvocellular neurons located in hypothalamus secrete both CRH and AVP and it is increased in stress conditions.Terminals of these neurons send signals to noradrenergic neurons of brainstem and hypophyseal system in brainstem. These neurons also send proijections to pro -opiomelanocortin nucleus located in hypothalamus. POMC (pro-opiomelanocortin) containing neurons send signals to locus ceruleus and NE sympathetic neurons of central stress system in brainstem.

CORTISOL- STRESS HORMONE



Cortisol is the primary stress hormone synthesized from adrenal cortex and regulated via HPA axis. Expressed at the highest in the early morning period .

Cortisol main targets are metabolic and also affects immune response, memory and ion transport. T lymphocyte cells are important component of cell mediated immunity. T cells responds to cytokine molecules through signaling pathway. cortisol blocks the T cells from recognizing interleukins. it leads to more chance of infection and impaired wound healing.

STRESS RESPONSE TO SURGERY

It is characterized by secretion of pituitary hormones and activation of sympathoadrenal system .Release of corticotrophin from pituitary stimulates cortisol from adrenal cortex, hypothalamic activation of autonomic nervous system results in

increased synthesis of catecholamines from adrenal medulla and release of norepinephrine from presynaptic nerve terminals. Increased sympathetic activity results in cardiovascular effects like tachycardia and hypotension.

ALPHA -2 ADRENERGIC AGONIST

Alpha 2 adrenergic receptors have sedative, anxiolytic, hypnotic, and analgesic properties. Epidural or intrathecal administration of alpha2 adrenergic agonist provides analgesia by activating alpha2 adrenergic receptors (G-protein coupled inhibitory receptor) on the sympathetic preganglionic neurons that causes reduction in norepinephrine release (via negative feedback mechanism). Descending noradrenergic pathways originating in nuclei A5 and A7 in pons and midbrain which play a major inhibitory role in sympathetic preganglionic neurons activity. The net effect is sympatholysis which results in analgesia, hypotension, bradycardia and sedation.

SUBTYPES OF ALPHA 2 RECEPTORS

Three subtypes have been found in humans

Alpha 2 A –primarily distributed in the periphery. Primary functions include

- 1) Hypotension

- 2) Analgesia
- 3) Sedation
- 4) Presynaptic feedback inhibition of norepineeprine release

Alpha 2B

- 1) Placental angiogenesis
- 2) Hypertensive effect of etomidate
- 3) Analgesic effect

Alpha 2C

- 1) Analgesic effect of moxonidine
- 2) Feedbackinhibition of adrenal catecholamine release
- 3) Modulation of behaviour

MODES OF ANALGESIA IN PAEDIATRIC CARDIOTHORACIC SURGERY:

PARA VERTEBRAL BLOCK: ultrasound guided bilateral single bupivacaine injection in the paravertebral space facilitates early extubationand decreases perioperative opioid requirements in on pump cardiac surgeries.

ADVANTAGES: Heart rate and invasive blood pressure will be lower and decreased intra op and post op opioid requirements .

DISADVANTAGE: Single injection technique are time limited by the duration of action of local anaesthetics.

PARASTERNAL INTERCOSTAL BLOCK

Bupivacaine (0.25%) or ropivacaine can be used in this technique for post operative analgesia.

ADVANTAGES:Better control of post operative sternal wound pain after cardiac surgery.

DISADVANTAGE :Short duration impairing the ability to asses long term chest wall pain and length of stay.

CAUDAL EPIDURAL ANAESTHESIA

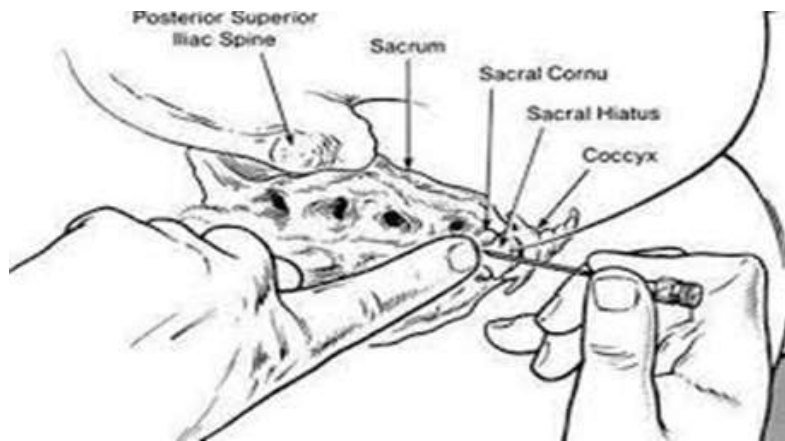
Most commonly used regional anaesthesia in children though it is oldest one.

HISTORY

- ❖ First described by CATHELIN AND SICARD in the year 1907
- ❖ In the year 1909 STECKEL of germany first used this technique
- ❖ 1910-LAWEN used caudal injection injection in surgery
- ❖ In the year 1923 MEEHER and BONAR used this technique in obstetrics and gynaecology
- ❖ Continuous caudal technique was developed by EDWARDS and HINSTON in the year 1942.
- ❖ 1943-continuous drop method introduced by BLOCH

ANATOMY OF CAUDAL BLOCK

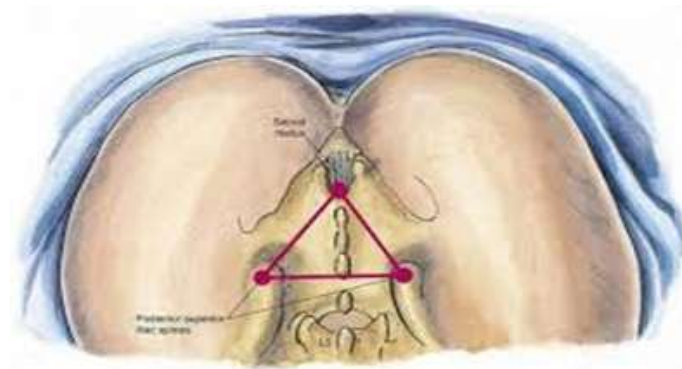
Caudal block is performed at the site of sacral hiatus through sacrococcygeal membrane .It is identified by equilateral triangle formed by sacral hiatus and posterior superior iliac spines.



SACRAL HIATUS

It is a bony defect located at lower end of sacrum just above sacrococcygeal junction and triangular in shape.

It is formed by nonfusion of fifth sacral and occasionally by fourth sacral vertebral arches.



It resembles inverted U or V shaped and it is covered by sacrococcygeal membrane and above covered by skin and subcutaneous tissue.it tends to change in size and shape with increasing age.

Long axis of sacrum and coccyx forms acute angle in neonates. Angle increases with the age .In neonate caudal space is filled with epidural fat which has spongy and gelatinous appearance with discrete spaces between fat globules with very minimal connective tissue fibre so local anaesthetics spread in rapid and uniform manner .it is difficult to perform caudal after 17 years the characteristic feature of caudal epidural space is that it communicates within transverse space.this improves the quality of block even with diluted local anaesthetic solutions in large volumes Caudal epidural space also highly vascularised like lumbar epidural space hence inadvertent intravascular injection will lead to systemic toxicity.

The mean distance from skin to caudal epidural space is 21 mm upto 7 years of age.so short beveled needle is enough to reach the epidural space and dural puncture can be avoided.

PHARMACOLOGY OF DEXMEDETOMIDINE



PHYSIOCHEMICAL CHARACTERISTICS & PHARMACOKINETICS

It is the S-enantiomer of medetomidine.

pKa is 7.1.

Belongs to imidazole subgroup of alpha 2 agonist. It is soluble in water and available as clear isotonic solution containing 100microgram/ml and 9mg sodium chloride per milliliter of water.

It is 94% protein bound. Pharmacokinetics of dexmedetomidine is not influenced by renal impairment (creatinine clearance <30ml/min) or age .

Elimination half life is 2 to 3 hours.

MECHANISM OF ACTION

Alpha 2 agonists causes sedative and hypnotic effect by acting on the alpha 2 receptors in the locus coeruleus and by analgesic action at alpha 2 receptors within the locus coeruleus and within the spinal cord .

ANALGESIA

Analgesic effect is through stimulation of alpha 2C and alpha 2a receptors which is located in the dorsal horn , directly suppressing the pain transmission by decreasing the release of SUBSTANCE P, GLUTAMATE, PRONOCICEPTIVE TRANSMITTERS AND HYPERPOLARIZATION OF INTER NEURONS.

DEXMEDETOMIDINE AS AN ADJUVANT

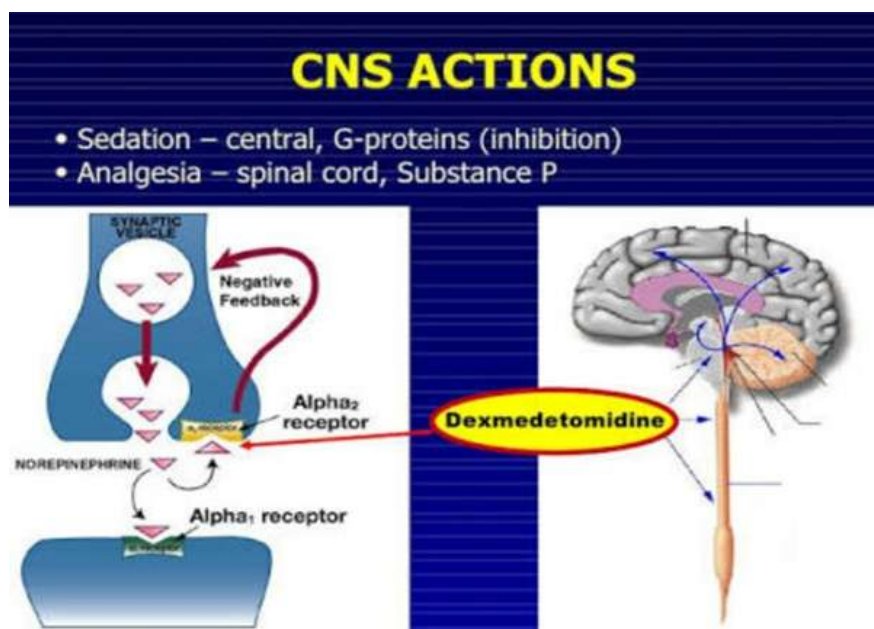
Dexmedetomidine has higher affinity for alpha 2 receptors and is associated with fewer hemodynamic and systemic effects at equi-analgesic doses.

Neuraxial administration of dexmedetomidine produces analgesia.

Epidural dexmedetomidine exhibits synergism with local anaesthetics and increases the density of motor block ,prolongation of both motor and sensory block, and improving post operative

analgesia .It augments the potentiation of local anasthetics and decreases the intraoperative anaesthetic requirements. It also prevents intraoperative awareness and improved postoperative analgesia when epidural dexmedetomidine was used in conjunction with general anaesthesia .In thoracic surgeries epidural dose of 2mcg /kg prolongs the duration of analgesia and prevents the awareness during anaesthesia and improves inraoperative oxygenation and postoperative analgesia.

In paediatric patients caudal dexmedetomine in a dose of 1 to 2 mcg/kg with bupivacaine cause more sedation and ,prolonged analgesia and less anaesthetic consumption and less irritability . When compared to intravenous route caudal dexmedetomidine does not cause bradycardia and hypotension.



REVIEW OF LITERATURE

1. *KJ ANAND et al(1990)*- Studied the hormonal metabolic stress response in neonates undergoing cardiac surgery. The results suggests that neonatal hormonal and metabolic responses to cardiac surgeries in neonates are extreme and are associated with a high hospital mortality rate.

2. *JP DESHOROUGH et al (2000)*- The stress response to trauma and surgery concluded that stress response to surgery comprises a number of hormonal changes initiated by neuronal activation of the hypothalamic–pituitary-adrenal axis. The overall metabolic effect is one of catabolism of stored body fuels. In general, the magnitude and duration of the response are proportional to the surgical injury and development of complications such as sepsis. Other changes also occur following surgery, notably an increase in cytokine production which is triggered locally as a tissue response to injury.

Regional anaesthesia with local anaesthetic agents inhibits the stress response to surgery and can also influence postop outcome by beneficial effects on organ function.

3. *GUBER et al(2001)*-Stress response in infants undergoing cardiac surgery-a study of fentanyl bolus,fentanyl infusion and fentanyl- midazolam infusion and demonstrated a significant endocrine stress response in infants with well compensated congenital cardiac disease undergoing cardiac surgery,but without adverse postop outcome.The use of large dose fentanyl with or without midazolam with the intention of providing stress free anaesthesia,does not appear to be an important determinant of early post op outcome.

4. *IBACACHE et al (2004)*-Single dose dexmedetomidine reduces agitation after sevoflurane anaesthesia in children and concluded that in children undergoing surgery using sevoflurane anaesthesia, dexmedetomidine 0.3mcg/kg administered in 10 mins after induction reduced the incidence of emergence agitation from 37% in the control group to 10%.No adverse effects attributable to dexmedetomidine were observed.

5. *AM MUKHTAR et al (2006)*- listed the use of dexmedetomidine in paediatric surgery for its ability to decrease heart rate, arterial blood pressure and neuroendocrine response during paediatric surgery and concluded that arterial blood pressure and heart rate sequential concentration of circulating

cortisol, epinephrine, nor epinephrine, and blood glucose were significantly reduced after administration of dexmedetomidine.

6. *I.SAADAWY et al (2008)* - Studied the effect of dexmedetomidine on the characteristics of bupivacaine in a caudal block in paediatrics and concluded that caudal dexmedetomidine seems to be a promising adjunct to provide excellent analgesia without side effects over a 24hour period.

7. *S.KONAKCI et al (2008)*- Studied the efficacy and neurotoxicity of dexmedetomidine administered via epidural route and concluded that dexmedetomidine does not have motor or sensory effects, but it may have a harmful effect on the myelin sheath when administered via the epidural route.

8. *GAJARSTI et al (2010)*-Changes in adrenocorticotrophic hormone (ACTH),cortisol, aldosterone levels following cardiac surgery and concluded that peak serum cortisol was unrelated to CPB/DHCA time and did not predict the level of inotrope support.However a subset of patients with elevated ACTH/cortisol ratio seemed to have a clinical status consistent with adrenal insufficiency and may be a target group for early post-op steroid therapy.

9. A.M.EL.HENNAWY et al (2009)-Studied the effects of addition of clonidine or dexmedetomidine to bupivacaine prolongs caudal analgesia in children and concluded addition of dexmedetomidine or clonidine to caudal bupivacaine significantly promoted analgesia in children undergoing lower abdominal surgeries with no significant advantage of dexmedetomidine over clonidine and without an increase in incidence of side effects.

10. JYRSON GUILHERME KLANT et al (2010)- Studied the effects of dexmedetomidine –fentanyl infusion on blood pressure and heart rate during cardiac surgery in children and concluded that the combination of fentanyl-dexmedetomidine infusion provided effective anaesthesia for paediatric patients undergoing cardiac surgery. In addition hyperdynamic response to surgical stimuli was blunted.

11. AN NAGUIB et al (JUNE 2013)-evaluated the role of three anaesthetic techniques in altering the stress response in children undergoing surgery for repair of congenital heart disease – concluded that low fentanyl alone was associated with the greatest stress response.

MATERIALS AND METHODS

This study was a prospective randomized controlled observer blinded study. This study was conducted after getting approval from my institutional ethical committee and written informed consent from parents (or) guardians.

METHODOLOGY

50 pediatric patients aged 2 to 10 years, ASA PS II undergoing elective surgical repair for atrial septal defect [ASD] were included in this study .

Patients were divided in to two groups

- 1) GROUP BD [bupivacaine 0.25 % & dexmedetomidine 1mcg/kg]
- 2) GROUP BF [buopivacaine 0.25% & fentanyl 1mcg/kg]

INCLUSION CRITERIA

- ❖ Age : 2years to 10-yrs
- ❖ ASA : II
- ❖ Surgery : Elective open heart surgery
- ❖ Who have given valid informed consent.

EXCLUSION CRITERIA

- ❖ Not satisfying inclusion criteria.
- ❖ ASA PS III and IV
- ❖ Patients posted for emergency surgery
- ❖ Hemodynamic instability requiring inotropes
- ❖ Children with altered sacral and caudal anatomy
- ❖ Local infection at the site of block
- ❖ Lack of written informed consent

MATERIALS USED

- ❖ Monitors – ECG, SPO2, EtCO2, NIBP, IBP,
TEMPERATURE URINE OUTPUT
- ❖ 20 G and 22G Intra venous cannula
- ❖ 20G and 22G arterial line catheter ,4 Fr to 7Fr central venous
pressure catheter.
- ❖ 10 ml syringe and 23G short bevelled needle for caudal block
- ❖ Drugs –bupivacaine 0.25% and dexmedetomidine

PRIMARY PARAMETERS

- ❖ Serum cortisol level
- ❖ Serum glucose level

SECONDARY PARAMETERS

- ❖ Intra operative HR,SBP,DBP,MAP
- ❖ Post operative HR
- ❖ Post operative FACES PAIN SCORE
- ❖ Time for Rescue analgesia requirement
- ❖ Early extubation
- ❖ Length of ICU stay
- ❖ Any adverse effect

METHODOLOGY OF STUDY

This study was conducted in a paediatric cardiothoracic surgery unit, institute of child health and hospital, Madras Medical College between April and July of 2017. Aim of the study was to assess the efficacy of caudal dexmedetomidine in stress response and post operative analgesia in children undergoing paediatric cardiothoracic surgery. 50 patients between the age group 2 to 10 years scheduled

for elective open heart surgery for ASD repair were randomly divided in to two groups.

1.GROUP BD received bupivacaine 0.25 % & dexmedetomidine 1mcg/kg with the total volume of 1.5ml/kg

2.GROUP BF received bupivacaine 0.25% &fentanyl 1mcg/kg with the volume of 1.5ml/kg

Patients were fasted for 6 hours before the procedure. Age, weight and baseline HEART RATE , NIBP, SPO2 were recorded.All operations were scheduled as the first case in the morning to equalize the circadian changes in the morning stress hormone levels.

Airway equipments include orophryngeal airway[size 0,1 ,2], bougie, ET tube appropriate size .

Volume to be injected in caudal block was prepared in syringes under strict aseptic precautions.

After insertion of 20G or 22G cannula general anaesthesia was induced with midazolam 0.1mg /kg ,fentanyl 10 microgram/kg and thiopentone 5mg /kg .vecuronium 0.1mg/kg was given to facilitate the endotracheal intubation with appropriate size ET tube.

In both groups patients were placed in lateral position .By using 23 G short beveled needle caudal block was performed under sterile condition.

Insertion of central venous catheter and arterial catheter was done after caudal block.

Median sternotomy was performed in all patients .blood samples were taken to determine serum cortisol and blood glucose immediately after induction [baseline], after sternotomy and after surgery .serum cortisol measured by eCLIA [ELECTRO CHEMILUMINESCENCE IMMUNOASSAY METHOD] method. Serum glucose level measured by HEXOKINASE method .

Heart rate ,systolic,diastolic and mean blood pressure were recorded before induction[baseline] ,10 minutes after caudal injection, 10 minutes after sternotomy,after cardiopulmonary by pass, at pacu admission and at extubation .patients were monitored using standard monitoring [HEART RATE, IBP, CVP, SPO2, ETCO2, TEMPERATURE].An increase in heart rate and mean arterial pressure after the skin incision and sternotomy compared with baseline values and was defined as failed caudal blockage..patient with suspected failed blockage were given

Inj.fentanyl 10microg/kg and was excluded from the study.percentage of sevoflurane used in both groups were recorded in both groups. After completion of procedure patients were shifted to PACU [post anaesthesia care unit] .hemodynamics were recorded and weaning process started..patients who fulfil extubation criteria were extubated and herat rate, MAP, SPO2 were recorded in both groups .

