

CLINICO-BIOCHEMICAL STUDY USING DIFFERENT SUTURE MATERIALS AND ANESTHETIC COMBINATIONS DURING PERFORMING HERNIORRHAPHY IN CALVES

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Abstract:

The agricultural sector of Pakistan is economically dependent on livestock production, which makes a substantial contribution to the agricultural domain. Agriculture accounts for 11% of the gross domestic product (GDP), with livestock contributing a significant 56.3% to the agricultural GDP. With a specific emphasis on calf herniorrhaphy, this research highlights the importance of livestock and a considerable threat it poses to the livestock industry. This study investigates the various forms and etiology of hernias in calves, with a particular focus on the high incidence of congenital hernias and the contributing factors that facilitate their development. The physiological reaction to surgical procedures is also investigated, with particular emphasis on the stress response. Compensatory surgical stress has the potential to result in extended recovery periods and heightened morbidity. The study underscores the criticality of reducing surgical tension in order to facilitate a speedier recovery following the procedure. In addition, the paper examines the effects of various anesthetic agents on physiological parameters and stress indicators, focusing on the combined effects of propofol and ketamine. Suture material selection is a critical factor in determining the efficacy of calf herniorrhaphy procedures. Chromatomal cat gut and polyglactin 910, two frequently employed suture materials, are compared in this study with respect to digestion, strength of tensile, and tissue reaction.

The selection of suture material is critical in terms of attaining the precision and accuracy that surgeons seek during surgical procedures. The objective of this study is to address a knowledge gap in the current body of research by examining the stress levels experienced by calves undergoing umbilical hernia surgery under various types of general anesthesia (propofol and ketamine), as per cortisol levels. Additionally, a comparative analysis is performed in the study between suture materials composed of polyglactin 910 and chromic catgut. The results obtained from this investigation provide significant contributions to the understanding of how to optimize surgical procedures and improve outcomes following calf herniorrhaphy.

Keywords: Livestock Production, Calf Herniorrhaphy, Surgical Stress, Anesthetic Agents, Suture Material Selection

Introduction:

Pakistan is an agriculture country. Livestock is subsector of agriculture in Pakistan. Agriculture contributes in gross domestic product (GDP) about 11% while the livestock share in agriculture gross domestic product (AGDP) is 56.3% (Rehman et al. 2017). Pakistan is blessed country having a large number of livestock populations that is more suitable to our local environment. Pakistan has 27.9 Mcattle, 27.3M buffalo, 26.5M sheep, 53.8M goat, and 0.9 M camels. Livestock produce 34M tons milk, 1.55M ton beef, 0.57M ton mutton (Chandio et al. 2015). Buffaloes are main milk producing animals in Pakistan and they are mainly almost 65% present in Punjab. In Sindh, cattle is used for draft purpose and also distributed in different provinces of Pakistan but not in Balochistan (Afzal 2008). Above data indicates the importance of cow calves in livestock sector of Pakistan. Herniorrephy is biggest challenge in calves that may lead to gigantic loss to this sector. Surgery is performed to resolve this problem. Protrusion of internal body content from the normal cavity while the skin remain intact is called hernia (Slatter 2003). These protrusions of organs can occur through normal anatomical or the accidentally produced cavities. Hernia consists of three main parts; a) hernia sac, b) hernial ring and c) hernial contents. The hernial ring varies in size from few millimeters to several centimeters (Venugopalan 2000). Congenital hernia like umbilical hernia and inguinal hernia, occur because of the Genetic factors, traumatic factors, certain drugs, and surgical interventions. There are mainly two types of causes in hernia, that are predisposing causes and exiting cause (Hassen et al. 2017).

In medicine stress is described as a physiological reaction. From an evolutionary point of view, the stress response is stimulated by central nervous system which saves the body from external threats by activation of underlying internal response like immune system to repair wound and protects against pathogens (Coggins and Rosenzweig 2012). Sometime this internal response exceeds the body tolerance and become "surplus" in conditions like major surgeries which provokes further tissue injury instead of inflammation. Outcomes of patients can be improved by decreasing the surgical stress as various body cells die genetically to repair by the process of apoptosis. It is about "help in the body help itself." (Dobson 2015). Stress leads to predictable behavioral, cognitive, Physiological and biochemical changes that are directed either to accommodate the effects of stress or alter the stressful event. It refers to internal and external stressors applied to different biological systems or to the animal which leads to measurable change in a physiological steady state. These changes after an injury or trauma comprising of neuroendocrine, immunological or metabolic changes are termed as stress response (Dobson 2015).

Stress response to surgery is a compensatory mechanism, but it has been argued that in current surgery this response is unnecessary. Prolonged stress results in increased morbidity due to less disease resistance leading to longer hospitalization time (Church *et al. 1994*). The stress response to surgery leads to wide range of metabolic and hormonal changes in body, among which two major systemic effects the haemato-immunological and the neuroendocrine effects can be distinguished (Ivanovs *et al. 2012*). Surgical operations on animals are stressful as they lead to several changes in stress markers and various physiological parameters. Adrenal cortex secretes a steroid hormone cortisol which is associated with stress reaction, carbohydrate metabolism and inflammation (Sjaastad *et al. 2010*). One of the crucial goals of modern surgery is better and fast post-operative recovery. Stress and pain are considered two major problems in the early postoperative period. After an infection or injury, systemic response is activated which comprises of cell signaling, cell migration and mediator release. (Struys *et al. 2007*). The application of different anesthetics and different anesthetic schemes has a different impact on the organism's response to stress response and changes of physiological parameters (*Dimitrov et al.*). An ideal suture material should have unique characteristics of good

handling characters, good knot security and tensile strength, absence of allergenic properties, resistance to infection with minimal tissue reaction and finally absorption on satisfactory tissue repair (Herrmann *et al. 1970*). Suture material selection by a surgeon is mainly due to its properties like absorption and non- absorption, type of suture material, traumatic and non-traumatic, tensile strength and handling characteristic (Craig *et al.* 1975). polyglactin 910 and chromic catgut are absorbable suture material and nylon is non-absorbable suture. Nylon suture material belongs non-absorbable class of suture material and its structure is monofilament. And it causes less tissue reaction than multifilament suture materials (Aderriotis and Sàndor 1999).

Anesthesia is administered through parental route and inhalational route in animals. Ice was used as anesthetic agent log years ago, and then an anesthetic agent ketamine HCL was discovered. In 1962 it was first time used as anesthetic agent in living organism. Ketamine HCl is derivative compound of aryl cyclohexylamine. It is antagonist of N-Methyl-D-aspartic (NMDA) receptors (Anis *et al. 1983).* It acts like sedative, analgesic and amnesia. It has smooth effects on cardiovascular system, respiratory system. Ketamine induce anesthesia in 5 minutes when administered through injection. And duration of anesthesia is more than 25 minutes (Mair *et al. 2009*).

A short acting anesthetic agent which has fast and rapid induction and recovery is propofol. It is nonsteroidal and non-barbiturate in nature (Hofmeister *et al. 2008*). It induces fast and smooth induction of anesthesia and after surgical procedure recovery is smooth. (VanNatta and Rex 2006). As propofol is short acting anesthetic agent, so has short time window for surgical procedures, that's why other anesthetic agents like ketamine is used along with propofol (Gross *et al. 2002*). To date there is yet no data about measurement of stress level (cortisol level) of Umbilical hernia surgery in calves under different general anesthesia (propofol and ketamine) and also comparison between chromic catgut acid and polyglactin 910 suture materials.

LITERATURE REVIEW

Anesthesia is term as the process of production of unconsciousness, desensitization and insensibility of whole body or some part of it. And it is reversible process. Mostly anesthetic agents are inhalant or injectable, used in animals. Injectable anesthetic agents produce either general or local effect. State of general Anesthesia (GA) in which whole body is desensitize along with analgesic effect and muscle relaxation for surgical intercessions, minimal suppression of functions of vital organs and fast, smooth and uncomplicated recovery, and their degrees depends upon anesthetic agent dose (Mook 2006). Balanced anesthesia is very important term which is generally used as to make the mixture of different anesthetic agents along and drugs with proper dose. That produce required effect with minimal side reactions (Mook 2006). General anesthesia application in large animal is not ideal because regurgitation, tympany, ingesta aspiration, cardiovascular and respiratory depression is more prominent risk in them as compared to other farms animals (Bodh 2011). Major surgeries are performed in bovine with smooth and painless methods, when proper and complete anesthesia stage is achieved. This is only possible by the use of high-quality anesthetic agent having properties like excellent analgesia and myorelaxation. That's why premedication is used which play important role. Preanesthetic agents are used to sedate the animals before administration of anesthetic agent. They also increase the anesthesia induction quality of anesthetic agents, decrease the adverse effect of agents related to dose of injectable and inhalant agents (Bodh 2011).

For the safety of animals, efficacy of anesthetic agent and patient preparation, pre-anesthetic assessment is very important. The vital signs of Respiratory, cardiovascular and central nervous (CNS) systems are checked. So that in deep anesthesia, desirable measurement could be taken in need (Bednarski *et al.* 2011).Ketamine HCl is, used as general anesthetic agent for human being and animals as well, a cyclohexylamine compound (Slingsby and Waterman-Pearson 2000), ketamine belongs to dissociative class of general anesthetic. It blocks N-methyl-D-aspartate (NMDA) receptor

along with reduction of presynaptic release of glutamate and helpful in pain control.one of the important and main metabolite of ketamine is norketamine, which has analgesic properties (Gehring *et al.* 2009).

Studies about propofol pharmacokinetics in sheep shows that the mean elimination half-life of propofol was 56.6 (13.1) minutes, whereas the mean volume of distribution at a steady state was 1.037 (0.480) L/kg (Short and Bufalari 1999).Propofol is dose dependent anesthetic agent, as it produces best quality anesthesia induction at higher dose and this quality decreases gradually with lower doses. Eye reflexes lost and become centralof those horses that get higher dose. Moderate and lower dose propofol produce nystagmus, rapid palpebral reflexes and corneal reflexes, and ear movements. So propofol with low dose produces worst quality induction of anesthesia (Frias *et al.* 2003). Anesthesia induction with propofol respiratory rate and body temperature is significantly decreased in sheep and in goats. And also show the smooth recovery with it (p<0.01) (Dad Brohi *et al.* 2019). Propofol produces minimal cardiorespiratory effects and its dose also reduce if it used along with meperidine and pentazocine (Anandmay *et al.* 2016).

A study was performed to compare different suture materials tissue responses which was conducted in 7 days. In study tissue early response was investigated at day 1st, 3rd, 5th and 7th day. This study showed catgut suture material produce severe inflammation at 3rd day than 1st day because of phagocytosis as material is absorbed early. At day 5th Catgut sutures start to absorb and absorption is completed at day 7th but inflammation last after that as well. This study also showed that natural absorbable suture material, catgut, produce relatively more inflammatory reaction, and more infiltration of cells. Although non absorbable suture material also stimulates histologic reactions, and inflammatory responses were observed but in lesser degree. And non-absorbable suture materials produced less inflammatory reactions (Yaltirik *et al.* 2003).

Polyglactin 910 (vicryl) have been studied in different experiment and in clinical cases, its physical properties have been compared with other natural, synthetic and absorbable suture materials. This suture material has high capacity of fluid absorption and less capillary capacity as compared to others. As compared to other synthetic and non-absorbable suture material it has more tensile strength. Moderate elongation at break. It does not show any un-favorable reaction to wound. Wound hernia ratio of patient of laparotomy is very low and this is confirmed after the 12-18 months follow-up of those patients. And reoccurrence of inguinal hernia was not noticed after the repair with polyglactin 910 also not seen any clinical sign of leakage from gastrointestinal region after anastomoses procedure. This study showed that polyglactin is best replace of catgut suture material (Blomstedt and Jacobsson 1977).

For successful surgeries, suture material and anesthetic agents' combination that having less stress effect after surgery and helpful in smooth healing, are used generally. 15 goats were selected in 3 group for cortisol level through Enzyme linked Immune Serum Assay (ELISA) test, following surgery of umblical hernia, as markers of surgical stress. For surgery the comparison between two suture materials, polyglycolic acid and chromoic catgut are used. Samples are collected after administration of anesthetic agent post anesthetic interval (PAI) and after surgery at 0,5,8,24,48 and 72 hours from all group of animals. Goats of group A showed serum cortisol (SC) level significantly increase 52.76 ± 6.12 ng/mL at 5th hour post-surgery and at 8th hours both A and B group showed that peak value of SC that was 72.53 ± 3.79 ng/mL and 61.59 ± 3.90 ng/mL respectively.as compared to baseline data SC level is different P>0.05 at 5th, 24th, and 48th hours for goats. But at 72th hour SC level decrease immediately for both A and B group 20.53 ± 8.74 ng/mL and 17.59 ± 2.45 ng/mL and were not remained significant. Cortisol responses shows that Diazepam lidocaine produce more stress than diazepam-bupivacaine, later one considered better anesthetic agent. And chromic catgut produces more inflammation than PGA (polyglycolic acid) as suture material (Saidu *et al.* 2016).

The surgical stress response has following effect in an animal: haemato-immunological and neuroendocrine. The changes in SAMA (sympathetic adrenal medullary axis) and HPAA (hypothalamic pituitary adrenal axis) induce neuroendocrine effects. Haemato-immunological effect is induced by acute phase reaction, cytokines release, and by the lymphocytic and neutrophilic propagation. And these are all involve in the production of stress response. If stress response is prolonged then may death occur and also adverse effect may come. Preoperative, perioperative and postoperative factors can affect the surgical stress (Ivanovs *et al.* 2012).

Hernia occurs almost in all domestic animals and most commonly in pigs, calves, pups and foals, but rarely reported in lab animals like rabbit. There few reports of literature regarding repair of umbilical hernia in rabbit is so far. Hernia in umbilical region is mostly due to navel cord muscle weakness and umbilical stump. Due to these reasons proper closure at umbilical area is not occurred and intestinal content comes out and a mass like football is formed called as hernia or in this case umbilical hernia (Bates and Straw 2008). For the repair of umbilical hernia in adults, there is no consensus on the best technique. Laparoscopic hernioplasty technique remains under question for the treatment of umbilical hernia. A research was conducted for comparative study of umbilical hernia treatment through open hernioplasty and laproscopic hernioplasty in adult. And study shows that mayo repair procedure causes high pain score after the surgical procedure. Increased postoperative pain is due to the inappropriate tension on the abdominal. It extends the hospital stay. Herniorrhaphy is the simplest procedure among the open techniques. At the ambulatory setting it can be performed expediently. However, the recurrence rate is highly associated with this technique (Slatter 2003).