Using paediatric FACES pain scale score with its 0 to 5 score range, post operative pain score assessed upon arrival and every half an hour for 6 hours. If pain score is more than 2 at any time, rescue analgesia IV PARACETAMOL 15mg/kg or FENTANYL 0.5mcg/kg given and time required for rescue analgesia were recorded in both groups.

METHODOLOGY

ETHICAL COMMITTEE APPROVAL



PATIENT SATISFYING INCLUSION CRITERIA



INFORMED CONSENT OBTAINED



RANDOMIZATION BY CLOSED ENVELOPE METHOD



HR, BP, SPO2 MEASUREMENT



PREOXYGENATION



INDUCTION



PRE INTUBATION HR BP MEASURED



INTUBATION WITH ENDOTRACHEAL TUBE



CAUDAL BUPIVACAINE AND DEXMEDETOMIDINE



SURGERY PROCEEDED WITH MAINTENANCE OF
ANAESTHESIA



END OF SURGERY



EXTUBATION



MEASUREMENT OF OTHER STUDY OUTCOME

- INTRAOPERATIVE OPIOID AND VOLATILE REQUIREMENT
- POSTOPERATIVE VISUAL ANALOGUE SCALE PAIN SCORE
- COMPLICATION RATE



DATA COMPILATION



STATISTICAL ANALYSIS



CONCLUSION

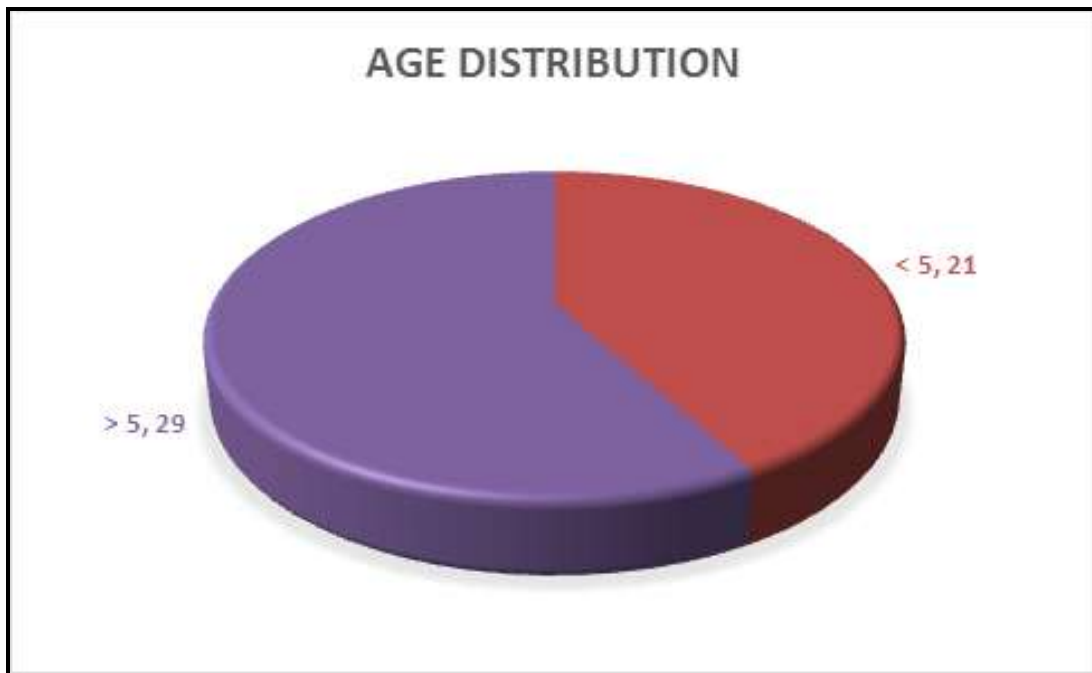
In this study unpaired T test is used for comparing the dexmedetomidine and fentanyl group.

ANOVA test is used to compare the mean value of serum cortisol and serum glucose values between the intervention groups.

OBSERVATION AND RESULTS

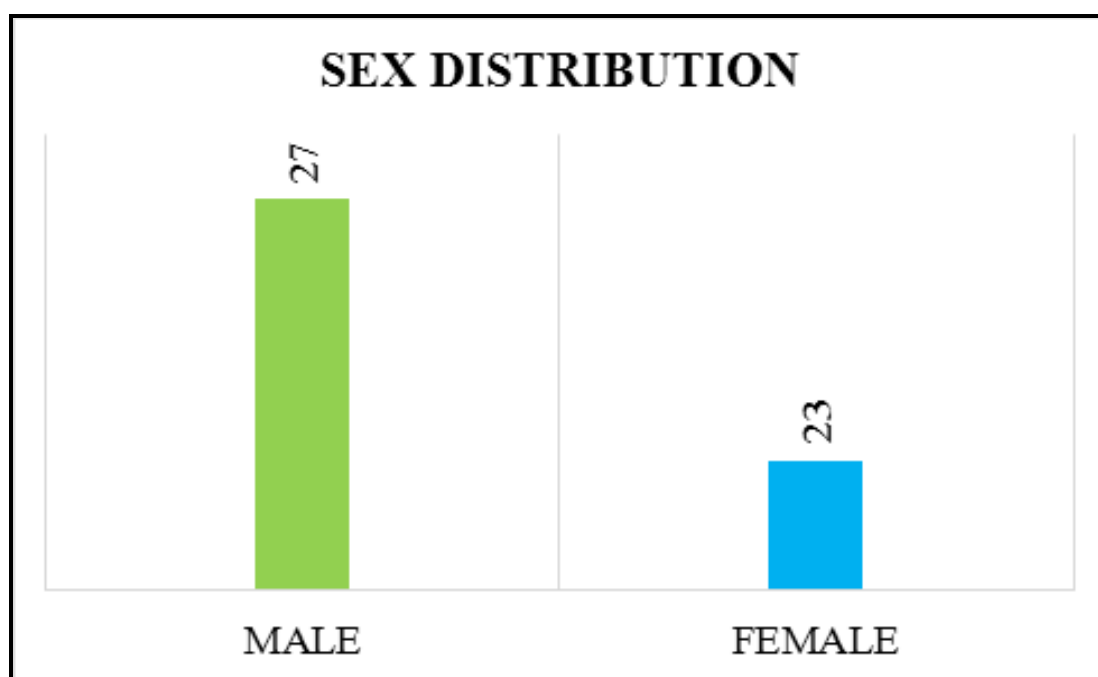
AGE DISTRIBUTION

AGE (IN YEARS)	NO OF PATIENTS	PERCENTAGE
< 5	21	42%
> 5	29	58%



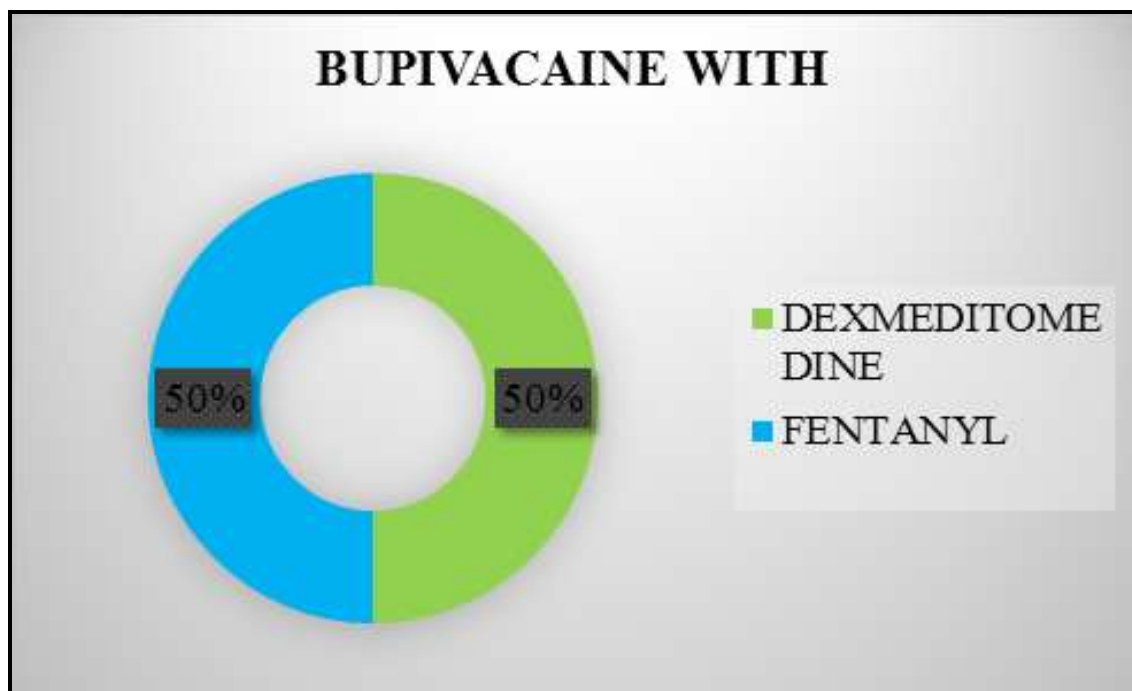
SEX DISTRIBUTION

SEX	NO OF PATIENTS	PERCENTAGE
MALE	27	54%
FEMALE	23	46%



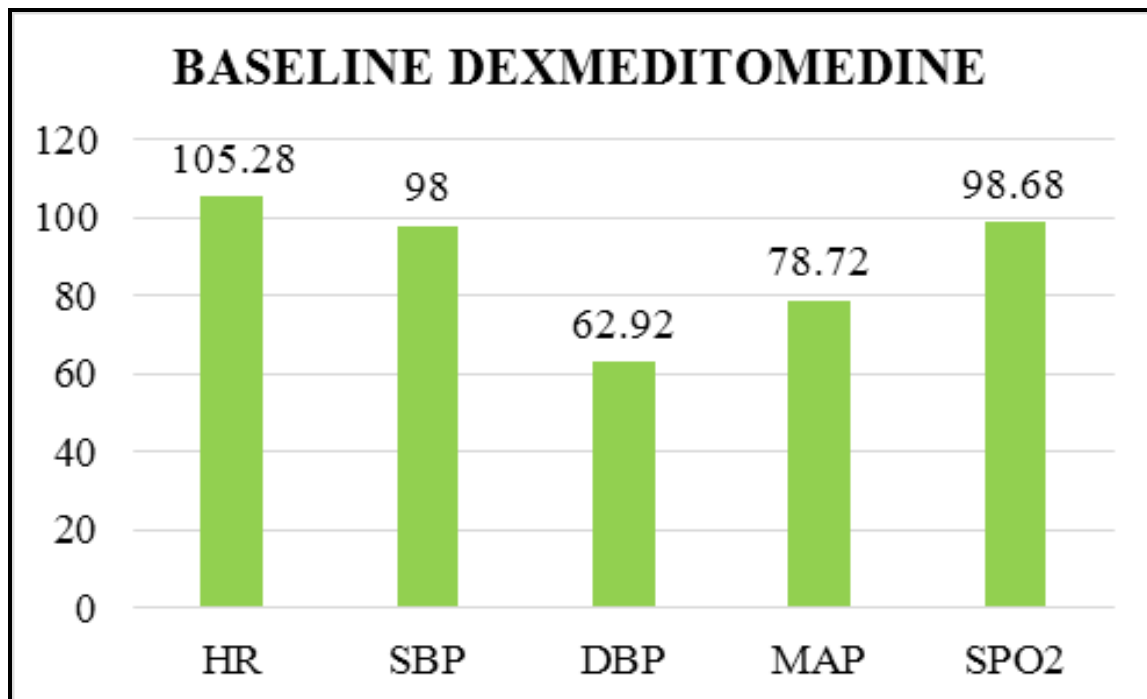
BUPIVACAINE WITH

BUPIVACAINE WITH	NO OF PATIENTS	PERCENTAGE
DEXMEDITOMEDINE	25	50%
FENTANYL	25	50%



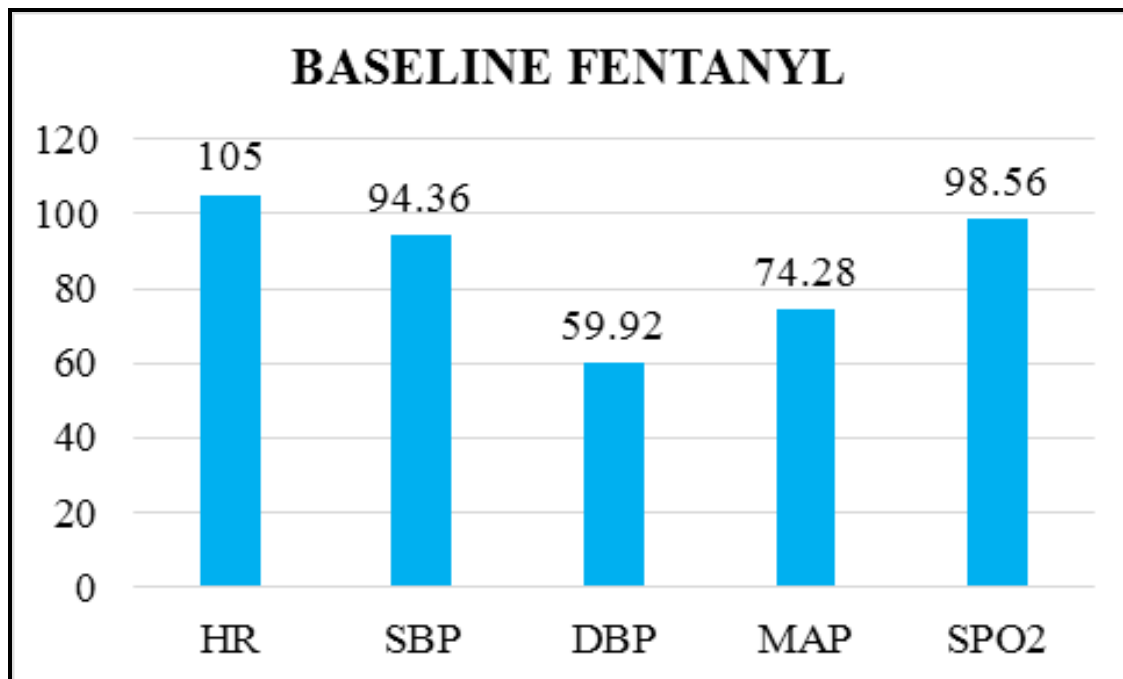
BASELINE – DEXMEDITOMEDINE GROUP

PARAMETERS	MEAN	SD
HR	105.28	4.73
SBP	98	7.07
DBP	62.92	5.97
MAP	78.72	4.31
SPO2	98.68	1.47



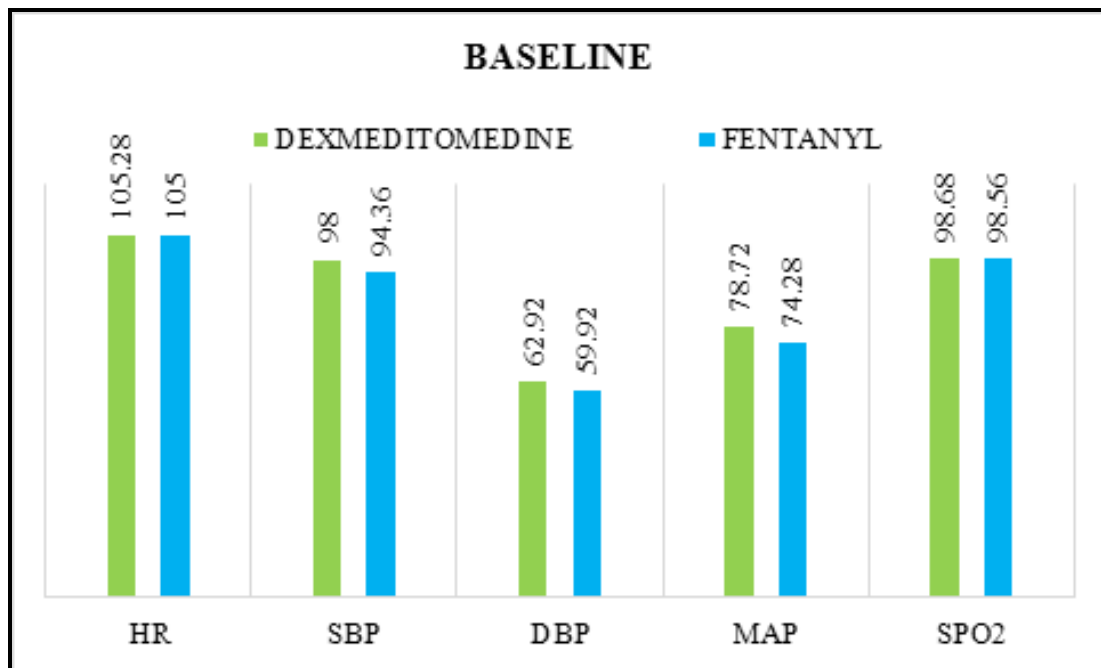
BASELINE – FENTANYL GROUP

PARAMETERS	MEAN	SD
HR	105	4.6
SBP	94.36	7.59
DBP	59.92	6.08
MAP	74.28	6.73
SPO2	98.56	0.58



BASELINE - MEAN COMPARISON

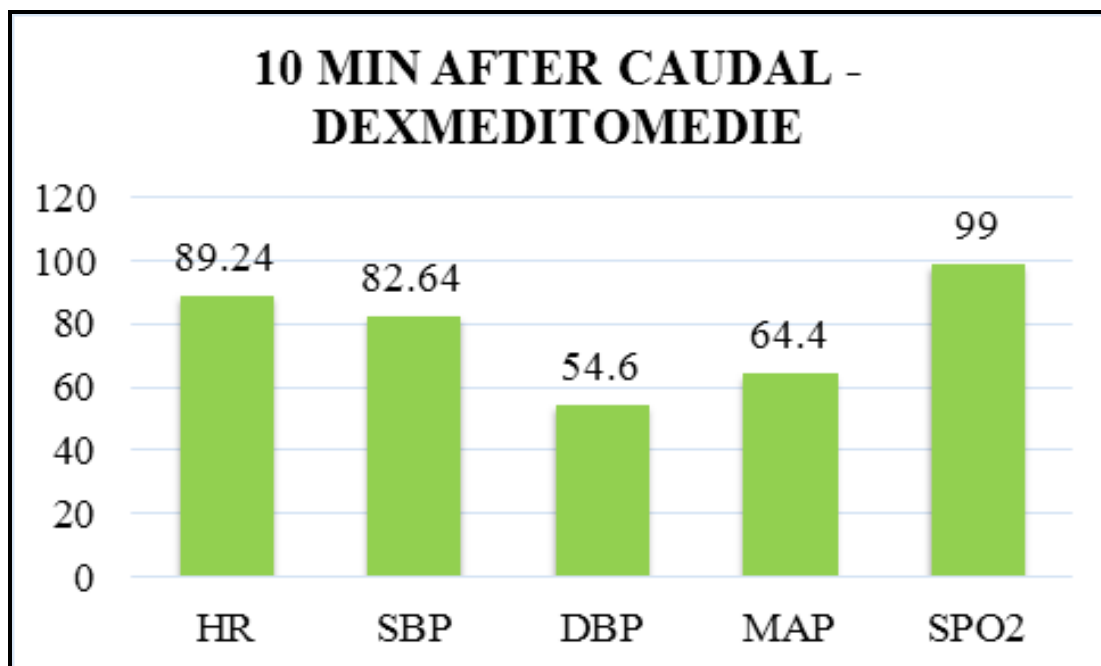
PARAMETERS	DEXMEDITOMEDINE	FENTANYL	P VALUE
HR	105.28	105	0.834
SBP	98	94.36	0.047
DBP	62.92	59.92	0.085
MAP	78.72	74.28	0.008
SPO2	98.68	98.56	0.429



According to my study comparison of baseline heart rate, SBP, DBP, MAP were compared between dexmedetomidine and fentanyl group and considered as statistically INSIGNIFICANT since P value is >0.05 .