MATERIAL AND METHODS

3.1 Study Design:

The patients were randomized into four groups (A, B, C and D) comprised of four animals in each group.

3.1.1 Group A:

In group A, four clinical cases were assigned as A1, A2, A3, and A4. Polyglactin 910 (vicryl 2) suture material was used for the repair of hernia in this group. Ketamine HCL (Betasol) @5 mg/kg was used as anesthetic and anesthesia was administered through intravenous route.

3.1.2 Group B:

In group B, four clinical cases were assigned as B1, B2, B3, and B4. Chromic catgut suture material was used for the repair of hernia in this group. Ketamine HCL (Betasol) @5 mg/kg was used as anesthetic and anesthesia was administered through intravenous route.

3.1.3 Group C:

In group C, four clinical cases were assigned as C1, C2, C3, and C4. Polyglactin 910 (vicryl 2) material was used for the repair of hernia in this group. Propofol @5-6 mg/kg was used as anesthetic and anesthesia was administered through intravenous route.

3.1.4 Group D:

In group D, four clinical cases were assigned as D1, D2, D3, and D4. Chromic catgut suture material was used for the repair of hernia in this group. Propofol @5-6 mg/kg was used as anesthetic and anesthesia was administered through intravenous route.



Figure 3.1: chromic catgut suture material



Figure 3.2: Vicryl (polyglactin (910)

3.2 Preoperative examination

The patient was admitted at indoor surgery clinic for preoperative assessment. The general body condition, temperature, pulse and respiration was noted and feeding status was observed. The cases in good vigor were declared fit for surgery.

Preoperative preparations:

3.3.1 Animal preparation

Calves were kept off feed 8 hours before surgery. First, pre-anesthetic (xylazine) was administered intramuscular. Temperature, pulse and respiration was noted before start of surgery.

3.3.2 Surgical Site preparation

Surgical site was clipped properly with use of surgical scissors and electronic clipper before start of surgery and scrubbed with povidone solution.

3.3.3 Surgeon preparation

Complete gowning and gloving of surgeon was performed. Complete asepsis procedure was adopted before start of surgery.

Anesthesia Administration

Pre-anesthetic Xylazine (xylax @0.015 mg/kg) was administered intramuscular to each calf. Sedation

parameters were observed i.e. head down, neck down and gait incoordination. The sedation timewas also noted. After pre-anesthetic, an anesthesia was administered according to the study design. Cases of group A and B were administered with ketamine HCL (Betasol) @5 mg/kg body weight intravenously. Cases of group C and D were administered with propofol @5-6 mg/kg intravenously.



Figure 3 : Propofol

Figure 4: Betamine (ketamine HCL)

Surgical Procedure

Herniorrhaphy was performed when animals were in complete surgical stage of anesthesia. The standard herniorrhaphy procedure for umbilical hernia repair was opted (*Turner and McIlwraith's Techniques in Large Animal Surgery 4th Edition*). Surgery was performed in ventro-dorsal recumbency. First pushed down hernia content through hernial ring with help of hand. Incision was given on the loop of lose skin. Then hernial ring was closed. A three layers closure was performed in this surgery

In group A, muscular and subcutaneous layer was closed with polyglactin 910.

In group B, muscular and subcutaneous layer was closed by using polyglactin 910. Suture material.

In group C, muscular and subcutaneous layer was closed with chromic catgut suture material.

In group D, muscular and subcutaneous layer was closed with chromic catgut suture material. In all the cases, the skin incision was closed by using silk material.



Figure 5: Applying Stay suture on hernial sac



Figure 6: Exposing the internal organ through hernial ring



Figure 7: Retrection of hernial sac wall Figure 8: Closure of hernial ring



Figure 9: skin closure with suture of umbilical hernia

Parameters

The study was assessed by monitoring following parameters.

3.6.1 Physical parameters:

In physical parameters temperature, pulse/ heart rate and respiration rate was measured.

a. Temperature:

Rectal temperature was noted through thermometer first before, during and after the surgery in all animals at interval of 0, 5, 10, 15, 30, 45 and 60 minutes.

b. Pulse rate:

In calves pulse rate was taken from femoral artery. And it was measured first before the surgery in all animals and after the surgery at the interval of 0, 5, 10, 15, 30, 45 and 60 minutes.

c. Respiration rate:

In calves mouth respiration was taken. And it was measured first before the surgery in all animals and after the surgery at the interval of 0, 5, 10, 15, 30, 45 and 60 minutes.

3.6.2 Sedation parameters:

The efficiency of anesthesia depends on its sedation property. The different sedation parameter were noted in this study. The reflexes were checked at interval of 0. 3, 5, 7 and 10 minutes. The sedationproperty was assessed by the presence of the following reflexes.

- a) Head down
- **b**) Neck down
- c) Palpebral reflex
- **d**) Gait incoordination

Behavioral changes were noted for sedation evaluation. This was graded on a 1 - 4 scoring scale asfollow

| Scoring | Absence of sedation reflexes |
|---------|--|
| 1 | No sign of sedation (Animal standing alert, keeping its head |
| | high, all reflexes present) |
| 2 | Mild sedation (Decreased alertness) |
| 3 | Moderate sedation (Animal calm, minimal restraint needed) |
| 4 | Complete sedation (Animal totally calm, no restraint needed) |
| | Table No. 31: Scoring scale of sedation affects |

1 able No. 3.1: Scoring scale of sedation effects

3.6.3 Analgesic parameters:

The efficiency of anesthesia depends on its analgesic property. The different analgesic parameters were noted in this study. The reflexes were checked at interval of 0. 3, 5, 7 and 10 minutes. The analgesiaproperty was assessed by the absence of the following reflexes.

- a) corneal reflex
- **b**) Toe pinch reflex
- c) Tail response
- d) Patellar reflex

For measuring the analgesia effects there was a graded system in which a scoring scale of 1 -4 asfollows.

| Scoring | Absence of analgesic effect |
|---------|---|
| 1 | Excellent analgesia (no response to pin prick) |
| 2 | Moderate analgesia (occasional response to pin prick) |
| 3 | Mild analgesia (weak response to pin prick) |
| 4 | No analgesia (strong response to pin prick) |
| | Table No. 3.2: Scoring scale for analysis affect |

Table No. 3.2: Scoring scale for analgesic effect

3.6.4 Induction time:

Induction time, the transition between the awake state and anesthetized state after the administration of anesthetic agent. The time was recorded in minutes.

3.6.5 Recovery Time:

In recovery time, time period duration will be noted in which animal recover from anesthesia after surgery and all anesthetic signs are disappeared.

3.6.6 Duration of anesthesia:

It is duration of total anesthetic period in which surgery was performed and first sign of awake was observed. Total duration of anesthesia was also recorded in minutes.

The analgesic parameters were evaluated on basis of presence of different reflexes. The toe pinch reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 5, 10, 15 and 20 minute. In group A, complete presence of reflex at 0, 5 and 10 minutes. No presence of reflex at 15 and 20 minute.

3.6.7 Hematological and Biochemical Parameters:

a). Blood Collection and Lab Analysis:

For hematological and biochemical tests such as LFT, RFT and cortisol level, blood samples were collected at different time intervals. A total 5ml blood sample was withdrawal with the help of syringe from jugular vein by putting thumb pressure at jugular furrow. EDTA containing vacutainers were used for hematological parameters while Gel & Clot activator vacutainers were used for biochemical parameters. Collected blood samples were taken to Pet Center laboratory of University of Veterinary and Animal Sciences Lahore, Pakistan for analysis.



Figure 10: Blood sampling for lab analysis



Figure 11: Blood sampling from calf before surgery

3.6.8 Hematologic Parameters

Complete blood count was also assessed for any signs of infection and Inflammation. For CBC, sample were collected before the start of surgery would be taken as normal value, just after the surgery, 16, 24, 48 and 72 hours. And at 7th day post-surgery.

- a) WBC count
- b) RBC count
- c) Hemoglobin

3.6.9 Biochemical tests

a. Cortisol level:

To evaluate the stress response in result of anesthesia, surgery and suture material cortisol level was measured. Sample was collected for this test first before the surgery then just after the administration of anesthesia in (post anesthesia interval). Samples for cortisol level were collected at interval of 30 and 60 minutes during surgery and 24 hours, 3rd and 7th day post-surgery

b. Liver function test LFT:

Liver function test was evaluated for anesthesia toxicity. Sample was collected for this test first before the surgery, 15, 30, 45 and 60 minutes during surgery and 16 and 24 hours post-surgery. The following enzymes were evaluated.

- i. Alanine Aminotransferase (ALT)
- ii. Aspartate Aminotransferase (AST)
- iii. Alkaline phosphatases (ALP)

c. RFT:

Renal function test was evaluated for anesthesia toxicity. Sample was collected for this test first before the surgery, 15, 30, 45 and 60 minutes during surgery and 16 and 24 hours post-surgery. The levels of following products were noted.

- a) Creatinine
- b) Blood urea nitrogen (BUN)

3.6.10 Post-operative protocols:

After surgery calves were kept under observation for 14 days. Antibiotic were given and antiseptic dressing did on daily basis wound healing or any scar was observed.

3.6.11 Statistic Analysis:

Data was analyzed by using following statistic tools:

- a. Physical parameter for this used "Repeated Measure Design using ANOVA".
- b. Analgesic parameters and Sedation Parameters were analyzed by using 'Chi-Square Test to compare the properties of several groups'.
- c. Induction Time, Duration of Anesthesia and Recovery Time data was analyzed by using 'Simple paired ANOVA test'.
- d. LFT, RFT, CBC, Cortisol level data was analyzed by "Repeated Measure Design using ANOVA"

RESULTS

In this study, different suture materials and different anesthetic combination was used to compare their efficacy, sedation, analgesic effect, hemodynamic and biochemical parameters, their cortisol level inresponse to stress produced by two different anesthetic combination and different suture materials. This study based upon clinical cases, presented to surgery clinic of university of veterinary and animal sciences Lahore. Total 16 cases of calves, having age 1 to 2 month, weight 65 to 70 kg, were selected for this study. These calves were divided into 4 groups. Each group had 4 animals.

Each group was assigned a name, A, B, C and D.

- 1) Group A (xylazine-Ketamine and Polyglactin 910 suture material)
- 2) Group B (Xylazine-Ketamine and Chromic catgut suture material)
- 3) Group C (Xylazine-Propofol and Polyglactin 910 suture material)
- 4) Group D (Xylazine-Propofol and Chromic catgut suture material)

All these combinations were evaluated on base of monitoring anesthetic effects, physical parameters, sedation and analgesic reflexes, hematological parameters and biochemical parameters on their respective intervals.

4.1 PHYSICAL PARAMETERS 4.1.1 TEMPERATURE

| Time(Min) | Individual Ketamine a | Xylazine- Mean±S.D | | | |
|-----------|--------------------------|--------------------|-------|-------|------------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 101.6 | 102.2 | 101.3 | 102.4 | 101.9±0.51 |
| 5 | 101.4 | 102.1 | 101.1 | 102.2 | 101.7±0.53 |
| 10 | 101.1 | 102 | 100 | 102 | 101.2±0.95 |
| 15 | 100.9 | 101.9 | 100.9 | 101.9 | 101.4±0.57 |
| 30 | 100.9 | 101.6 | 100.7 | 101.7 | 101.2±0.49 |
| 45 | 100.7 | 101.5 | 100.5 | 101.5 | 101.0±0.52 |
| 60 | 100.5 | 101.4 | 100.4 | 101.5 | 100.9±0.58 |

Table No. 4.1: Body temperature of group A calves

Our results showed that body temperature of the group A animals treated with xylazine-ketamine with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 101.9 to 100.9 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 101.9 ± 0.51 , 101.7 ± 0.53 , 101.2 ± 0.95 and 101.4 ± 0.57 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 101.2 ± 0.49 , 101.0 ± 0.52 and 100.9 ± 0.58 at 30, 45 and 60 minutes interval was recorded (table.4.1).

| | Individual | Body temperat | vith | | |
|-----------|------------|---------------|-----------|-------|------------|
| Time(Min) | Xylazine-K | etamine and C | Mean± S.D | | |
| | B1 | B2 | B3 | B4 | |
| Baseline | 102.6 | 101.9 | 102.3 | 102.8 | 102.4±0.33 |
| 5 | 102.3 | 101.9 | 102.3 | 102.6 | 102.2±0.24 |
| 10 | 102.1 | 101.7 | 102.1 | 102.4 | 102.0±0.24 |
| 15 | 102 | 101.6 | 102 | 102.1 | 101.9±.19 |
| 30 | 101.9 | 101.4 | 101.9 | 102 | 101.8±0.23 |
| 45 | 101.7 | 101.3 | 101.6 | 101.9 | 101.6±.21 |
| 60 | 101.5 | 101.3 | 101.5 | 101.7 | 101.5±0.14 |

Table No. 4.2: Body temperature of Group B calves

Our results showed that body temperature of the group B animals treated with xylazine-ketamine with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 102.4 to 101.5 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 102.4 ± 0.33 , 102.2 ± 0.24 , 102.0 ± 0.24 and $101.9\pm.19$ at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 101.8 ± 0.23 , $101.6\pm.21$ and 101.5 ± 0.14 at 30, 45 and 60 minutes interval was recorded (table.4.2).