10 MIN AFTER CAUDAL – DEXMEDITOMEDINE

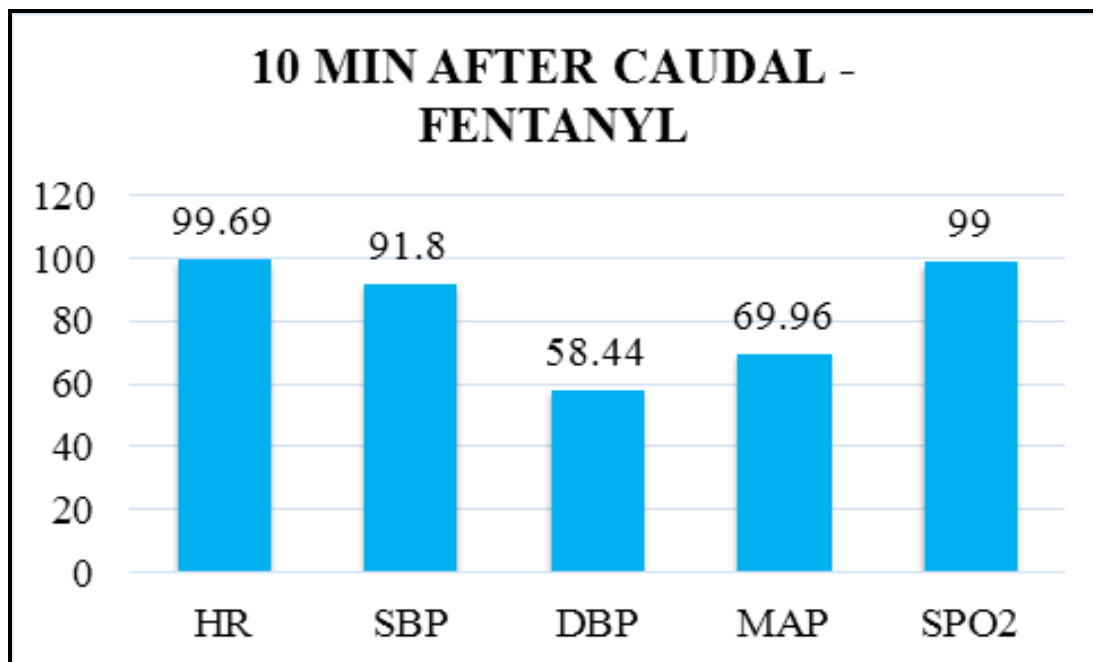
PARAMETERS	MEAN	SD
HR	89.24	4.31
SBP	82.64	5.29
DBP	54.6	4.96
MAP	64.4	4.99
SPO2	99	0.2



After caudal block Most of the dexmed group patients had mean heart rates ranging from 88 to 92 beats per minute with standard deviation 4.31 and MAP ranges from 62 mmHg to 66mmHg with standard deviation 4.99 intraoperatively.

10 MIN AFTER CAUDAL – FENTANYL

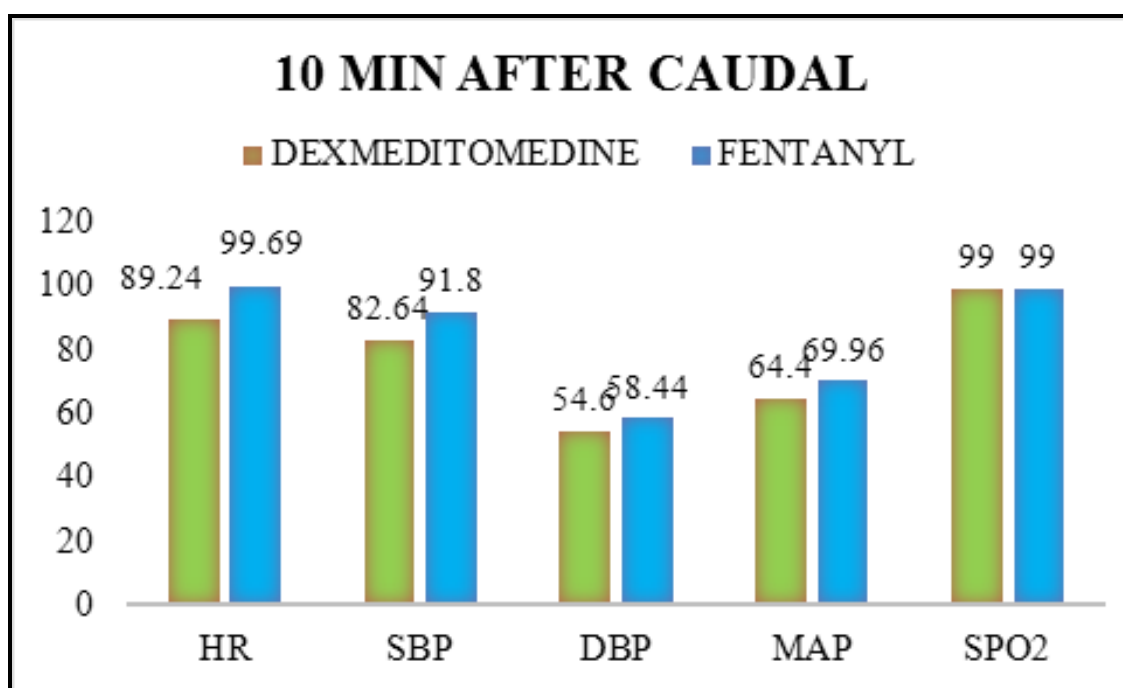
PARAMETERS	MEAN	SD
HR	99.69	3.23
SBP	91.8	6.8
DBP	58.44	2.15
MAP	69.96	6.3
SPO2	99	0



After caudal block most of the fentanyl group patients had heart rates ranging from 98 to 102 beats per minute with standard deviation 3.23 and MAP ranges from 68 mmHg 74 mmHg with standard deviation 6.3 intraoperatively.

10 MIN AFTER CAUDAL - MEAN COMPARISON

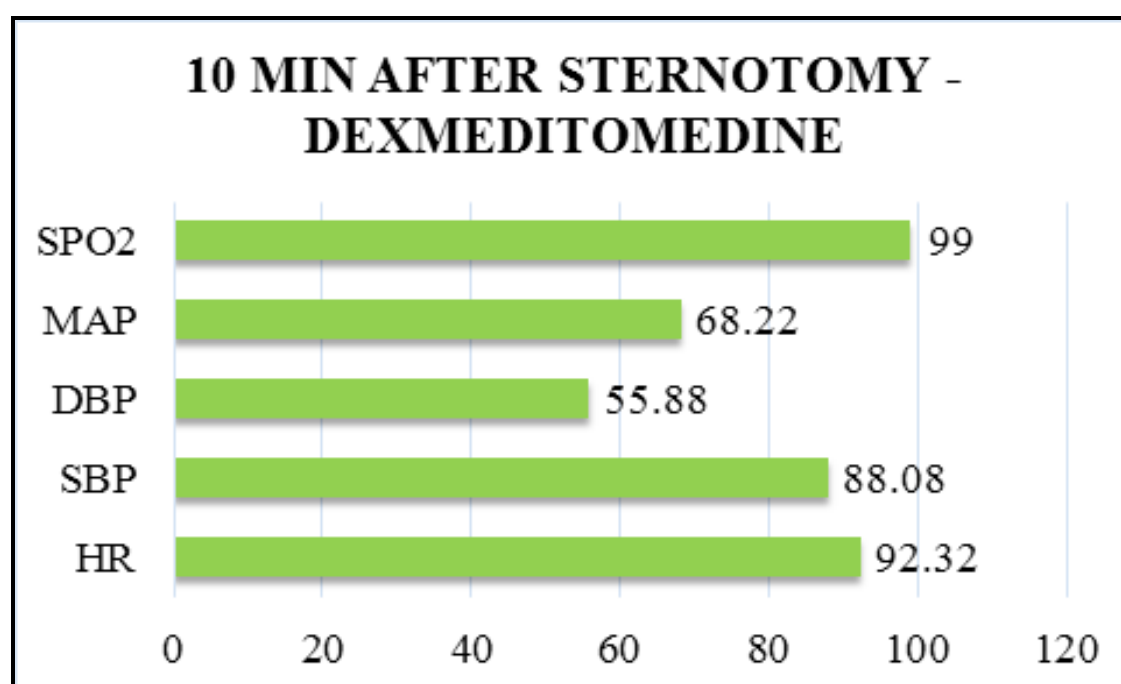
PARAMETERS	DEXMEDITO MEDINE	FENTANYL	P VALUE
HR	89.24	99.69	0.001
SBP	82.64	91.8	0.001
DBP	54.6	58.44	0.005
MAP	64.4	69.96	0.001
SPO2	99	99	0.322



The association between the two dexmedetomidine and fentanyl group in heart rate and MAP after caudal block is considered to be statistically significant since P value is <0.05 .

10 MIN AFTER STERNOTOMY – DEXMEDITOMEDINE

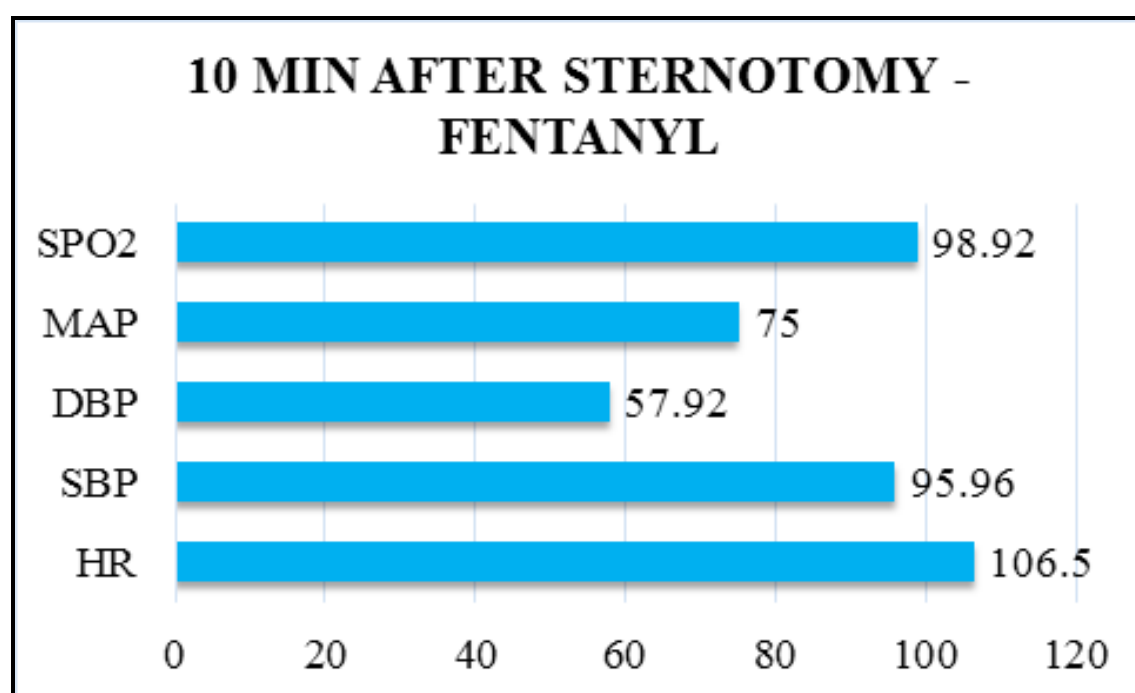
PARAMETERS	MEAN	SD
HR	92.32	4.5
SBP	88.08	4.26
DBP	55.88	4.98
MAP	68.22	4.21
SPO2	99	0



After sternotomy most of the dexmedetomidine group patients had heart rate 92 beats per minute with standard deviation 4.5 and and MAP 68mmHg with standard deviation of 4.21 intraoperatively.

10 MIN AFTER STERNOTOMY – FENTANYL

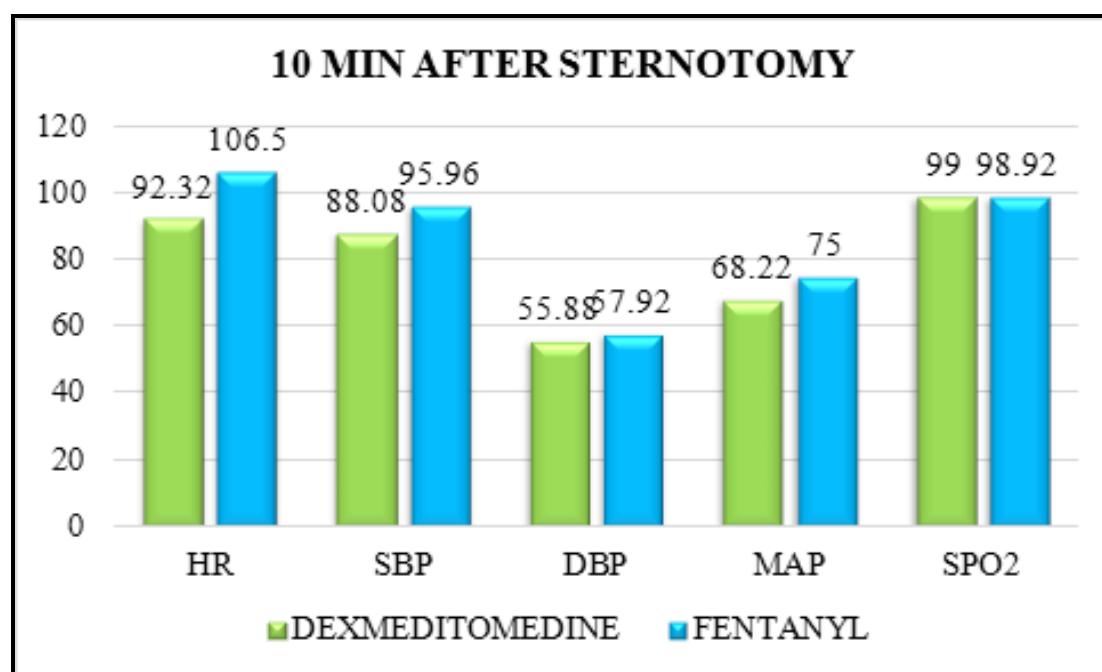
PARAMETERS	MEAN	SD
HR	106.5	3.9
SBP	95.96	5.67
DBP	57.92	11.6
MAP	75	2.44
SPO2	98.92	0.27



After sternotomy most of the fentanyl group patients had heart rate is 106 beats per minute with standard deviation 3.9 and MAP is 75 mmHg with standard deviation 4.21 intraoperatively.

10 MIN AFTER STERNOTOMY - MEAN COMPARISON

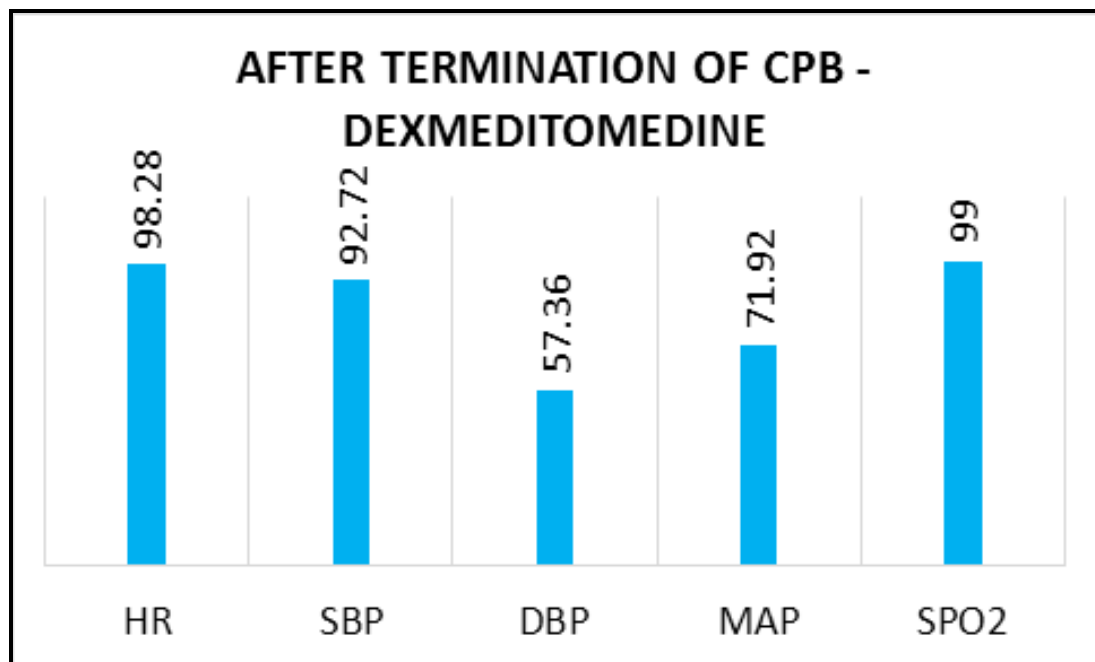
PARAMETERS	DEXMEDITO MEDINE	FENTANYL	P VALUE
HR	92.32	106.5	0.001
SBP	88.08	95.96	0.001
DBP	55.88	57.92	0.423
MAP	68.22	75	0.001
SPO2	99	98.92	0.155



The association between the two dexmedetomidine and fentanyl group in heart rate and MAP after sternotomy is considered to be statistically significant since $P < 0.05$. Comparison of DBP between the 2 groups was not statistically significant since the $P > 0.05$.

AFTER TERMINATION OF CPB – DEXMEDITOMEDINE

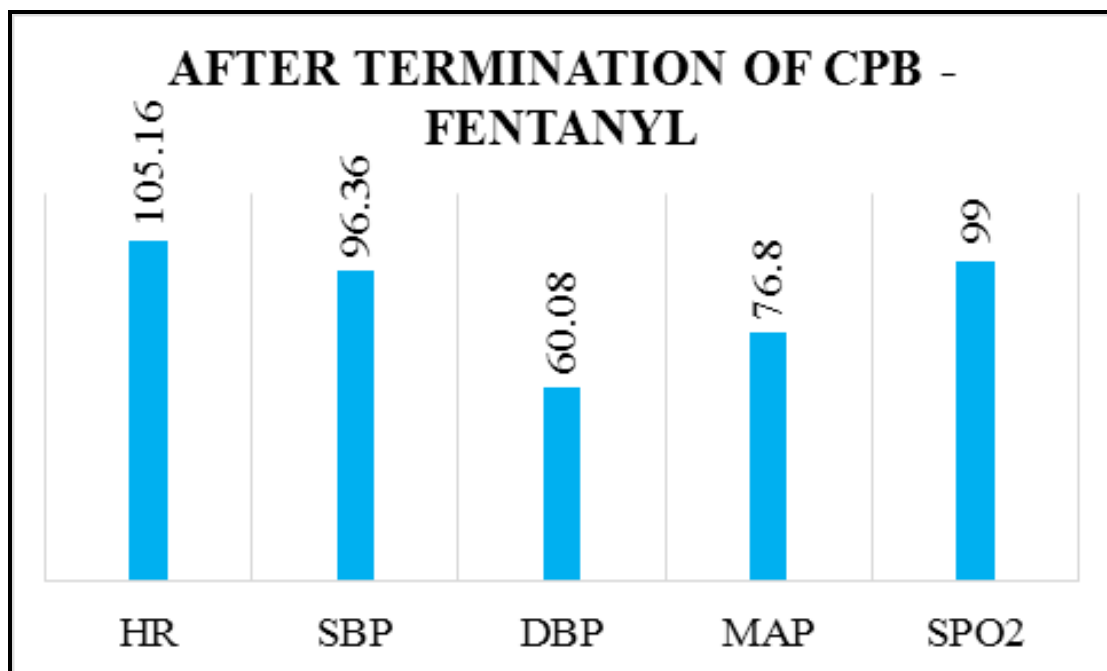
PARAMETERS	MEAN	SD
HR	98.28	3.47
SBP	92.72	4.1
DBP	57.36	5.76
MAP	71.92	4.8
SPO2	99	0



After termination of CPB most of the dexmedetomidine group patients had heart rates ranging from 96 to 100 beats per minute and MAP ranges from 70 mmHg to 74 mmHg intraoperatively.