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| Time | Individual with Xylaz | Individual Body temperature F (per min) of calvesinjected with Xylazine-Propofol and polyglactin 910 suture material | | | | | | |
|----------|--------------------------|--|-------|-------|------------|--|--|--|
| (Min) | C1 . | C2 | C3 | C4 | | | | |
| Baseline | 102.7 | 102.5 | 103.1 | 102.2 | 102.6±0.37 | | | |
| 5 | 102.3 | 102.2 | 102.8 | 101.9 | 102.3±0.37 | | | |
| 10 | 101.9 | 101.9 | 102.6 | 101.6 | 102.0±0.42 | | | |
| 15 | 101.7 | 101.5 | 102.1 | 101.3 | 101.6±0.34 | | | |
| 30 | 101.6 | 101.4 | 101.8 | 100.9 | 101.4±0.38 | | | |
| 45 | 101.3 | 101.1 | 101.7 | 100.6 | 101.1±0.45 | | | |
| 60 | 100.9 | 101.2 | 101.5 | 100.3 | 100.9±0.51 | | | |

 Table No. 4.3: Body temperature of Group C calves

Our results showed that body temperature of the group C animals treated with xylazine-propofol with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 102.6 to 100.9 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 102.6 ± 0.37 , 102.3 ± 0.37 , 102.0 ± 0.42 and 101.6 ± 0.34 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 101.4 ± 0.38 , 101.1 ± 0.45 and 100.9 ± 0.51 at 30, 45 and 60 minutes interval was recorded (table.4.3).

| Time | Individual Body temperature (per min) of calves injected with Xylazine-Propofol and Chromic catgut suture material Mean± S.D | | | | | | | |
|----------|---|-------|-------|-------|------------|--|--|--|
| (Min) | D1 | D2 | D3 | D4 | | | | |
| Baseline | 102.5 | 102.8 | 102 | 101.9 | 102.3±0.42 | | | |
| 5 | 102.4 | 102.5 | 102 | 101.6 | 102.1±0.41 | | | |
| 10 | 102.2 | 102.3 | 101.8 | 101.5 | 101.9±0.36 | | | |
| 15 | 102.1 | 102.2 | 101.6 | 101.3 | 101.8±0.42 | | | |
| 30 | 101.9 | 102 | 101.5 | 101.1 | 101.6±0.41 | | | |
| 45 | 101.7 | 101.9 | 101.3 | 100.9 | 101.4±0.44 | | | |
| 60 | 101.5 | 101.7 | 101.1 | 100.7 | 101.2±0.44 | | | |

Table No. 4.4: Body temperature of Group D calves

Our results showed that body temperature of the group D animals treated with xylazine-propofol with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 102.3 to 101.2 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 102.3 ± 0.42 , 102.1 ± 0.41 , 101.9 ± 0.36 and 101.8 ± 0.42 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 101.6 ± 0.41 , 101.4 ± 0.44 and 101.2 ± 0.44 at 30, 45 and 60 minutes interval was recorded (table.4.4).

| | Group A | Group B | Group C | Group D | |
|----------|-------------|-------------|-------------|-------------|---------|
| Time(Min | Mean±S.D | Mean± S.D | Mean± S.D | Mean± S.D | P Value |
| | | | | | |
| Baseline | 101.87±0.51 | 102.40±0.33 | 102.62±0.37 | 102.30±0.42 | |
| 5 | 101.70±0.53 | 102.27±0.24 | 102.30±0.37 | 102.12±0.41 | |
| 10 | 101.27±0.95 | 102.07±0.24 | 102.00±0.42 | 101.95±0.36 | |
| 15 | 101.40±0.57 | 101.92±.19 | 101.65±0.34 | 101.80±0.42 | 0.000 |
| 30 | 101.22±0.49 | 101.80±0.23 | 101.42±0.38 | 101.62±0.41 | |
| 45 | 101.05±0.52 | 101.62±.21 | 101.17±0.45 | 101.45±0.44 | |
| 60 | 100.95±0.58 | 101.50±0.14 | 100.97±0.51 | 101.25±0.44 | |

Table No. 4.5: Comparative mean values of Body temperature (F⁰) of Group A, B, C and D.

Statistically analysis of result showed that there was a significantly ($P \le 0.05$) difference in decrease in temperature in groups. There was seen overall decrease in temperature in all groups, till end of the observation. Xylazine-ketamine combination showed the more hypothermia as compared to all groups.



Graph 4.1 Comparative Mean Values of Body Temperature of all Groups

4.1.2 : PULSE

| Time | Individ injectec polygla | ual Pulse 1 1 with 2 ctin 910 su | ves and Mean± S.D | | |
|----------|--------------------------------|--|----------------------|-----|-------------|
| (Min) | A1 | A2 | A3 | A4 | |
| Baseline | 109 | 110 | 113 | 111 | 110.75±1.70 |
| 5 | 107 | 108 | 112 | 111 | 109.50±2.38 |
| 10 | 106 | 107 | 110 | 109 | 108.00±1.82 |
| 15 | 104 | 105 | 107 | 107 | 105.75±1.50 |
| 30 | 103 | 102 | 105 | 108 | 104.50±2.64 |
| 45 | 102 | 102 | 106 | 106 | 104.00±2.30 |
| 60 | 104 | 103 | 105 | 107 | 104.75±1.70 |

Table No. 4.6: pulse of group A calves

Our results showed that pulse rate of the group A animals treated with xylazine-ketamine with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 110.75 to 104.75 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 110.75 ± 1.70 , 109.50 ± 2.38 , 108.00 ± 1.82 and 105.75 ± 1.50 at,

0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 104.50 ± 2.64 , and 104.00 ± 2.30 at 30, and 45minutes interval was recorded. At minute 60 little bit increase toward normal 104.75 ± 1.70 (table.4.6).

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| Time | Individual Ketamine | Individual Pulse Rate (per min) of calves injected with Xylazine- Ketamine and Chromic Catgut suture material | | | | | |
|----------|------------------------|--|-----|-----------|-------------------|--|--|
| (Min) | B1 | B2 | B3 | B4 | | | |
| Baseline | 114 | 111 | 117 | 109 | 112.75±3.50 | | |
| 5 | 111 | 109 | 116 | 107 | 110.75±3.86 | | |
| 10 | 109 | 107 | 114 | 104 | 108.50±4.20 | | |
| 15 | 106 | 104 | 112 | 102 | 106.00±4.32 | | |
| 30 | 105 | 103 | 109 | 100 | 104.25±3.77 | | |
| 45 | 103 | 102 | 105 | 99 | 102.25 ± 2.50 | | |
| 60 | 104 | 103 | 106 | 101 | 103.50±2.08 | | |

Table No. 4.7: Pulse of group B calves

Our results showed that pulse rate of the group B animals treated with xylazine-ketamine with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 112.75 to 103.5 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 112.75 ± 3.50 , 110.75 ± 3.86 , 108.50 ± 4.20 and 106.00 ± 4.32 . At, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 104.25 ± 3.77 , and 102.25 ± 2.50 at 30, 45 minutes interval was recorded. At minute 60 little bit increase toward normal 103.50 ± 2.08 (table.4.7).

| Time(Min) | Individual Pulse Propofol and poly | Mean± S.D | | | |
|-----------|---------------------------------------|-----------|-----|-----|-------------|
| | C1 | C2 | C3 | C4 | |
| Baseline | 114 | 119 | 109 | 110 | 113.00±4.54 |
| 5 | 111 | 115 | 107 | 110 | 110.75±3.30 |
| 10 | 110 | 113 | 106 | 107 | 109.00±3.16 |
| 15 | 107 | 111 | 104 | 106 | 107.00±2.94 |
| 30 | 104 | 109 | 102 | 103 | 104.50±3.10 |
| 45 | 102 | 107 | 101 | 102 | 103.00±2.70 |
| 60 | 105 | 106 | 103 | 104 | 104.50±1.29 |

Table No. 4.8: Pulse of Group C calves

Our results showed that pulse rate of the group C animals treated with xylazine-propofol with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 113.00 to 104.5 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 113.00 ± 4.54 , 110.75 ± 3.30 , 109.00 ± 3.16 and 107.00 ± 2.94 . At, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 104.50 ± 3.10 , and 103.00 ± 2.70 at 30and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 104.50 ± 1.29 (table.4.8).

| Time | Individua Xylazine- | al Pulse r Propofol and | ed with Mean± S.D | | |
|----------|------------------------|----------------------------|----------------------|------------|-------------|
| (Min) | D1 | D2 | D3 | D 4 | |
| Baseline | 107 | 109 | 111 | 115 | 110.50±3.41 |
| 5 | 106 | 107 | 110 | 113 | 109.00±3.16 |
| 10 | 105 | 105 | 109 | 110 | 107.25±2.62 |
| 15 | 103 | 104 | 106 | 109 | 105.50±2.64 |
| 30 | 102 | 102 | 104 | 106 | 103.50±1.91 |
| 45 | 101 | 100 | 103 | 103 | 101.75±1.50 |
| 60 | 102 | 101 | 103 | 105 | 102.75±1.70 |

Table No. 4.9: pulse of Group D calves

Our results showed that pulse rate of the group D animals treated with xylazine-propofol with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 110.50 to 102.75 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 110.50 ± 3.41 , 109.00 ± 3.16 , 107.25 ± 2.62 and 105.50 ± 2.64 . At, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 103.50 ± 1.91 and 101.75 ± 1.50 and at 30 and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 102.75 ± 1.70 (table.4.9).

| Time (min) | Group A | Group B | Group C | Group D | P value |
|------------|-------------|-------------|-------------|-------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 110.75±1.70 | 112.75±3.50 | 113.00±4.54 | 110.50±3.41 | |
| 5 | 109.50±2.38 | 110.75±3.86 | 110.75±3.30 | 109.00±3.16 | |
| 10 | 108.00±1.82 | 108.50±4.20 | 109.00±3.16 | 107.25±2.62 | |
| 15 | 105.75±1.50 | 106.00±4.32 | 107.00±2.94 | 105.50±2.64 | 0.000 |
| 30 | 104.50±2.64 | 104.25±3.77 | 104.50±3.10 | 103.50±1.91 | |
| 45 | 104.00±2.30 | 102.25±2.50 | 103.00±2.70 | 101.75±1.50 | |
| 60 | 104.75±1.70 | 103.50±2.08 | 104.50±1.29 | 102.75±1.70 | |

Table No. 4.10: Comparative mean values of Pulse of Group A, B, C and D.

In pulse observation, overall decrease was seen in all groups. Statistical analysis of results showed that there was significance ($P \le 0.05$) difference in all groups. Decrease in pulse rate continued up to 45 minutes in all groups, then it turned to normal. Group B (xylazine-ketamine along with chromic catgut suture material relatively more variation in decrease in pulse rate during the observation.



Graph 4.2 Comparative Mean value of Pulse Rate of Groups

| Time | Individu Xylazine | al Respiration e-Ketamine and | with Mean± S.D | | |
|----------|----------------------|----------------------------------|-------------------|----|------------|
| (Min) | A1 | A2 | A3 | A4 | |
| Baseline | 29 | 33 | 34 | 28 | 31.00±2.94 |
| 5 | 24 | 27 | 28 | 22 | 25.25±2.75 |
| 10 | 21 | 24 | 25 | 19 | 22.25±2.75 |
| 15 | 19 | 22 | 23 | 17 | 20.25±2.44 |
| 30 | 18 | 21 | 21 | 16 | 19.00±2.44 |
| 45 | 16 | 19 | 20 | 15 | 17.50±2.38 |
| 60 | 17 | 20 | 22 | 19 | 19.50±2.08 |

4.1.3 **RESPIRATION RATE:**

Table No. 4.11: Respiration Rate of Group A calves

Our results showed that respiration rate of the group A animals treated with xylazine-ketamine with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 31.00 to 19.50 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 31.00 ± 2.94 , 25.25 ± 2.75 , 22.25 ± 2.75 and 20.25 ± 2.44 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 19.00 ± 2.44 and 17.50 ± 2.38 at 30 and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 19.50 ± 2.08 (table.4.11).

| Time | Individu injected suture r | alves catgut Mean± S.D | | | |
|----------|----------------------------------|---------------------------|----|-----------|------------|
| (Min) | B 1 | B2 | B3 | B4 | |
| Baseline | 27 | 31 | 35 | 26 | 29.75±4.11 |
| 5 | 23 | 29 | 31 | 23 | 26.50±4.12 |
| 10 | 21 | 25 | 27 | 20 | 23.25±3.30 |
| 15 | 19 | 23 | 25 | 19 | 21.50±3 |
| 30 | 17 | 22 | 24 | 18 | 20.25±3.30 |
| 45 | 18 | 20 | 21 | 16 | 18.75±2.21 |
| 60 | 20 | 21 | 22 | 17 | 20.00±2.16 |

Table No. 4.12: Respiration Rate of Group B calves

Our results showed that respiration rate of the group B animals treated with xylazine-ketamine with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 29.75 to 20.00 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 29.75 ± 4.11 , 26.50 ± 4.12 , 23.25 ± 3.30 and 21.50 ± 3 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 20.25 ± 3.30 and 18.75 ± 2.21 at 30 and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 20.00 ± 2.16 (table.4.12).

| Time | Individual injected with suture mater | Mean± S.D | | | |
|----------|---|-----------|----|----|------------|
| (Min) | C1 | C2 | C3 | C4 | |
| Baseline | 32 | 37 | 29 | 30 | 32.00±3.55 |
| 5 | 30 | 35 | 28 | 28 | 30.25±3.30 |
| 10 | 29 | 34 | 26 | 24 | 28.25±4.34 |
| 15 | 27 | 32 | 24 | 22 | 26.25±4.34 |
| 30 | 26 | 30 | 20 | 20 | 24.00±4.89 |
| 45 | 24 | 29 | 18 | 19 | 22.50±5.06 |
| 60 | 25 | 31 | 21 | 21 | 24.50±4.72 |

Table No. 4.13: Respiration Rate of Group C calves

Our results showed that respiration rate of the group C animals treated with xylazine-propofol with polyglactin 910 suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 32.00 to 24.50 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 32.00 ± 3.55 , 30.25 ± 3.30 , 28.25 ± 4.34 and 26.25 ± 4.34 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 24.00 ± 4.89 and 22.50 ± 5.06 at 30 and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 24.50 ± 4.72 (table.4.13).