AFTER TERMINATION OF CPB- FENTANYL

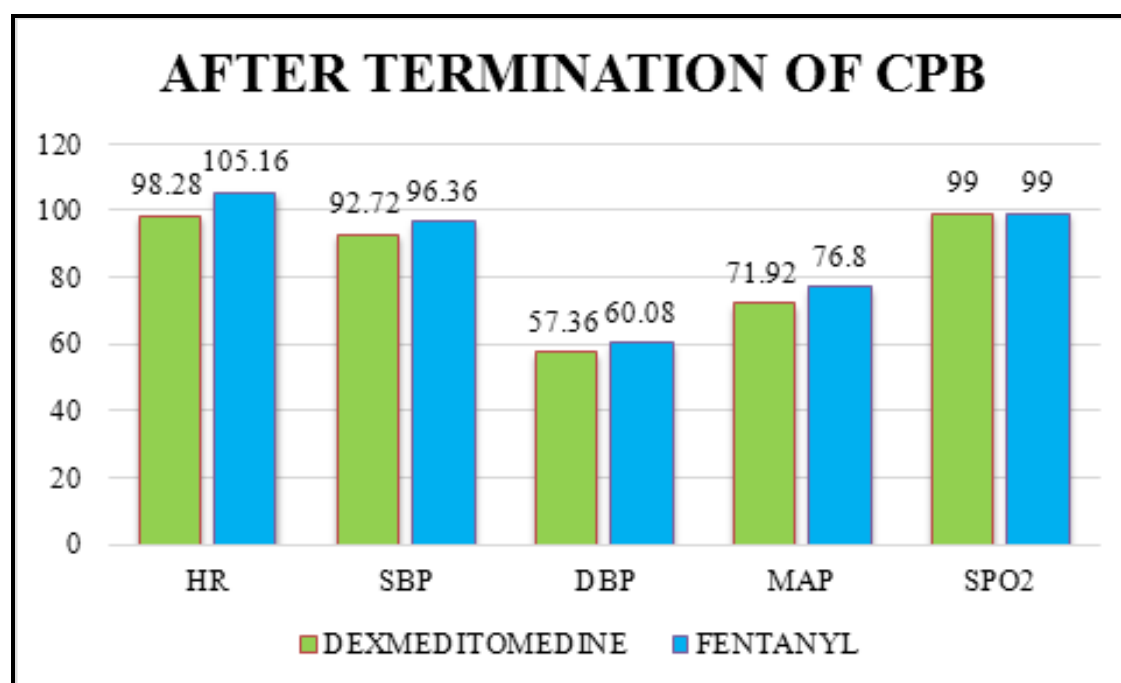
PARAMETERS	MEAN	SD
HR	105.16	20.62
SBP	96.36	5.5
DBP	60.08	11.9
MAP	76.8	2.54
SPO2	99	0



After termination of CPB most of the fentanyl group patients had heart rates ranging from 96 to 116 beats per minute and MAP ranges from 75 mmHg to 78mmHg intraoperatively.

AFTER TERMINATION OF CPB- MEAN COMPARISON

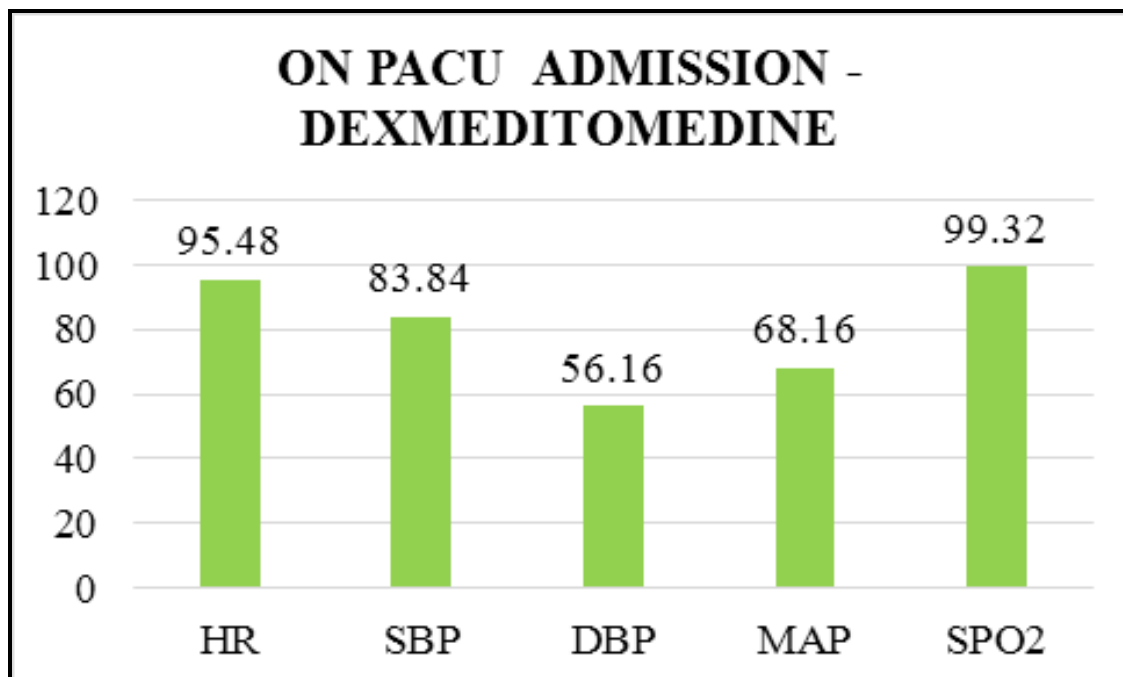
PARAMETERS	DEXMEDITOMEDINE	FENTANYL	P VALUE
HR	98.28	105.16	0.016
SBP	92.72	96.36	0.011
DBP	57.36	60.08	0.303
MAP	71.92	76.8	0.001
SPO2	99	99	1



The association between the two dexmedetomidine and fentanyl group in heart rate and MAP after termination of CPB is considered to be statistically significant since $P < 0.05$. comparison of DBP between the 2 groups was not statistically significant since the $P > 0.05$.

ON PACU ADMISSION – DEXMEDITOMEDINE

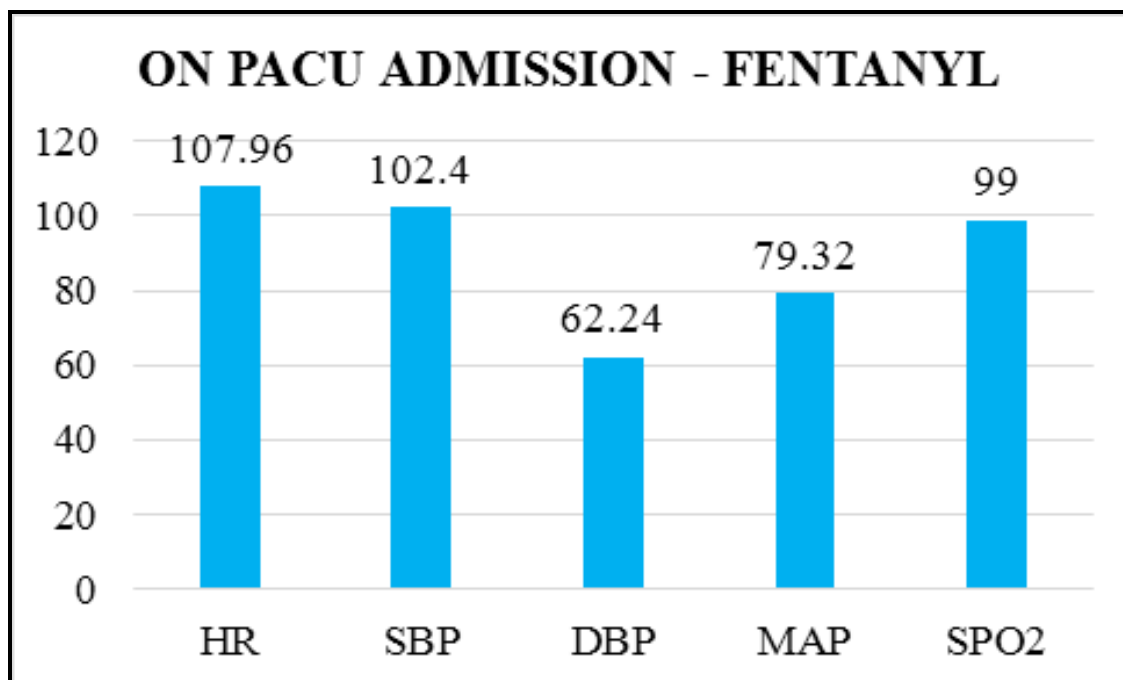
PARAMETERS	MEAN	SD
HR	95.48	3.8
SBP	83.84	3.4
DBP	56.16	3.6
MAP	68.16	3.21
SPO2	99.32	0.47



On pacu admission most of the dexmed group patients had heart rates ranging from 93 to 96 beats per minute and MAP ranges from 66 mmHg to 70mmHg postoperatively.

ON PACU ADMISSION – FENTANYL

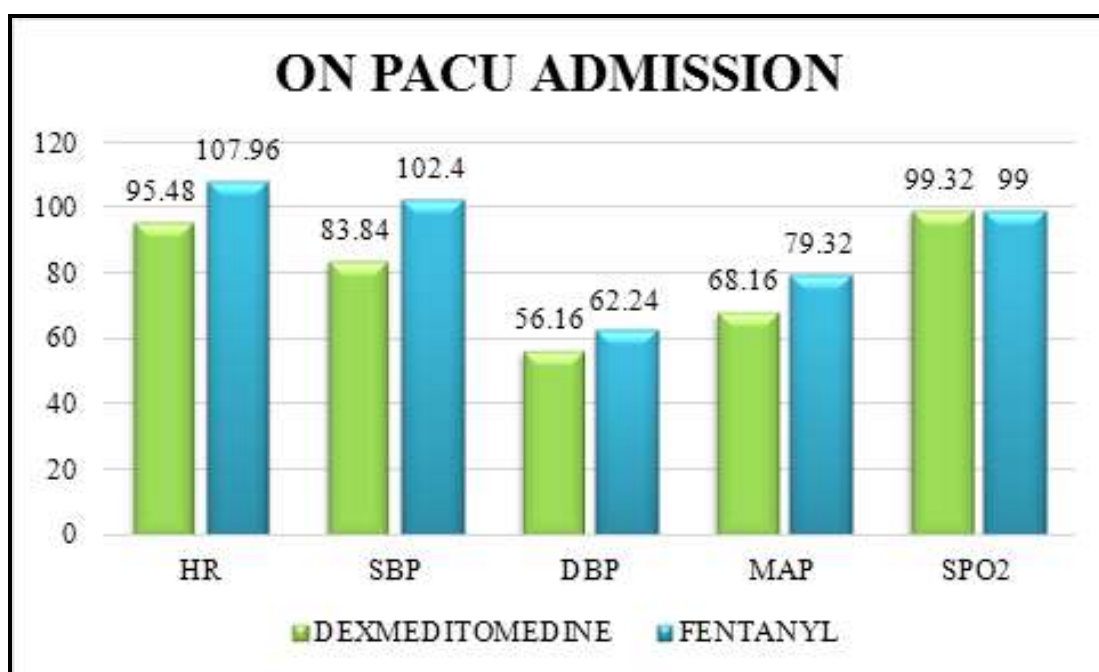
PARAMETERS	MEAN	SD
HR	107.96	4.15
SBP	102.4	6.58
DBP	62.24	3.58
MAP	79.32	2.76
SPO2	99	0



On pacu admission most of the fentanyl group patients had heart rates ranging from 93 to 96 beats per minute and MAP ranges from 66 mmHg to 70mmHg postoperatively.

ON PACU ADMISSION - MEAN COMPARISON

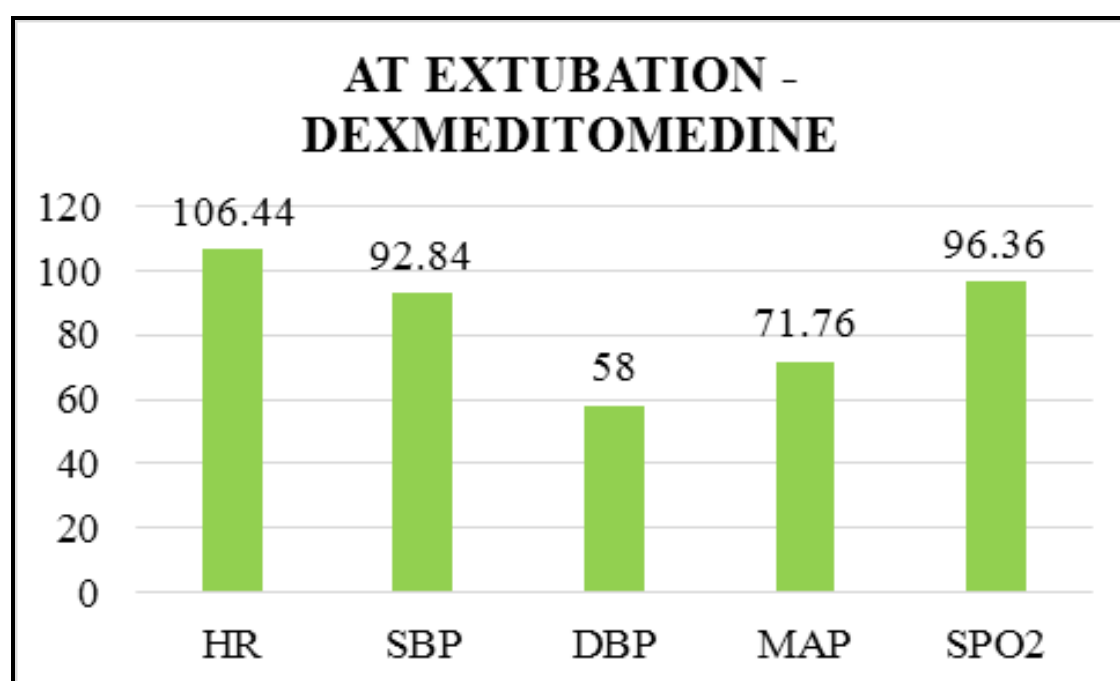
PARAMETERS	DEXMEDITOMEDINE	FENTANYL	P VALUE
HR	95.48	107.96	0.001
SBP	83.84	102.4	0.001
DBP	56.16	62.24	0.001
MAP	68.16	79.32	0.001
SPO2	99.32	99	1



Association between the dexmed and fentanyl group in heart rate and MAP on PACU admission is considered as statistically significant since the $P < 0.05$.

AT EXTUBATION – DEXMEDITOMEDINE

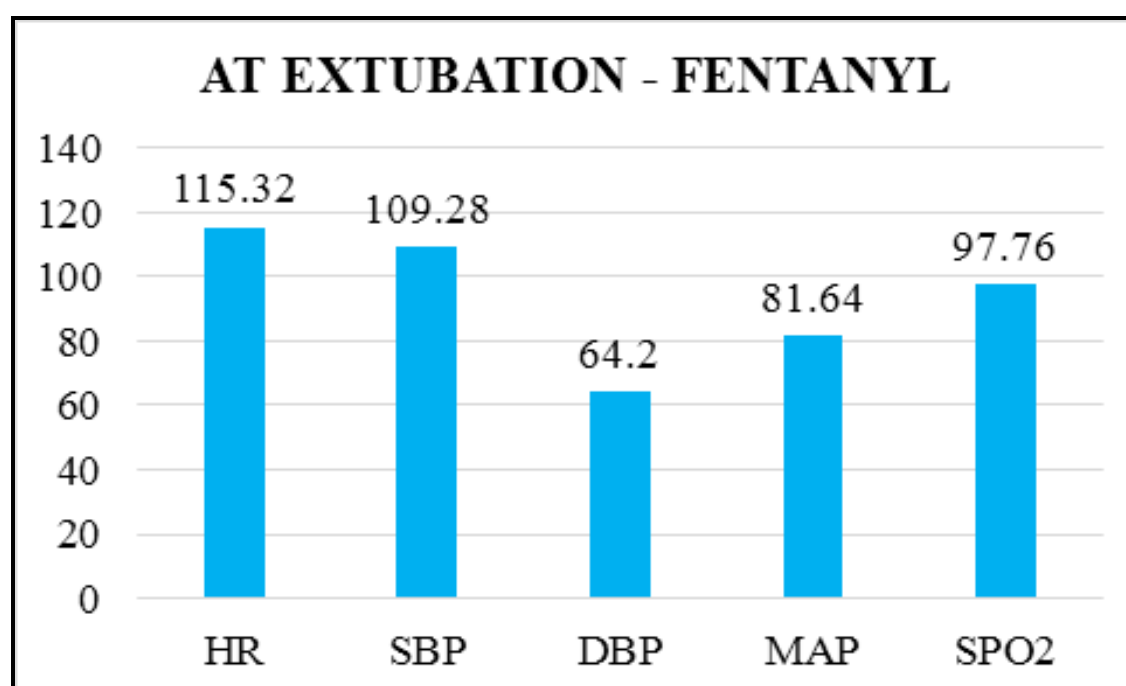
PARAMETERS	MEAN	SD
HR	106.44	5.08
SBP	92.84	4.35
DBP	58	4.43
MAP	71.76	3.52
SPO2	96.36	0.99



At extubation most of the patients in dexmedetomidine group had heart rates ranging from 103 to 108 beats per minute and MAP ranges from 68 mmHg and 72 mmHg postoperatively.