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| Time | Individual Xylazine-Pr | with Mean± S.D | | | |
|----------|---------------------------|-------------------|----|------------|------------|
| (Min) | D1 | D2 | D3 | D 4 | |
| Baseline | 33 | 35 | 28 | 29 | 31.25±3.30 |
| 5 | 31 | 32 | 26 | 27 | 29.00±2.94 |
| 10 | 30 | 31 | 23 | 24 | 27.00±4.08 |
| 15 | 27 | 29 | 20 | 22 | 24.50±4.20 |
| 30 | 26 | 28 | 19 | 20 | 23.25±4.42 |
| 45 | 24 | 23 | 16 | 18 | 20.25±3.86 |
| 60 | 25 | 24 | 18 | 19 | 21.50±3.51 |

Table No. 4.14: Respiration Rate of Group D calves

Our results showed that respiration rate of the group D animals treated with xylazine-propofol with chromic catgut suture was decreased overall. The results showed that the mean body temperature was decreased overall from the value 31.25 to 21.50 at 5 minute to 60 minutes interval. The overall decreased in body temperature ranged from 31.25 ± 3.30 , 29.00 ± 2.94 , 27.00 ± 4.08 and 24.50 ± 4.20 at, 0, 5, 10 and 15 minutes. Similarly, decreased in body temperatures ranged from 23.25 ± 4.42 and 20.25 ± 3.86 at 30 and 45 minutes interval was recorded. At minute 60 little bit increase toward normal 21.50 ± 3.51 (table.4.14).

| Time (min) | Group A | Group B | Group C | Group D | P value |
|------------|------------|------------|------------|------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 31.00±2.94 | 29.75±4.11 | 32.00±3.55 | 31.25±3.30 | |
| 5 | 25.25±2.75 | 26.50±4.12 | 30.25±3.30 | 29.00±2.94 | |
| 10 | 22.25±2.75 | 23.25±3.30 | 28.25±4.34 | 27.00±4.08 | |
| 15 | 20.25±2.44 | 21.50±3 | 26.25±4.34 | 24.50±4.20 | |
| 30 | 19.00±2.44 | 20.25±3.30 | 24.00±4.89 | 23.25±4.42 | 0.000 |
| 45 | 17.50±2.38 | 18.75±2.21 | 22.50±5.06 | 20.25±3.86 | |
| 60 | 19.50±2.08 | 20.00±2.16 | 24.50±4.72 | 21.50±3.51 | |

Table No. 4.15: Comparative mean values of Respiration rate of Group A, B, C and D.

Decrease in respiration rate was seen in all groups overall. Statistical analysis of results showed significance (P \leq 0.05) difference in decrease in respiration in all groups. Group D (xylazine-propofol along with chromic catgut) showed more respiratory depression as compared to all groups.



Graph 4.3 Comparative Mean values of Respiration Rate of all Groups

| TIME | Average scoring Head Down Reflex in all groups | | | | | |
|-------|--|---------|---------|---------|--|--|
| (min) | Group A | Group B | Group C | Group D | | |
| 0 | 1 | 1 | 1 | 1 | | |
| 3 | 2 | 2 | 3 | 3 | | |
| 5 | 3 | 2 | 4 | 4 | | |
| 7 | 3 | 3 | 4 | 2 | | |
| 10 | 4 | 4 | 2 | 2 | | |

4.2 SEDATION PARAMETERS

 Table No. 16: Average scoring of comparative analysis of head down reflex- sedation parameter of groups A, B, C and D.

The sedation parameters were evaluated on basis of absence of different reflexes. The head down reflex was checked after administration of anesthetic combinations. Our results showed that animals of group A, showed 1, 2, 3, 3 and 4 scored at 0, 3, 5, 7 and 10 minute which indicated that at 0 minute there was no absence of head down, at minute 3, all animals showed mild head down, at minute 5 and 7- the head down reflex was moderate absent and at minute 10, a complete absence of head down reflex was observed.

In group B, scoring shown in Table. 4.16- described that at 0 minute, head down reflex was absent, at 3 and 5 minutes, reflex was mild absent, at 7 and 10 minutes, the score was 3 and 4 respectively, indicated moderate and complete absence of head down reflex. The head down reflex is indicative of sedative efficacy of anesthetic agent.

In groups C and D, all animal show no absence of head down reflex at minute 1 and moderate and complete absence of head down reflex at minute 3 and 4 respectively. All animals of group C showed complete absence of head down reflex at minute 7 and animals of group D showed mild absence of head down reflex at minute 7. All animals of group C and D showed mild absence of head down reflex at minute 10.

| TIME | Average scor | Average scoring of Neck Down Reflex in all groups | | | | | |
|-------|--------------|---|---------|---------|--|--|--|
| (min) | Group A | Group B | Group A | Group D | | | |
| 0 | 1 | 0 | 1 | 0 | | | |
| 3 | 2 | 3 | 2 | 3 | | | |
| 5 | 3 | 5 | 3 | 5 | | | |
| 7 | 3 | 7 | 3 | 7 | | | |
| 10 | 4 | 10 | 4 | 10 | | | |

4.2.2 NECK DOWM

 Table No. 17: Average scoring of comparative analysis of neck down reflex of sedation parameters of all groups A, B, C and D

The sedation parameters were evaluated on basis of absence of different reflexes. The neck down reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 3, 5, 7 and 10 minute which indicated that all animal showed no absence of neck down reflex at minute 1. And mild absence of neck down reflex all animals of group A, C and D. And no absence neck down reflex in all animals of group B, Moderate absence of neck down reflex in groups A and C and mild absence of reflex in groups C and D at minute 3. At minute 7, A, B and D group showed moderate absence of neck down reflex while complete absence function neck down reflex in group C. Group A and B showed complete absence of neck down reflex at minute 10. In group C moderate absence and in group D mild absence of neck down reflex at minute 10.

| TIME | Average scoring of palpebral Reflex in all groups | | | | | |
|-------|---|---------|---------|---------|--|--|
| (min) | Group A | Group B | Group C | Group D | | |
| 0 | 1 | 1 | 1 | 1 | | |
| 3 | 1 | 1 | 3 | 4 | | |
| 5 | 2 | 2 | 3 | 4 | | |
| 7 | 3 | 2 | 4 | 4 | | |
| 10 | 4 | 3 | 2 | 2 | | |

4.2.3 PALPEBRAL REFLEX

 Table No. 18: Average scoring of comparative analysis of palpebral reflex of sedation parameters of all groups A, B, C and D

The sedation parameters were evaluated on basis of absence of different reflexes. The palpebral reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 3, 5, 7 and 10 minute. In group A and B population so no absence of palpebral reflex at 0 and 3 minutes and mild absence of reflex at minute 5. Group C showed mild absence of palpebral reflex at minute 3 and 5 while complete absence of reflex was showed at minute 7. Group D showed complete absence of palpebral reflex at 3, 5 and 7 minute. Group C showed moderate absence of reflex at minute 7 and complete absence reflex at 10 minute. Group B showed mild and moderate absence of reflexes at 7 and 10 minute respectively. In group C and D al animals showed mild absence palpebral reflex at 10 minute.

4.2.4 GAIT INCOORDINATION

| TIME (min) | Average scoring o | Average scoring of gait incoordination in all groups | | | | | | |
|------------|-------------------|--|---------|---------|--|--|--|--|
| | Group A | Group B | Group C | Group D | | | | |
| 0 | 1 | 1 | 1 | 1 | | | | |
| 3 | 1 | 1 | 3 | 3 | | | | |
| 5 | 2 | 2 | 4 | 4 | | | | |
| 7 | 2 | 3 | 2 | 2 | | | | |
| 10 | 3 | 4 | 1 | 3 | | | | |

Table No. 19: Average scoring of comparative analysis of gait incoordination reflex of sedation parameters of all groups A, B, C and D

The sedation parameters were evaluated on basis of absence of different reflexes. The gait incoordination reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 3, 5, 7 and 10 minute. Animal of groups A, B, C and D showed no absence of reflex gait incoordination at 0 minute. At minute 3, group A and B showed no absence of reflex while Group C and D showed moderate absence of reflex. Group A and B showed mild absence of reflex and group C and D showed complete absence of gait incoordination at minute 5. At minute 7 group A, C and D showed mild absence of reflex while group B showed moderate absence of gait incoordination at minute 10. Group B showed complete absence of reflex at 10 minute. And group no absence of reflex at minute 10.