AT EXTUBATION – FENTANYL

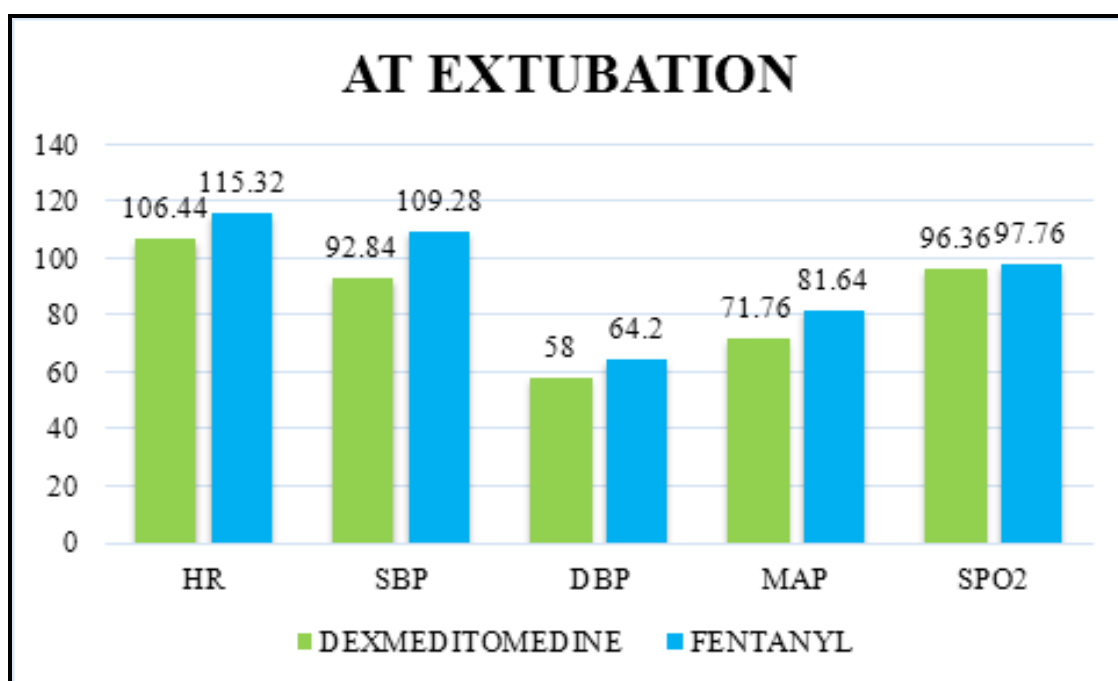
PARAMETERS	MEAN	SD
HR	115.32	3.49
SBP	109.28	9.03
DBP	64.2	4.02
MAP	81.64	2.36
SPO2	97.76	1.16



At extubation most of the patients in fentanyl group had heart rates ranging from 113 to 117 beats per minute and MAP ranges from 78 mmHg to 82 mmHg postoperatively.

AT EXTUBATION - MEAN COMPARISON

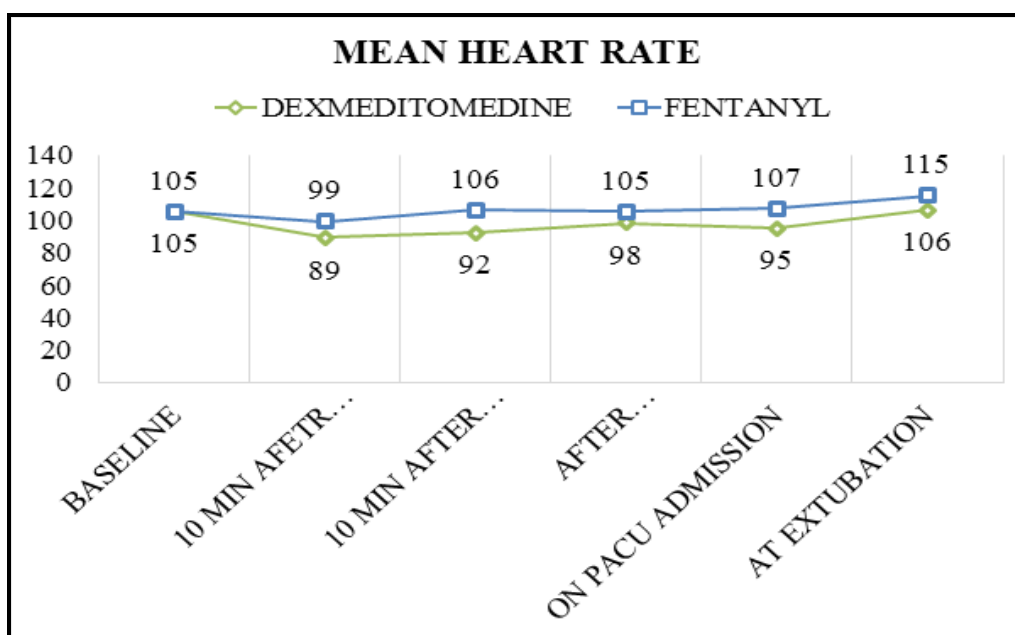
PARAMETERS	DEXMEDETO MEDINE	FENTANYL	P VALUE
HR	106.44	115.32	0.001
SBP	92.84	109.28	0.001
DBP	58	64.2	0.001
MAP	71.76	81.64	0.001
SPO2	96.36	97.76	0.001



At extubation mean heart rate and MAP of dexmed group is 106 per minute and 71 mmHg respectively. In fentanyl group mean heart rate was 115 per minute and MAP was 82 mmHg. Association between the DEXMEDETO MIDINE AND FENTANYL group is considered as statistically significant since $p < 0.05$.

MEAN HR

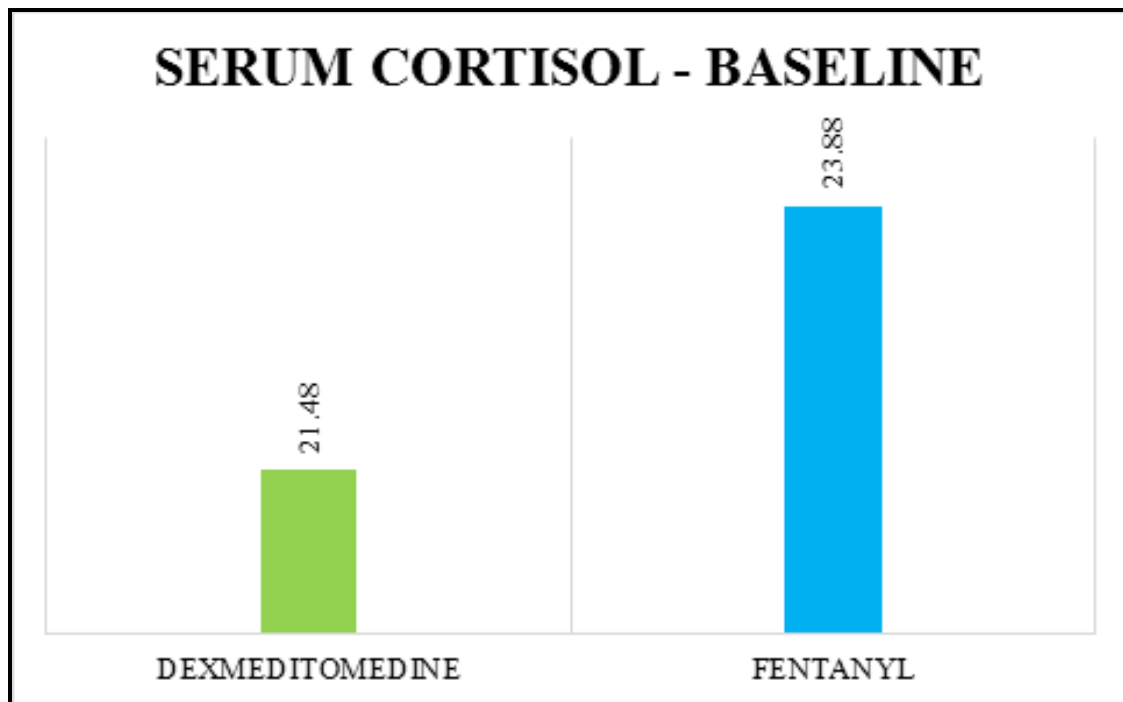
BUPIVACAINE WITH	DEXMEDITO MEDINE	FENTANYL
BASELINE	105	105
10 MIN AFETR CAUDAL	89	99
10 MIN AFTER STERNOTOMY	92	106
AFTER TERMINATION OF CPB	98	105
ON PACU ADMISSION	95	107
AT EXTUBATION	106	115



The mean heart rate were recorded in dexmed group. 10 minutes after caudal it was 99, 10 minutes after sternotomy it was 92, after surgery it was 98, on pacu admission it was 95 and at extubation 106. These values were compared with fentanyl group. Association between the dexmed and fentanyl group in is considered statistically significant since the $p < 0.05$.

SERUM CORTISOL – BASELINE

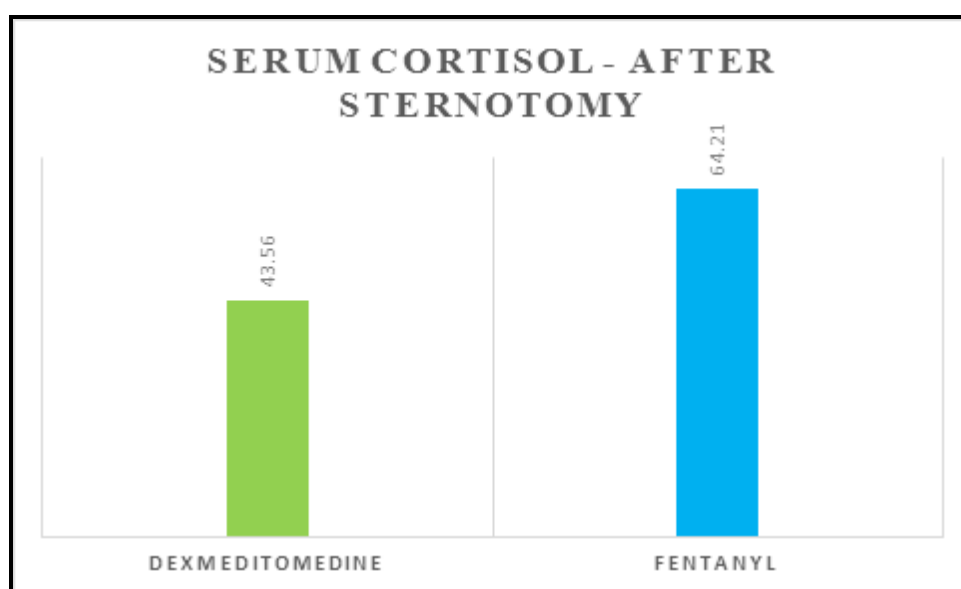
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMEDINE0	21.48	2.73
FENTANYL	23.88	3.19
P VALUE - 0.124		
INSIGNIFICANT		



Patients in dexmedetomidine group had mean cortisol baseline value of 21.48 mic/dl and fentanyl group had 23.88 mic/dl and is considered to be statistically insignificant since the $p > 0.05$.

SERUM CORTISOL - POST STERNOTOMY`

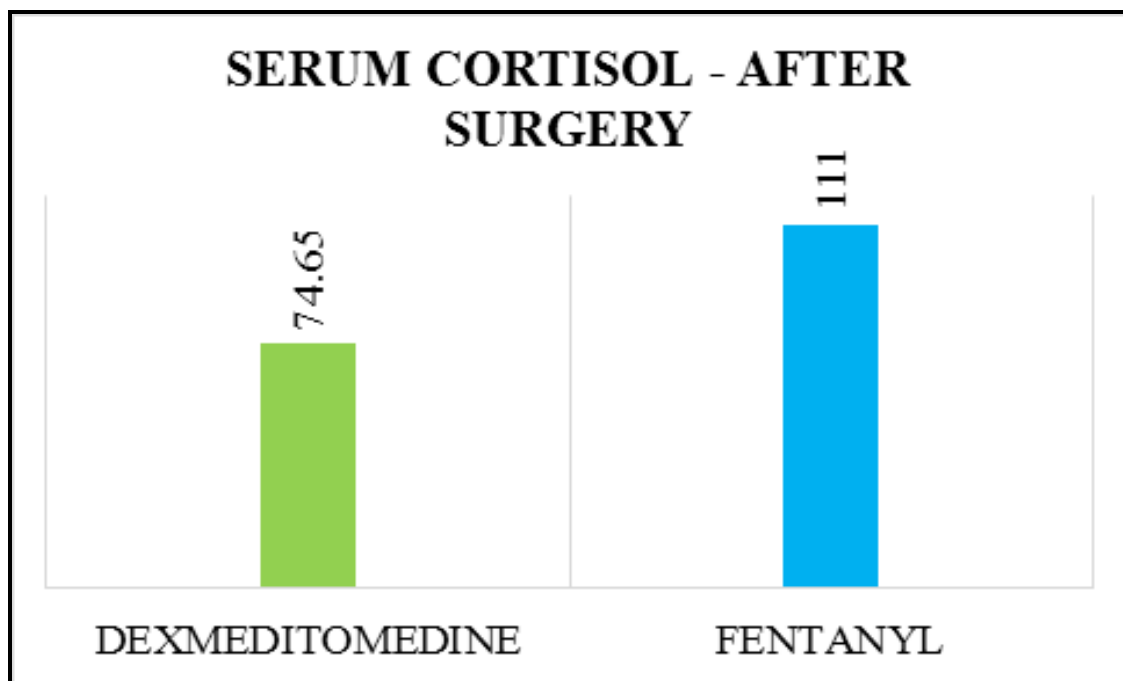
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMEDINE	43.56	4.7
FENTANYL	64.21	9.6
P VALUE - 0.001		
SIGNIFICANT		



After sternotomy patients in dexmed group had cortisol values ranging from 42 to 46 mics/dl and fentanyl group ranging from 50 to 60 microgram/dl.it is considered to be statistically significant since the $P < 0.05$.

SERUM CORTISOL - AFTER SURGERY

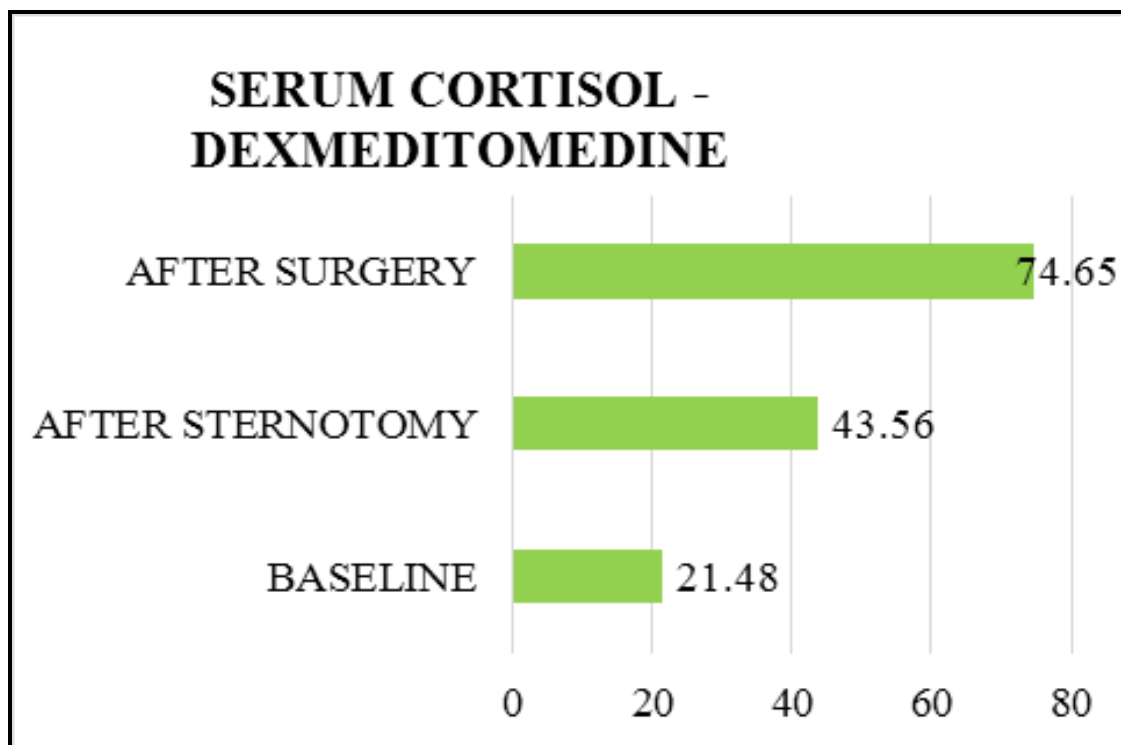
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMEDINE	74.65	5.17
FENTANYL	111	14.46
P VALUE - 0.002		
SIGNIFICANT		



After surgery patients in dexmed group had cortisol values ranging from 71 to 76 t microgram/dl and fentanyl group ranging from 104 to 118 microgram/dl.It is considered to be statistically significant since the $P < 0.05$.

SERUM CORTISOL

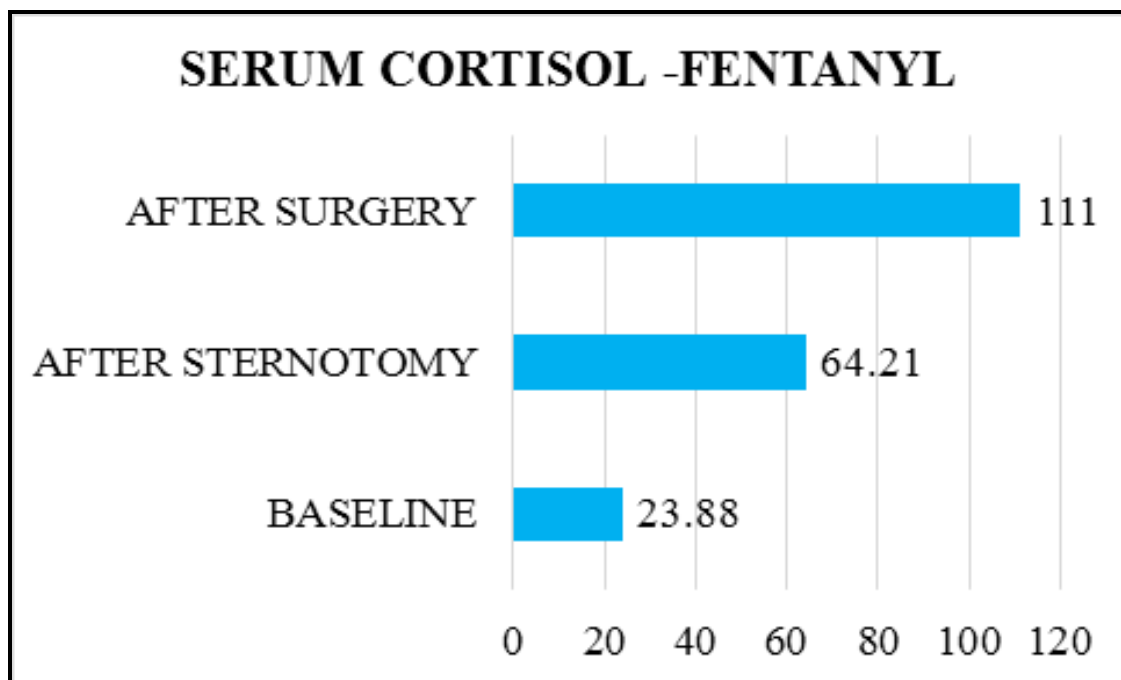
DEXMEDITOMEDINE	MEAN	SD
BASELINE	21.48	2.73
AFTER STERNOTOMY	43.56	4.7
AFTER SURGERY	74.65	5.17
P VALUE - 0.012		
SIGNIFICANT		



Sternotomy and after surgery the Serum cortisol values in dexmedetomidine group were considered to be statistically significant since the $P < 0.05$.

SERUM CORTISOL

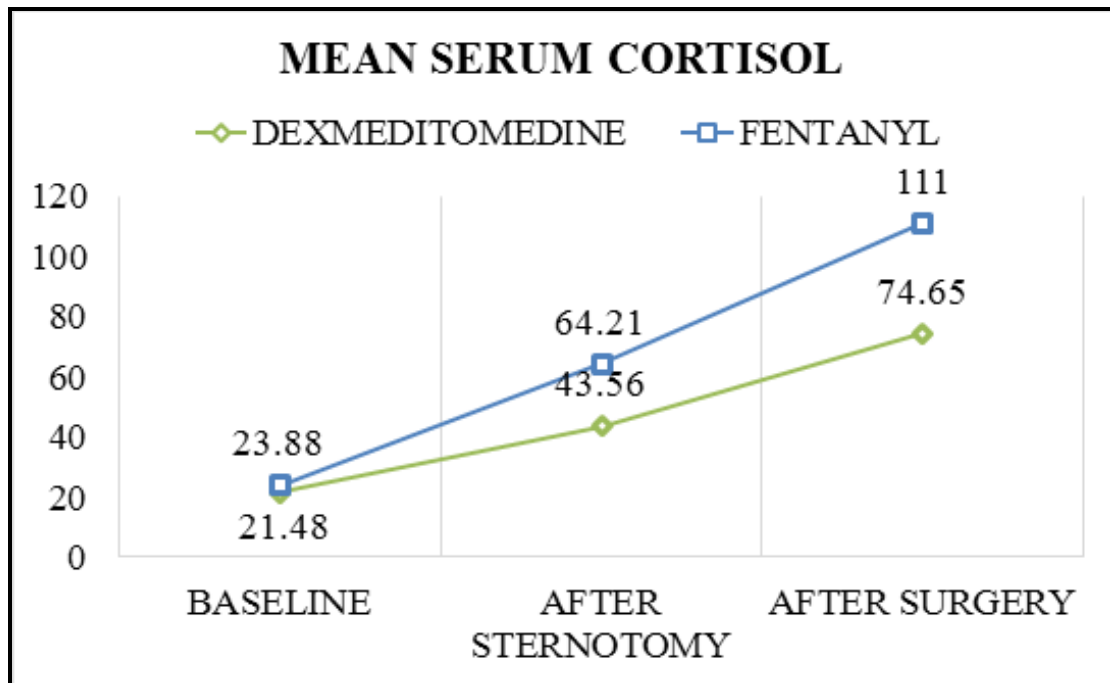
FENTANYL	MEAN	SD
BASELINE	23.88	3.19
AFTER STERNOTOMY	64.21	9.67
AFTER SURGERY	111	14.46
P VALUE - 0.009		
SIGNIFICANT		



After sternotomy and after surgery the Serum cortisol values in dexmedetomidine group were considered to be statistically significant since the $P < 0.05$.

MEAN SERUM CORTISOL

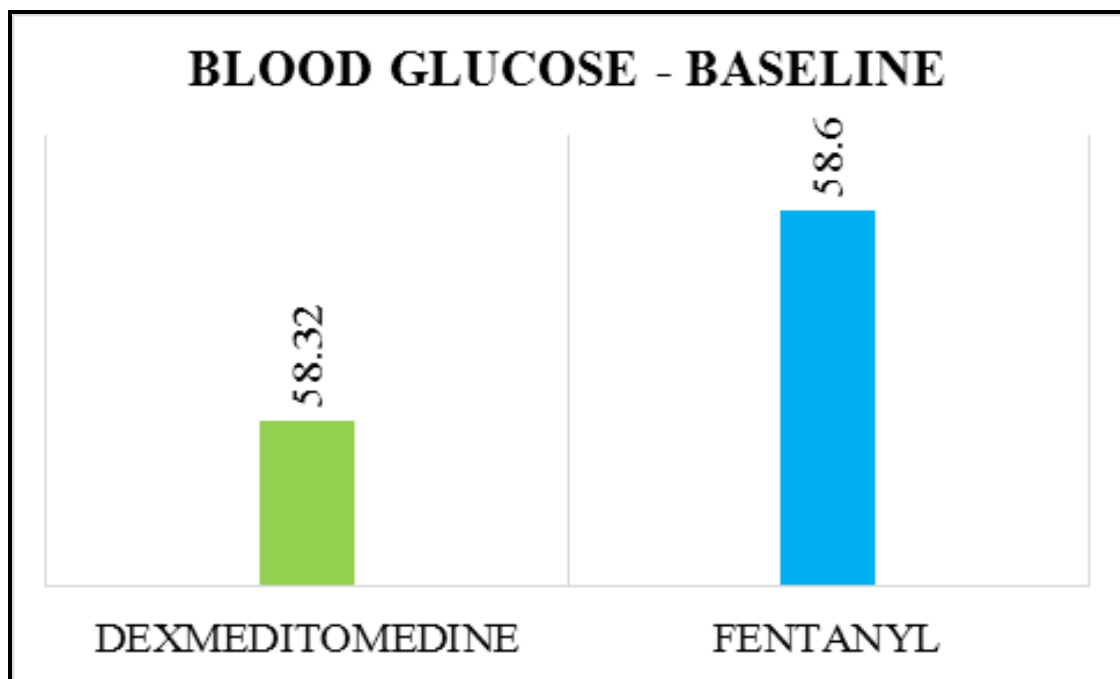
BUPIVACAINE WITH	DEXMEDITOMEDINE	FENTANYL
BASELINE	21.48	23.88
AFTER STERNOTOMY	43.56	64.21
AFTER SURGERY	74.65	111



After sternotomy and after surgery mean SERUM CORTISOL values of dexmed group patients were measured and compared with fentanyl group and considered to statistically significant since the p value is <0.05 .

BLOOD GLUCOSE – BASELINE

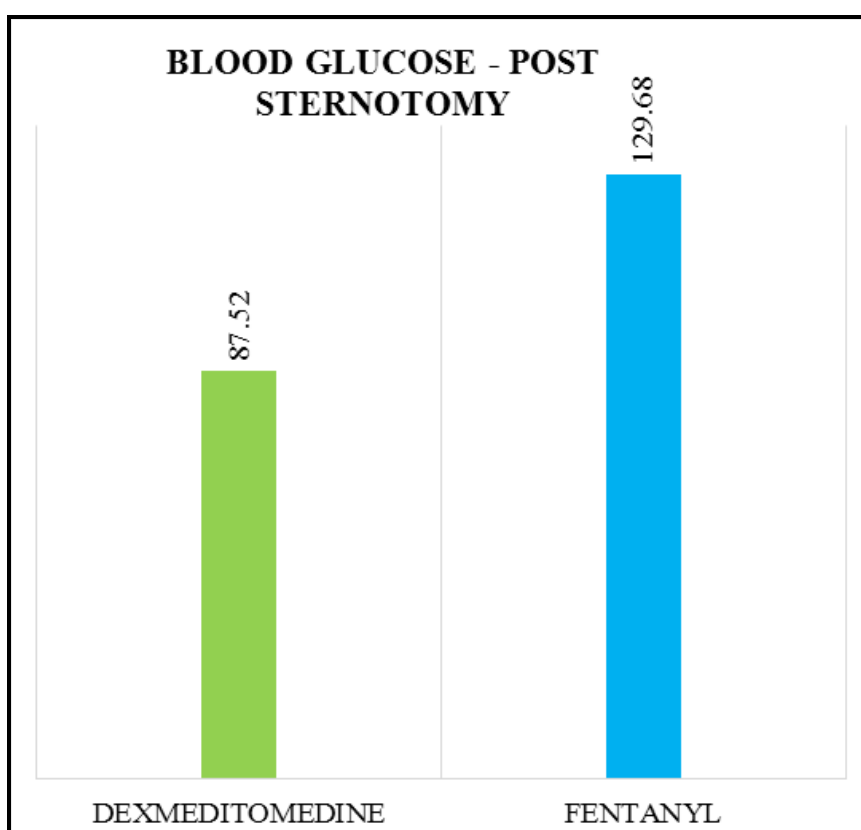
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMEDINE	58.32	5.06
FENTANYL	58.6	5.13
P VALUE - 0.847		
NON SIGNIFICANT		



Baseline glucose values were compared between dexmedetomidine and fentanyl group of patients and considered to be statistically insignificant since the p value is > 0.05 .

BLOOD GLUCOSE - POST STERNOTOMY

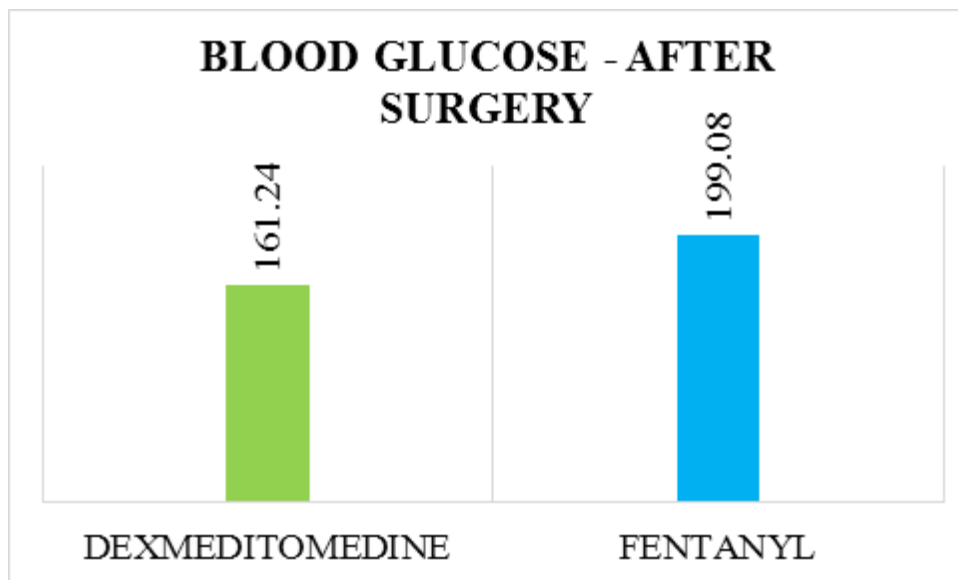
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMIDINE	87.52	6.93
FENTANYL	129.68	11.66
P VALUE - 0.001		
SIGNIFICANT		



Post sternotomy serum glucose values in dexmed group of patients were ranging from 85mg/dl to 91mg/dl and in fentanyl group of patients were ranging from 124mg/dl to 136mg/dl.it is considered to be statistically significant since the p value is <0.05.

BLOOD GLUCOSE - AFTER SURGERY

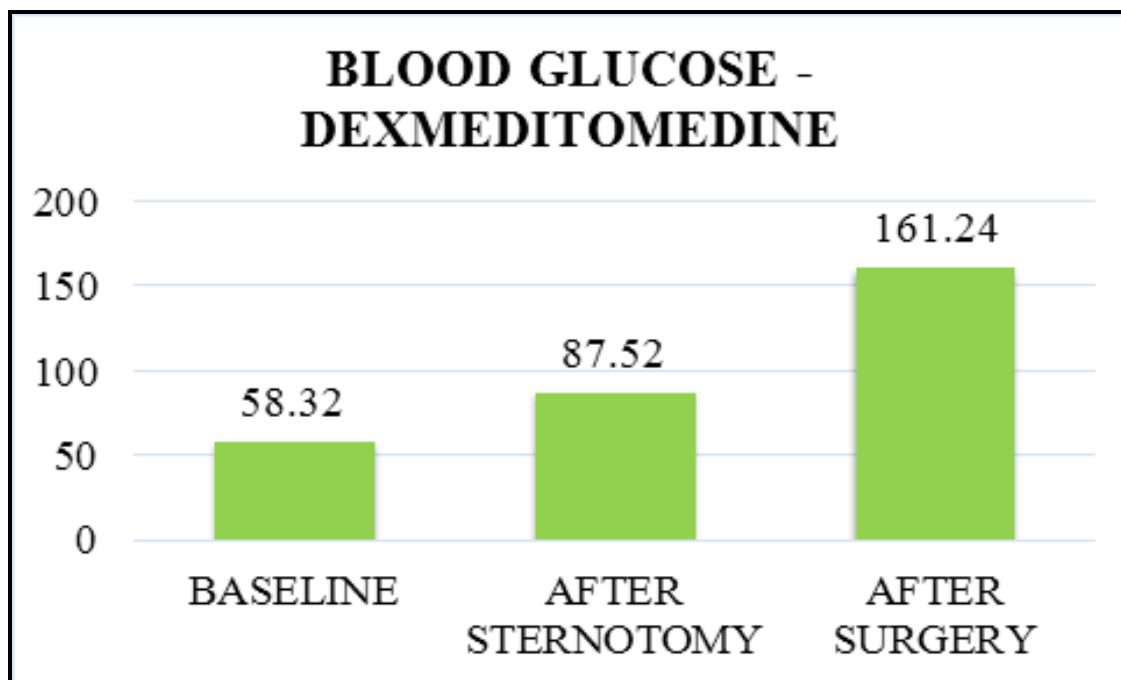
BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMIDINE	161.24	8.65
FENTANYL	199.08	18.51
P VALUE - 0.002		
SIGNIFICANT		



After surgery serum glucose values in dexmed group of patients were ranging from 155mg/dl to 165mg/dl and in fentanyl group of patients were ranging from 190mg/dl to 210mg/dl and it is considered to be statistically significant since the p value is <0.05.

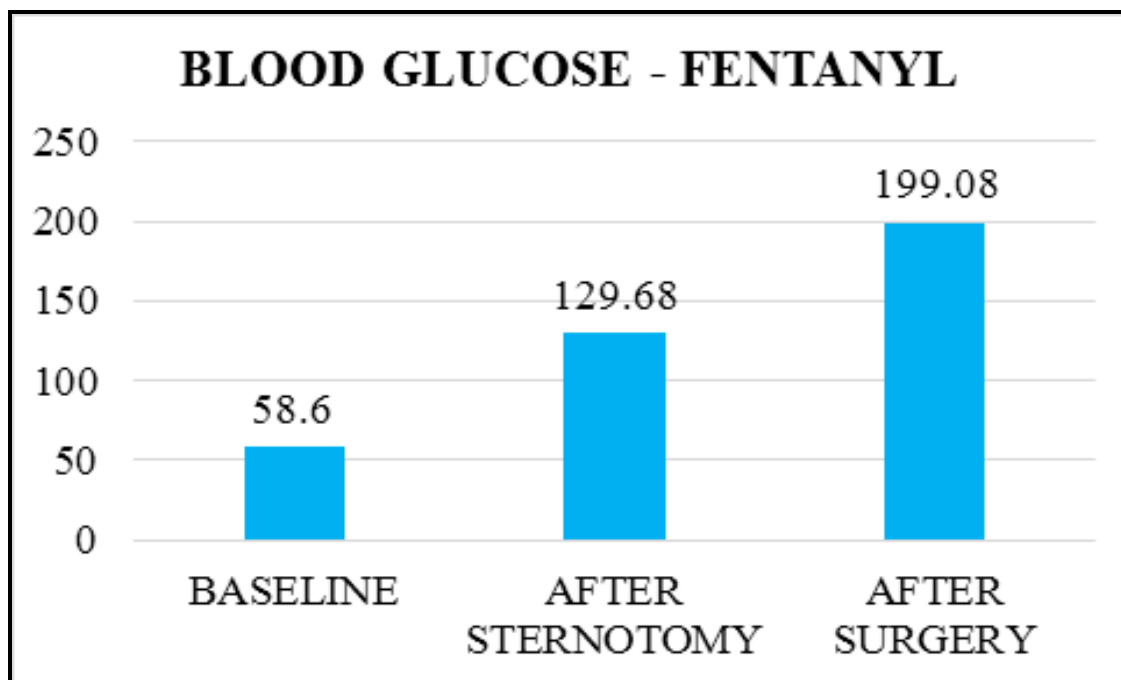
BLOOD GLUCOSE

DEXMEDITOMEDINE	MEAN	SD
BASELINE	58.32	5.06
AFTER STERNOTOMY	87.52	6.93
AFTER SURGERY	161.24	8.65
P VALUE - 0.019		
SIGNIFICANT		



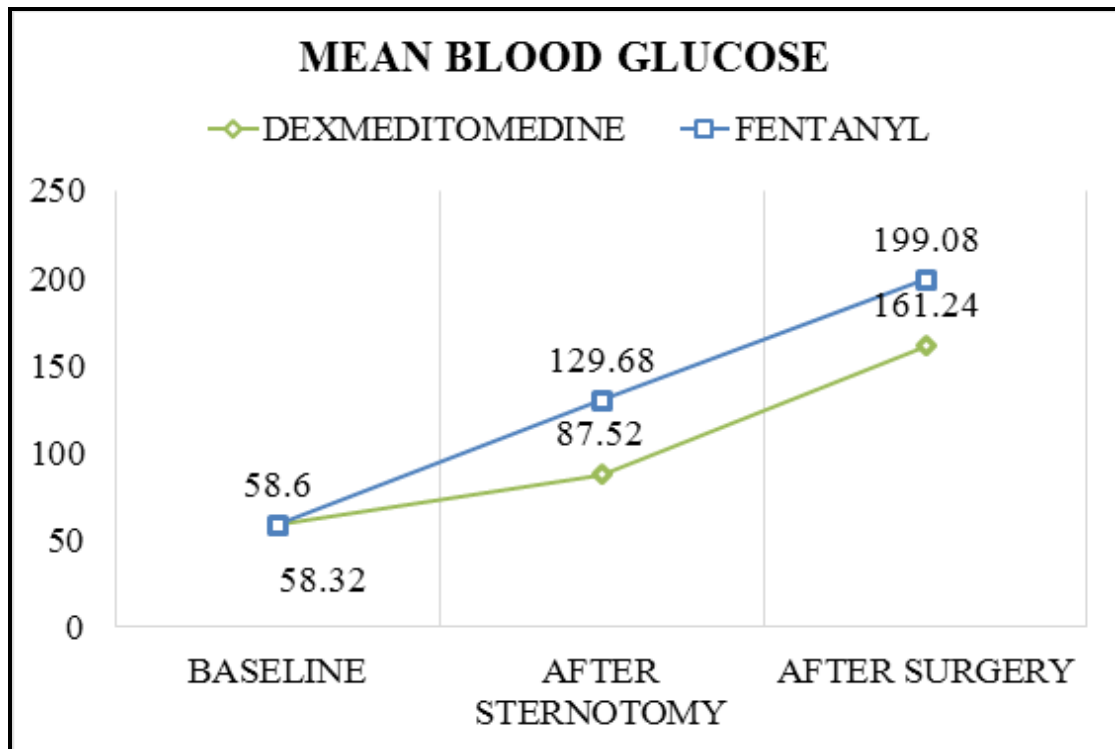
BLOOD GLUCOSE

FENTANYL	MEAN	SD
BASELINE	58.6	5.13
AFTER STERNOTOMY	129.68	11.66
AFTER SURGERY	199.08	18.51
P VALUE - 0.002		
SIGNIFICANT		



MEAN BLOOD GLUCOSE

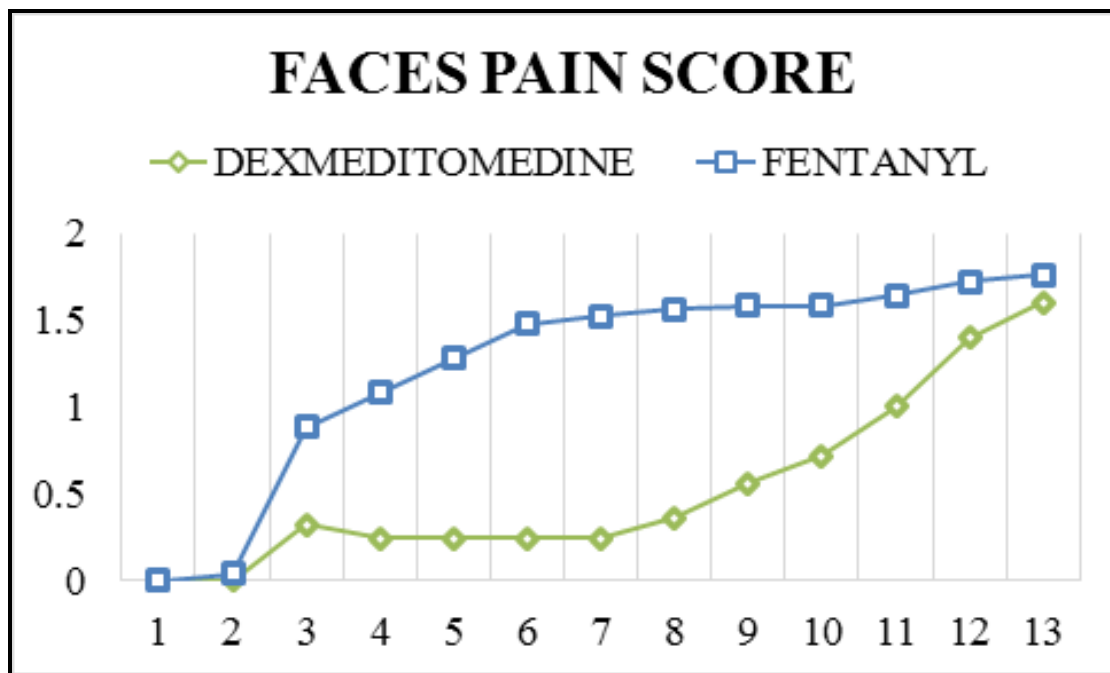
BUPIVACAINE WITH	DEXMEDITOMIDINE	FENTANYL
BASELINE	58.32	58.6
AFTER STERNOTOMY	87.52	129.68
AFTER SURGERY	161.24	199.08



After sternotomy and after surgery mean SERUM GLUCOSE values of dexmed group patients were measured and compared with fentanyl group and considered to statistically significant since the p value is <0.05.

FACES PAIN SCORE

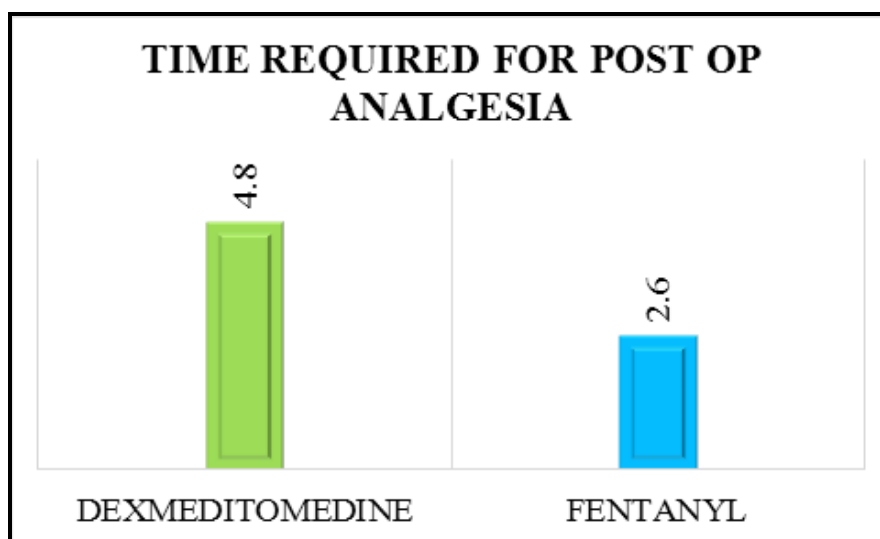
Bupivacaine With	FACE PAIN SCORE – MEAN												
	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Dexmedito Midine	0	0	0.32	0.24	0.24	0.24	0.24	0.36	0.56	0.72	1	1.4	1.6
Fentanyl	0	0.04	0.88	1.08	1.28	1.48	1.52	1.56	1.58	1.58	1.64	1.72	1.76
P Value	0	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.033	0.046	0.56



FACES pain score for analgesia were analysed and compared between these two groups and found that pain score was lower in dexmedetomidine group when compared to fentanyl group.

TIME REQUIRED FOR POST OP ANALGESIA (IN HOURS)

BUPIVACAINE WITH	MEAN	SD
DEXMEDITOMEDINE	4.8	1.12
FENTANYL	2.6	0.91
P VALUE - 0.001		
SIGNIFICANT		



In dexmedetomidine group of patients The mean time duration required for the postoperative rescue analgesia is around 4.8 hours with standard deviation of 1.12.

In fentanyl group of patients the mean time duration required for the postoperative rescue analgesia is around 2.6 hours with standard deviation of 0.91.

Time duration required for the postoperative rescue analgesia were compared between dexmedetomidine and fentanyl group which was high with dexmedetomidine group and considered to be statistically significant since the p value is <0.05.

DISCUSSION

Cardiac surgeries are frequently performed in paediatric population worldwide. It causes pain both in the intraoperative and post operative period.

The stress response is considerably high in patients undergoing cardiac surgery especially during midline sternotomy and when patient is on cardio pulmonary bypass. Hence attenuation of stress response is important in cardiac surgery for a successful postoperative outcome like early extubation, early discharge from ICU and decreased ventilator complications. This alleviates the anxiety and burden to the parents.

There are some documented studies that alpha 2 agonist, dexmedetomidine suppresses the stress response effectively. Dexmedetomidine used via regional technique is superior than intravenous route because of no hypotension and bradycardia occurs . Hence it provides better intraoperative hemodynamic stability and also reduces the post operative analgesia requirements.

In this study, caudal anaesthesia (SINGLE SHOT TECHNIQUE) was preferred over catheter placement technique

because of heparin use intraoperatively and to avoid epidural hematoma in the perioperative period.

In this study, paediatric patients undergoing open heart surgery were included. 25 members in each group. Caudal dexmedetomidine or fentanyl was used as an adjuvant with 0.25% bupivacaine. The changes in Serum cortisol level, blood glucose level were measured and compared between two groups. Also heart rate changes, mean arterial pressure changes, FACES pain score, end tidal sevoflurane concentration, time required to initiate post operative analgesia and extubation time were measured and compared between two groups.

SERUM CORTISOL CHANGES

When statistically analyzing the serum cortisol level between these two groups, a significantly lower level of serum cortisol is seen in group BD when compared to group BF after sternotomy and after surgery.

After sternotomy, patients in group BD had cortisol values ranging from 42- 46mcg/dl and in fentanyl group ranging from 50- 60mcg/dl. It is considered to be statistically significant since the p value is < 0.05.

After surgery , patients in group BD had cortisol values ranging from 71- 76mcg/dl and in fentanyl group ranging from 108-118mcg/dl. It is considered to be statistically significant since the p value is < 0.05 .

After sternotomy and after surgery the serum cortisol values in group BD were considered to be statistically significant since the p value is <0.05 .

After sternotomy and after surgery mean serum cortisol values in group BD also measured and compared with group BF and considered to be statistically significant since the p value is <0.05 .

SERUM GLUCOSE CHANGES

When statistically analyzing the blood glucose level between these two groups, a significantly lower level of blood glucose is seen in group BD when compared to group BF post sternotomy and after surgery.

Post sternotomy blood glucose values in group BD were ranging from 85- 91mg/dl and in group BF ranging from 124-136mg/dl. It is considered to be statistically significant since the p value is < 0.05 .

After surgery, blood glucose values in group BD were ranging from 155-165mg/dl and in group BF ranging from 190-210mg/dl. It is considered to be statistically significant since the p value is < 0.05 .

Post sternotomy and after surgery blood glucose values in group BD were considered to be statistically significant since the p value is < 0.05 . Post sternotomy and after surgery mean blood glucose values of group BD were measured and compared with group BF and considered to be statistically significant since the p value is < 0.05 .

The results obtained in serum cortisol and blood glucose level are similar to the study done by DALIE ABDELHAMID NASR et al., in which they compared the efficacy of dexmedetomidine and fentanyl on stress response and pain relief in patients undergoing cardiac surgery.

FACES PAIN SCORE

FACES pain score for analgesia in the post operative period were lower and better in group BD when compared to group BF.

TIME REQUIRED FOR POST OPERATIVE ANALGESIA

In group BD, the mean time duration required for post operative rescue analgesia is around 4.8 hours with Standard deviation of 1.12.

In group BF, the mean time duration required for post operative rescue analgesia is around 2.6 hours with standard deviation of 0.91.

Time duration required for post operative rescue analgesia were compared between two groups and found group BD had higher mean duration and it is considered to be statistically significant since the p value is < 0.05 .

HEART RATE CHANGES

When statistically analyzing the heart rate distribution between these two groups, there is lower range of increase in heart rate seen in group BD when compared to group BF 10 minutes after caudal, 10 minutes after sternotomy, after surgery, on PACU admission and at extubation.

The mean heart rate were recorded in group BD 10 minutes after caudal, 10 minutes after sternotomy, after surgery, on PACU

admission and at extubation were 99, 92, 98, 95, 106 respectively. These values compared with group BF.

Association between group BD and BF is considered statistically significant since the p value is < 0.05 .

MEAN ARTERIAL PRESSURE CHANGES

When statistically analyzing the MAP changes between these two groups, The mean MAP (mean arterial pressure) in group BD were recorded. It is 64mmHg 10 minutes after caudal injection with SD 4.9mmHg, 10 minutes after sternotomy it was 68 mmHg with SD of 4.21 mmHg, after surgery it was 71mmHg with SD of 4.8mmHg, on PACU admission it was 68 mmHg with SD of 3.21mmHg, at extubation it was 71 mmHg with SD of 3.52mmHg.

The mean MAP (mean arterial pressure) in group BF were recorded. It is 69mmHg 10 minutes after caudal injection with SD 6.3mmHg, 10 minutes after sternotomy it was 75 mmHg with SD of 2.44 mmHg, after surgery it was 76mmHg with SD of 2.44mmHg, on PACU admission it was 79 mmHg with SD of 2.76mmHg, at extubation it was 81 mmHg with SD of 2.36mmHg.

The mean arterial pressure values of group BD were compared with group BF and it was concluded that group BD is

superior than group BF and considered as STATISTICALLY SIGNIFICANT since the $p < 0.05$.

End tidal sevoflurane concentration was significantly less in group BD when compared to group BF.

EXTUBATION TIME

It was shorter in group BD when compared to group BF. Early extubation decreases the ventilator associated complications in the post operative period and decreases the length of ICU stay.

Other demographic variables like age and sex distribution between these two groups was not statistically significant.

SUMMARY

This study was conducted to assess the efficacy of caudal dexmedetomidine on stress response and postoperative pain in paediatric open heart surgeries.

From my study following observations made

- 1) Serum cortisol and serum glucose levels were lower in dexmedetomidine group compared to fentanyl group and which was statistically significant. so stress response was lower and better in dexmedetomidine group compared to fentanyl group.
- 2) Intraoperative heart rate and mean arterial pressure were better and controlled in dexmed group compared to fentanyl group.
- 3) FACES pain score for analgesia in the post operative period were lower and better in dexmedetomidine group compared to fentanyl group.
- 4) Requirement of postoperative rescue analgesia was at 5 hours in dexmedetomidine group and at 2.5 hours in fentanyl group.
- 5) In both group no adverse effect occurred during intraoperatively and Postoperatively.

CONCLUSION

From my study, I conclude that caudal dexmedetomidine is a very useful and better adjuvant in paediatric open heart surgeries in attenuating the hemodynamic stress response of sternotomy and cardio pulmonary bypass. It is better intraoperative hemodynamic control and provides adequate and more prolonged post operative analgesia and shorter time to extubation.

Thus to conclude, caudal dexmedetomidine sttenuates the stress response, provides better intra operative and post operative analgesia, decreases the length of ICU stay and hence cost effective and decreases the incidence of post operative respiratory infection as well. So caudal dexmedetomidine proves to be comparatively superior than fentanyl.

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SERUM CORTISOL	DEXMEDETOMIDINE	FENTANYL
BASELINE		
POST STERNOTOMY		
AFTER CPB		
AFTER SURGERY		

BLOOD GLUCOSE MEASUREMENT

BLOOD GLUCOSE	DEXMEDETOMIDINE	FENTANYL
BASELINE		
POST STERNOTOMY		
AFTER CPB		
AFTER SURGERY		

VARIABLE	BD GROUP				BF GROUP			
	HR	SBP	DBP	MAP	HR	SBP	DBP	MAP
Baseline after Induction								
10 mts after caudal Injection								
10 mts after sternotomy								
On CPB time of max cooling								
After termination CPB								
On PACU admission								
At extubation								

Hemodynamics: intra operative

POST OPERATIVE

TIME (hrs)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	10	14	18	22	24
VAS																		
HR																		
SBP																		
DBP																		
MAP																		
Resque Anlgesia																		

INFORMATION TO PARTICIPENTS

Investigator : DR.VINOTHKUMAR.R

Name of the Participant:

Title. “ The efficacy of caudal dexmedetomidine on stress response and postoperative pain for paediatric cardiac surgeries surgeries under general Anaesthesia”.

(A Prospective, randomized, double blinded , controlled study for evaluating the analgesic efficacy of (0.25%)Bupivacaine&dexmedetomidine Vs(0.25%)Bupivacaine & fentanyl)

You are invited to take part in this research study. We have got approval from the IEC. You are asked to participate because you satisfy the eligibility criteria. We want to compare and study on stress response and post operative analgesic efficacy of bupivacaine(0.25%)and dexmedetomidine(0.5mcg/kg & bupivacaine (0.25%) with fentanyl (1mcg/kg)in caudal block after general anaesthesia for paediatric cardiac surgeries surgeries .

What is the Purpose of the Research:

- 1.To evaluate stress response in paediatric cardiac surgeries
- 2 To evaluate the duration of post operative analgesic efficacy of these drugs
- 3.To assess Intraoperative and post operative haemodynamic
- 4.Post operative visual analogue scale pain score.
- 5.Complication rate.
- 6.To evaluate intra operative opioids dosage and volatile usage

The Study Design:

All the patients in the study will be divided into three groups.

Group1- pre operative superficial and deep cervical plexus block using ultrasound technique after general anaesthesia using normal saline

Group 2- pre operative superficial and deep cervical plexus block using ultrasound technique after general anaesthesia using ropivacaine (0.2%).

Benefits

caudal block optimise the intra operative hemodynamic, reduces stress response and blood glucose level, reduces opioid and volatile requirement , provides better post operative pain relief.

This intervention has been shown to be well tolerated as shown by previous studies. And if you do not want to participate you will have alternative of setting the standard treatment and your safety is our prime concern.

Time :

Date :

Place :

Signature / Thumb Impression of Patient

Patient Name:

Signature of the Investigator : _____

Name of the Investigator : _____

PATIENT CONSENT FORM

Study title **“the efficacy of caudal dexmedetomidine on stress response and post operative pain in paediatric cardiac surgeries under general Anaesthesia”.**

(A Prospective, randomized, double blinded , controlled study for evaluating the analgesic efficacy of (0.25%)Bupivacaine with dexmedetomidine Vs(0.2%) bupivacaine & fentanyl)

Study center: **INSTITUTE OF CHILD HEALTH
MADRAS MEDICAL COLLEGE,
CHENNAI-0 3.**

Participant name: _____ Age: _____ Sex: _____
I.P.No: _____

I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the pitfall in the procedure. I have been explained about the safety, advantage and disadvantage of the technique.

I understand that my participation in the study is voluntary and that I am free to withdraw at anytime without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

Time: _____

Date: _____
thumb impression of patient

Signature /

Place: _____

Patient name: _____

Signature of the investigator: _____

Name of the investigator: _____

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராய்ச்சியின் தலைப்பு

தைராய்டு கர்ப்பி அறுவை சிகிச்சைக்கு முழு மயக்கம் கொடுத்த பின்பு கழுத்தின் இருபுறமும் மேலோட்டமான மற்றும் உள் நரம்பு பின்னல் பகுதியில் ரோபிவேகெய்ன் (அ) ரோமிவேகெய்ன் மற்றும் குளோனிடின் மருந்து கலவை செலுத்தி மரத்துப்போகும் தன்மை அடிப்படையில் ஒப்பீடுதல்

ஆய்வு நிலையம் : மயக்கவியல் துறை, சென்னை மருத்துவக் கல்லூரி
சென்னை - 3.

பங்கு பெறுவரின் பெயர் :

பங்குபெறுபவரின் எண் :

பங்குபெறுபவர் இதனை (✓) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது.

நான் இவ்வாய்வில் தன்னிச்சையாகதான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அதை பிரகரிக்கவும் என் முழு மனதுடன் சம்மதிக்கின்றேன்.

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் 'இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிக்கிறேன்.

பங்கேற்பவரின் கையொப்பம் இடம்..... தேதி.....

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்

ஆய்வாளரின் கையொப்பம் இடம்..... தேதி.....

ஆய்வாளரின் பெயர்

ஆராய்ச்சி தகவல் தாள்

ஆராய்ச்சி தலைப்பு

மார்புகூட்டு அறுவை சிகிச்சையின்போது எபிட்யூரல் முறையில் ரோபிவாகைன் மருந்து செலத்தும்போது சிறந்த வலி நிவாரணத்திற்கு துணை மருந்தாக டெக்ஸ்மெடிடோமிடினையும் மெக்னீசியம் சல்பைட்டையும் ஒப்பீடு செய்தல்.

ஆராய்ச்சியாளர் பெயர் : மருத்துவர்.மிலன் ஜோதி படார்

பங்கேற்பாளர் பெயர் :

ஆராய்ச்சியின் நோக்கம்

மார்புகூட்டு அறுவை சிகிச்சையின்போது எபிட்யூரல் முறையில் ரோபிவாகைன் மருந்து செலத்தும்போது சிறந்த வலி நிவாரணத்திற்கு துணை மருந்தாக டெக்ஸ்மெடிடோமிடினையும் மெக்னீசியம் சல்பைட்டையும் ஒப்பீடு செய்தல்.

1. அறுவை சிகிச்சைக்குப்பின் வலி நிவாரண நேரம்.
2. அறுவை சிகிச்சையின்போதும், அதன் பின்பும், நாடித்துடிப்பு, இரத்த அழுத்தம்.
3. அறுவை சிகிச்சைக்கு பின்னான விகவல் அனலாக் அளவுகோலின் படி வலியின் அளவு.
4. பக்க விளைவுகள்
5. அறுவை சிகிச்சையின்போது இதர வலி நிவாரணிகளின் தேவை

ஆய்வு முறை

ஆய்வில் பங்குபெறும் நோயாளிகள் இரண்டு குழுக்களாகப் பிரிக்கப்படுவர்.

குழு-1 துணை மருந்தாக டெக்ஸ்மெடிடோமிடின் செலுத்தப்பட்டவர்கள்

குழு-2 துணை மருந்தாக மெக்னீசியம் சல்பைட் செலுத்தப்பட்டவர்கள்

நன்மைகள்

1. அறுவை சிகிச்சையின்போது நாடித்துடிப்பு மற்றும் இரத்த அழுத்தம் சீராக செயல்பட உதவுகின்றன.
2. இதர வலி நிவாரணிகளின் தேவை வெகுவாக குறைக்கப்படுகின்றன.

**INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003**

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

CERTIFICATE OF APPROVAL

To
Dr.Vinothkumar.R.
II Year Post Graduate in MD Anaesthesiology
Institute of Anaesthesiology & Critical Care
Madras Medical College
Chennai 600 003

Dear Dr.Vinothkumar.R,

The Institutional Ethics Committee has considered your request and approved your study titled **"THE EFFICACY OF CAUDAL DEXMEDETOMIDINE ON STRESS RESPONSE AND POST OPERATIVE PAIN IN PAEDIATRIC CARDIAC SURGERY" - NO.10022017 (II)**

The following members of Ethics Committee were present in the meeting hold on **21.02.2017** conducted at Madras Medical College, Chennai 3

- | | |
|---|---------------------|
| 1.Dr.C.Rajendran, MD., | :Chairperson |
| 2.Dr.M.K.Muralidharan,MS.,M.Ch.,Dean, MMC,Ch-3 | :Deputy Chairperson |
| 3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3 | : Member Secretary |
| 4.Prof.B.Vasanthi,MD., Prof.of Pharmacology.,MMC,Ch-3 | : Member |
| 5.Prof.K.Ramadevi,MD.,Director,Inst.of Bio-Che,MMC,Ch-3 | : Member |
| 6.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3 | : Lay Person |
| 7.Thiru S.Govindasamy, BA.,BL,High Court,Chennai | : Lawyer |
| 8.Tmt.Arnold Saulina, MA.,MSW., | :Social Scientist |

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.


Member Secretary - Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

Urkund Analysis Result

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GROUP –BD [BUPIVACAINE AND DEXMEDETOMIDINE]

S. No	NAME	AGE/SEX	WT	IP NO	DIAG-NOSIS	ASA PS	BASELINE VALUES AFTER INDUCTION					10 MIN AFTER CAUDAL INJECTION					10 MIN AFTER STERNOTOMY					AFTER TERMINATION OF CPB				
							HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2
1.	SHRUTHIKA	4/F	13KG	939403	ASD	II	118	90	69	79	99	102	83	51	65	99	108	88	64	68	99	101	90	53	70	99
2.	VISHNU	5/M	15KG	938355	ASD	II	112	94	53	66	99	94	87	53	64	99	98	89	53	64	99	104	95	54	66	99
3.	VISHITHA	8/F	18KG	945026	ASD	II	108	97	62	80	99	96	88	56	72	100	98	87	62	75	99	96	95	54	66	99
4.	NAVASAKTHI	5/F	14KG	941661	ASD	II	104	97	54	78	99	92	83	52	66	99	94	81	55	66	99	100	87	52	75	99
5.	MUTHU	9/M	18KG	940868	ASD	II	108	102	60	76	99	93	81	55	66	99	95	93	67	79	99	96	98	57	73	99
6.	MARIA WILSON	8/M	19KG	941061	ASD	II	102	95	72	83	98	88	73	52	62	99	92	90	56	82	99	94	93	67	79	99
7.	IYAPPAN	9/M	20KG	948749	ASD	II	102	103	66	81	98	91	88	53	67	99	92	89	54	64	99	90	98	58	73	99
8.	MADHAVAN	3/M	12KG	936986	ASD	II	98	99	54	74	98	87	83	57	69	99	90	94	58	73	99	104	92	54	71	99
9.	BHUVANESWARI	8/F	16KG	949017	ASD	II	104	94	58	73	98	90	86	64	67	99	93	91	52	71	99	101	95	54	66	99
10.	KEERTHANA	8/F	16KG	943391	ASD	II	108	113	60	80	98	88	83	51	65	99	92	98	53	73	99	99	91	52	70	99
11.	JEYAPPAUL	7/M	17KG	948456	ASD	II	104	92	68	81	99	88	83	52	66	99	91	89	51	69	99	97	87	62	75	99
12.	RITHIKA	4/F	13KG	928307	ASD	II	112				99	90	73	52	62	99	94	90	53	70	99	101	98	57	73	99
13.	PARANTHAMAN	10/M	21KG	925892	ASD	II	102	97	54	78	98	91	83	50	65	99	96	83	57	69	99	104	88	64	76	99
14.	AINVIN ZARIYA	6/F	16KG	928439	ASD	II	100	102	60	76	99	86	80	49	54	99	92	86	64	67	99	98	90	69	79	99
15.	ARUNRAJ	7/M	18KG	949352	ASD	II	106	112	61	80	98	86	87	62	66	99	90	94	53	68	99	100	91	53	73	99
16.	DARSHINI	6/F	14KG	925463	ASD	II	108	104	66	81	99	88	86	64	67	99	88	89	53	64	99	97	94	54	66	99
17.	MAHESWARI	7/F	17KG	943216	ASD	II	105	95	72	83	98	90	70	54	50	99	90	83	51	65	99	96				99
18.	NITHYASREE	8/F	18KG	934256	ASD	II	101	92	68	81	99	85	80	49	54	99	88	89	54	64	99	98	88	64	76	99
19.	PALLAVI	5/F	15KG	932451	ASD	II	103	104	66	83	99	87	73	52	62	99	86	91	52	71	99	96	99	54	74	99
20.	KRISHNAN	8/M	18KG	956432	ASD	II	110	104	70	84	99	90	83	52	66	99	92	83	50	65	99	94	98	57	73	99
21.	POOVRASAN	7/M	16KG	953210	ASD	II	100	92	68	81	99	83	89	51	69	99	88	86	64	67	99	95	92	68	81	99
22.	INDHUMATHI	5/F	13KG	942306	ASD	II	98	98	64	81	99	81	86	64	67	99	86	81	55	66	99	96	89	54	64	99
23.	NITHISH	8/M	18KG	935076	ASD	II	107	114	67	84	99	86	83	52	65	99	90	87	62	66	99	98	89	53	64	99
24.	HARSHAVARDHAN	6/M	16KG	947905	ASD	II	104	88	56	72	99	87	88	64	68	99	91	88	53	67	99	100	95	54	66	99
25.	HARIHARAN	7/M	17KG	937676	ASD	II	108	93	67	79	99	92	87	54	66	99	94	83	51	65	99	102	87	62	75	99

S. NO	INTRA OPERATIVE									GROUP BD [BUPIVACAINE AND DEXMEDETOMIDINE]						
	ON PACU ADMISSION					AT EXTUBATION				SERUM CORTISOL MEASUREMENT				BLOOD GLUCOSE MEASUREMENT		
	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	BASELINE	POST STERNOTOMY	AFTER SURGERY	BASELINE	POST STERNOTOMY	AFTER SURGERY
1	98	87	53	64	99	106	92	54	71	98	20.4	43.6	73.4	56	82	147
2	100	87	54	66	99	103	88	56	72	97	23.3	46.4	76.5	58	79	166
3	102	88	56	72	99	107	86	64	67	96	24.6	48.5	80.1	48	88	158
4	99	83	61	71	99	113	102	60	76	97	18.4	41.4	82.9	54	84	168
5	98	92	54	71	99	114	94	58	73	96	19.3	42.5	80.2	62	98	156
6	96	81	59	67	99	105	91	52	70	97	22.2	48.4	82.4	49	93	160
7	98	89	51	69	100	112	98	57	73	96	24.2	40.4	72.4	63	88	152
8	102	85	62	74	99	117	90	53	70	97	25.3	43.8	81.4	58	86	162
9	98	81	59	67	100	104	94	54	66	95	24.6	43.4	63.8	56	96	158
10	96	85	55	70	99	108	88	64	76	96	22.4	40.5	67.6	63	91	144
11	94	85	55	70	99	116	103	61	77	98	20.2	37.2	64.4	64	92	154
12	93	84	61	72	100	112	91	52	70	99	22.8	48.1	78.4	68	83	148
13	95	76	53	60	99	102	88	56	72	97	23.4	47.4	79.6	59	78	157
14	93	83	50	65	99	105	94	55	66	96	25.1	33.4	73.4	66	79	167
15	94	84	61	72	99	108	88	56	72	96	20.4	34.6	71.2	59	78	157
16	97	80	53	65	100	103	94	58	73	96	19.6	42.4	69.4	58	88	158
17	98	81	59	67	99	100	91	65	78	97	19.2	44.8	74.5	53	93	170
18	100	85	56	70	99	107	97	62	70	95	23.6	45.4	75.8	52	89	173
19	94	87	54	66	99	103	91	64	73	95	22.2	46.7	76.4	59	88	174
20	92	82	51	64	100	101	96	62	70	95	21.4	48.4	77.8	61	92	169
21	90	82	58	70	100	99	94	54	66	96	18.6	49.3	76.4	64	94	172
22	88	85	56	69	99	105	98	60	74	96	18.9	52.4	82.5	58	98	176
23	90	83	61	71	100	103	89	51	69	96	19.2	39.4	69.3	56	76	159
24	90	81	59	67	99	100	91	65	78	96	19.3	41.2	68.4	53	78	164
25	92	80	53	65	100	108	93	57	72	96	18.4	39.4	68.2	61	97	162

FACES PAIN SCORE [IN HOURS] [BUPIVACAINE DEXMED GROUP]														POSTOP ANALGESIA INITIATION IN HOURS
S.NO	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	[IV paracetamol]
1	0	0	0	0	0	0	0	0	0	0	0	1	1	6
2	0	0	0	0	0	0	0	0	0	0	0	1	1	6
3	0	0	1	1	1	1	1	2	2	2	2	3	3	4
4	0	0	0	0	0	0	0	0	0	1	1	1	1	4
5	0	0	0	0	0	0	0	0	0	0	1	1	1	6
6	0	0	1	1	1	1	1	2	2	2	2	2	2	4
7	0	0	1	1	1	1	1	1	1	1	2	2	2	5
8	0	0	2	2	2	2	2	2	2	2	3	3	3	1
9	0	0	0	0	0	0	0	0	0	0	0	1	1	5
10	0	0	0	0	0	0	0	0	0	0	0	1	1	5
11	0	0	0	0	0	0	0	0	0	0	1	1	1	5
12	0	0	0	0	0	0	0	0	1	1	1	1	1	4
13	0	0	1	0	0	0	0	0	1	1	1	1	1	6
14	0	0	1	0	0	0	0	0	0	0	0	1	1	6
15	0	0	0	0	0	0	0	0	0	1	1	1	1	4
16	0	0	0	0	0	0	0	0	1	1	1	1	1	4
17	0	0	1	1	1	1	1	1	1	1	1	2	3	4
17	0	0	0	0	0	0	0	0	0	0	0	0	0	8
18	0	0	0	0	0	0	0	0	1	1	1	1	1	5
19	0	0	0	0	0	0	0	0	0	1	1	1	1	5
20	0	0	0	0	0	0	0	0	0	0	1	2	3	6
21	0	0	0	0	0	0	0	0	0	0	1	1	2	6
22	0	0	0	0	0	0	0	0	0	1	1	1	1	5
23	0	0	0	0	0	0	0	0	1	1	1	1	1	5
24	0	0	0	0	0	0	0	0	0	0	1	2	3	5
25	0	0	0	0	0	0	0	1	1	1	1	2	3	6

GROUP –BD [BUPIVACAINE AND FENTANYL]

S. No	NAME	AGE/SEX	DIAGNOSIS	WT	IP NO	ASA PS	BASELINE VALUES					10 MIN AFTER CAUDAL INJECTION					10 MIN AFTER STERNOTOMY					AFTER TERMINATION OF CPB				
							HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2
1.	SIVAKUMAR	8/M	ASD	18KG	945285	II	108	95	52	83	99	104	88	64	68	99	108	91	64	74	99	108	99	66	80	99
2.	SARAN	4/M	ASD	15KG	934568	II	106	97	60	79	98	106	87	59	72	99	110	101	58	75	99	106	90	69	79	99
3.	AFRIN	5/F	ASD	16KG	947931	II	110	94	58	73	97	102	81	55	66	99	104	94	58	73	98	110	96	64	81	99
4.	PRAVEENA	8/F	ASD	18KG	934657	II	114	96	63	81	98	104	96	62	70	99	108	99	54	74	98	114	88	64	76	99
5.	GOWTHAM	5/M	ASD	12KG	947231	II	102	83	50	65	99	105	102	57	73	99	112	102	60	76	99	115	101	58	75	99
6.	AKSHARA	4/F	ASD	11KG	933911	II	110	86	64	67	99	99	94	53	68	99	102	88	64	76	99	110	100	65	80	99
7.	PREETHI	3/F	ASD	10KG	937678	II	106	101	65	80	98	99	98	60	74	99	105	98	60	74	99	106	102	60	76	99
8.	ELAVARASI	10/F	ASD	20KG	943458	II	105	101	58	75	98	99	87	57	72	99	106	101	58	75	99	110	87	62	75	99
9.	SWETHA	8/F	ASD	18KG	942493	II	108	97	60	79	98	100	87	62	75	99	103	88	64	75	99	106	98	59	73	99
10.	HARIBALA	3/M	ASD	9KG	935512	II	110	88	64	76	98	102	88	64	68	99	114	102	57	73	99	102	99	66	80	99
11.	Vaishnavi	3/M	ASD	10KG	936264	II	116	87	53	64	99	104	90	53	70	99	116	91	64	74	99	115	97	60	79	99
12.	MUKESH	6/M	ASD	18KG	943285	II	104	83	51	65	99	98	91	52	70	99	112	101	58	75	99	118	101	58	75	99
13.	PARKAVI	9/M	ASD	18KG	944285	II	108	100	65	80	99	102	101	58	75	99	104	99	54	74	99	114	98	59	73	99
14.	PARMESH	4/M	ASD	12KG	930739	II	105	94	53	66	99	98	86	64	67	99	106	98	60	74	99	116	100	65	80	99
15.	SHAROONWINSI	5/F	ASD	13KG	933909	II	102	88	56	72	99	98	88	64	68	99	103	101	58	75	99	10	88	64	76	99
16.	RAGAVAN	10/M	ASD	20KG	936052	II	100	114	67	84	98	96	81	55	66	99	105	99	55	74	99	104	101	58	75	99
17.	ARUL	6/M	ASD	15KG	937802	II	101	94	53	66	98	98	87	62	75	99	106	85	56	70	99	116	102	60	76	99
18.	LIKKITHA	4/F	ASD	12KG	936668	II	105	99	54	74	99	100	94	58	43	99	110	91	65	78	99	118	99	66	80	99
19.	MANIKANDAN	3/M	ASD	14KG	936979	II	100	102	60	76	98	96	99	54	74	99	105	92	54	71	99	102	88	64	76	99
20.	HARJIKA	5/F	ASD	13KG	937642	II	104	95	72	83	99	101	102	51	73	99	106	88	64	76	99	100	101	58	75	99
21.	ANUSHA	7/F	ASD	16KG	936058	II	100	86	64	67	99	97	106	64	74	99	100	94	69	80	99	105	98	5	73	99
22.	HARI	5/M	ASD	14KG	928899	II	98	101	58	75	99	94	102	57	73	99	103	98	67	80	99	110	88	64	76	99
23.	SASHTIDARAN	7/M	ASD	20KG	933907	II	99	88	64	76	99	96	87	59	72	99	102	106	63	74	99	112	87	62	75	99
24.	MOHAMMED AAYISH	6/M	ASD	15KG	928503		103	104	70	84	99	98	84	61	72	99	108	101	58	75	99	100	102	60	76	99
25.	KIRTHIKA	4/F	ASD	11KG	929030	II	101	86	64	67	99	96	86	56	71	99	105	91	6	80	99	102	99	66	80	99

INTRA OPERATIVE											GROUP –BF[BUPIVACAINE AND FENTANYL GROUP]					
S.NO	ON PACU ADMISSION					AT EXTUBATION					SERUM CORTISOL MEASUREMENT			BLOOD GLUCOSE MEASUREMENT		
	HR	SBP	DBP	MAP	SPO2	HR	SBP	DBP	MAP	SPO2	BASELINE	POST STER NOTOMY	AFTER SURGERY	BASELINE	POST STER NOTOMY	AFTER SURGERY
1	104	98	64	81	99	110	101	65	80	99	22.8	61.4	120.6	59	121	198
2	110	113	60	80	99	114	114	67	84	96	23.7	44.9	91.1	53	150	220
3	108	98	63	81	99	116	123	60	82	97	16.9	44.4	103.4	56	134	210
4	101	105	66	83	99	117	116	57	80	99	24.1	58.9	110.4	64	128	183
5	100	101	58	75	99	108	104	70	84	98	27.4	76	120.4	60	158	224
6	106	98	64	81	99	112	104	66	83	96	18.4	67.2	98.3	56	140	212
7	108	93	67	79	99	117	102	60	76	99	19.3	63.8	96.7	54	121	173
8	112	102	60	76	99	116	123	60	82	97	25.4	66.4	118.0	66	128	176
9	106	117	52	75	99	112	101	65	80	98	23.6	69.0	96.0	64	134	218
10	111	93	67	79	99	111	104	66	83	99	20.8	59.4	106.4	51	136	220
11	113	101	58	75	99	117	114	67	84	96	21.4	44.9	91.7	48	118	168
12	109	113	60	80	99	119	116	57	80	98	24.6	62.5	97.5	52	144	217
13	107	98	64	81	99	120	123	60	82	99	28.3	68.9	107.6	54	122	201
14	104	98	63	81	99	112	101	65	80	98	22.6	58.3	96.8	56	136	194
15	110	101	58	75	99	120	104	66	83	98	23.8	74.5	110.8	62	114	169
16	111	105	66	83	99	120	123	60	82	99	26.3	72.6	128.6	63	122	172
17	114	102	60	76	99	118	104	70	84	97	25.3	70.5	102.4	66	132	194
18	113	98	64	81	99	120	93	69	79	96	22.3	62.8	118.6	57	110	186
19	102	98	63	81	99	114	114	67	84	96	21.4	49.4	93.7	55	109	178
20	107	113	64	80	99	113	102	60	76	99	26.8	69.3	130.4	58	128	204
21	101	101	58	75	99	111	101	65	80	97	27.4	72.8	136.2	61	126	210
22	110	105	66	83	99	117	123	60	82	99	25.7	70.2	128	63	129	208
23	112	98	64	81	99	118	114	67	84	99	27.8	71.0	107	67	134	222
24	113	98	63	81	99	114	104	66	83	98	29.4	74.5	132.7	62	140	214
25	107	113	64	80	99	117	104	70	84	97	21.6	73.6	131.7	58	128	206

FACES PAIN SCORE [IN HOURS] [BUPIVACAINE FENTANYL GROUP]														POSTOP ANALGESIA INITIATION IN HOURS
S.NO	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	
1	0	0	1	1	1	2	2	1	1	2	2	2	2	2
2	0	1	2	2	2	2	3	2	2	1	1	2	2	3
3	0	0	2	2	1	1	1	2	2	1	2	3	3	1 and 5
4	0	0	1	1	1	2	2	2	2	1	1	1	1	3
5	0	0	2	2	1	1	1	1	2	2	1	2	2	1
6	0	0	1	1	2	2	1	1	1	1	2	2	1	2
7	0	0	1	1	2	1	1	1	1	1	1	2	2	2
8	0	0	1	1	1	2	2	2	1	1	2	3	2	3
9	0	0	1	1	1	1	1	2	2	2	1	1	1	4
10	0	0	1	1	1	2	2	2	1	1	1	2	2	2
11	0	0	1	1	2	2	1	1	1	2	1	2	2	2
12	0	0	2	2	2	1	1	1	1	1	3	2	2	1
13	0	0	1	1	1	2	2	2	2	1	2	2	2	2
14	0	0	1	1	1	2	1	1	2	2	1	1	1	2
15	0	0	1	1	2	2	1	1	1	1	1	2	2	2
16	0	0	0	0	1	1	2	2	2	1	1	1	2	3
17	0	0	1	1	2	2	2	2	2	3	3	3	4	1 and 4
17	0	0	0	0	0	0	1	2	2	1	1	2	1	3
18	0	0	1	1	2	1	2	2	1	1	1	2	2	3
19	0	0	0	1	1	1	2	2	2	1	1	1	1	3
20	0	0	0	1	1	1	2	2	1	1	1	2	2	3
21	0	0	0	1	2	2	1	1	1	1	1	1	1	2
22	0	0	0	1	1	1	1	2	2	3	2	1	2	2
23	0	0	0	1	1	1	1	2	2	1	1	1	2	4
24	0	0	1	1	1	2	2	1	1	1	2	2	1	3
25	0	0	1	1	1	2	2	1	1	1	2	2	2	3