4.3 ANALGESIC PARAMETERS 4.3.1 TAIL PINCH

| TIME | Average scoring | Average scoring of tail Reflex in all groups | | | | | |
|-------|-----------------|--|---------|---------|--|--|--|
| (min) | Group A | Group B | Group C | Group D | | | |
| 0 | 1 | 1 | 1 | 1 | | | |
| 5 | 1 | 1 | 3 | 3 | | | |
| 10 | 2 | 2 | 4 | 4 | | | |
| 15 | 4 | 3 | 2 | 2 | | | |
| 20 | 4 | 4 | 2 | 3 | | | |

 Table No. 20: Average scoring of comparative analysis of tail pinch reflex of sedation parameters of all groups A, B, C and D

The analgesic parameters were evaluated on basis of presence of different reflexes. The tail pinch reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 5, 10, 15 and 20 minute.

At minute 1, groups A, B, C and D showed no reflex. At minute 5 group A and B showed no reflex whilegroup C and D moderate reflex of tail pinch. At minute 10, mild reflex in group A and B, complete reflexin group C and D. Complete reflex of tail pinch in group A at minute 15, moderate in group B while mildin groups C and D. At minute 20, complete reflex in group A and B, mild in group c while moderate in group D.

4.3.2 TOE PINCH

| TIME | Average scoring of toe pinch Reflex in all groups | | | | | |
|-------|---|---------|---------|---------|--|--|
| (min) | Group A | Group B | Group C | Group D | | |
| 0 | 1 | 1 | 1 | 1 | | |
| 5 | 1 | 1 | 2 | 3 | | |
| 10 | 1 | 2 | 3 | 4 | | |
| 15 | 4 | 3 | 4 | 4 | | |
| 20 | 4 | 4 | 4 | 1 | | |

 Table No. 21: Average scoring of comparative analysis of toe pinch reflex of sedation parameters of all groups A, B, C and D

In group B, complete presence of 0 and 5 minute. At 10 minute, mild presence of toe pinch reflex. At minute 15 moderate presence of reflex. At 20 minute, complete presence of reflex.

In group C, complete, moderate and mild and no presence of reflex at minute 0, 5, 10 and 15 respectively. At minute 20, no presence of reflex.

In group D, complete presence of reflex at 0 minute, mild presence of reflex at 5 minute. At minute 10, 15 minute no presence of reflex. Complete presence of reflex at minute 20.

| TIME (min) | Average scoring of patellar Reflex in all groups | | | | | | |
|---------------|--|---------|---------|---------|--|--|--|
| | Group A | Group B | Group C | Group D | | | |
| 0 | 1 | 1 | 1 | 1 | | | |
| 5 | 1 | 1 | 1 | 1 | | | |
| 10 | 1 | 1 | 3 | 3 | | | |
| 15 | 3 | 2 | 4 | 4 | | | |
| 20 | 4 | 4 | 2 | 3 | | | |

4.3.3 PATELLAR REFLEX

 Table No. 4.22: Average scoring of comparative analysis of patellar reflex of sedation parameters of all groups A, B, C and D

The analgesic parameters were evaluated on basis of presence of different reflexes. The patellar reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 5, 10, 15 and 20 minute. **In group A** and B complete presence of reflex of patellar at 0, 5 and 15 minutes. At minute 15, in group A mild presence of reflex and in **group B** moderate reflex. At minute 20, no presence of reflex in group A and B. **In group C** and D, complete presence of reflex at minute 0 and 5 minutes. At minutes 10 and 15, mild and no presence of reflex respectively. At 20 minute, group C showed moderate presence of reflex and group D showed moderate mild presence of reflexes.

| ГІМЕ | Average scoring of corneal Reflex in all groups | | | | | |
|------|---|---------|---------|---------|--|--|
| min) | Group A | Group B | Group C | Group D | | |
| | 1 | 1 | 1 | 1 | | |
| | 1 | 1 | 1 | 1 | | |
| 0 | 1 | 1 | 2 | 2 | | |
| 5 | 3 | 2 | 4 | 3 | | |
| 0 | 4 | 3 | 2 | 1 | | |

4.3.4 CORNEAL REFLEX

 Table No. 4.23: Average scoring of comparative analysis of corneal reflex of sedation parameters of all groups A, B, C and D

The analgesic parameters were evaluated on basis of presence of different reflexes. The corneal reflex was checked after administration of anesthetic combinations. Our results showed that animals of groups A, B, C and D showed 1, 2, 3, 3 and 4 score at 0, 5, 10, 15 and 20 minute.

Groups A, and B showed complete presence of corneal reflex at 0, 5 and 10 minutes. As similarly in group C and D at minute 0 and 5, while in both group moderate presence of corneal reflex at minute 10.

At minute 15, groups A and D showed moderate presence of corneal reflex, group B and C showed mild and no presence of reflex.

At minute 20, group A, B, C and D showed no, mild, moderate and complete presence of corneal reflexrespectively.

| | Mean values of anesthetic effect parameters Mean \pm SD | | | | |
|-------------------------------|---|--------|--------|--------|--|
| Parameters | А | B | С | D | |
| Induction of Anesthesia (min) | 5±1.5 | 6±2.1 | 2±1.1 | 3±1.5 | |
| Duration of Anesthesia (min) | 45±9.6 | 40±6.7 | 25±4.2 | 20±4.2 | |
| Recovery Time (min) | 9±2.3 | 12±3.5 | 6±2.7 | 7±3.1 | |

4.4 MONITORING ANESTHETIC EFFECT PARAMETERS

Table No. 4.24: Comparative analysis of induction time, duration of anesthesia and recovery time of Groups A, B, C and D.

The induction time is the interval from injection of anesthesia to the start of surgical state. In our study, we calculated the important parameter of induction time of different anesthetic combination. Induction time of group A, B, C and D ranged from 5 ± 1.5 , 6 ± 2.1 , 2 ± 1.1 and 3 ± 1.5 . The shortest induction time was observed in group C- Propofol treated group. The induction time of group B was longer. But overall, the group A and B fell in same range of induction time, similarly, group C and D, hadalmost similar induction time.

Duration of anesthesia of group A, B C and D ranged from 45 ± 9.6 , 40 ± 6.7 , 25 ± 4.2 and 20 ± 4.2 respectively. Shortest and longest duration of anesthesia was observed in group D (xylazine-propofol treated) and group A (xylazine-ketamine) respectively. Group A and B showed same range of duration of anesthesia while group C and D had the same length.

Recover of anesthesia of group A, B C and D ranged from 9 ± 2.31 , 2 ± 3.5 , 6 ± 2.7 and 7 ± 3.1 respectively. Shortest and longest recovery time noted in group C (xylazine-propofol treated) and B (xylazine-ketamine treated) respectively. Group A and B showed same range of recovery of anesthesia aswell as group C and D had the same.

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| Comparative analysis of induction of anesthesia (min) | | | | |
|---|-----------|---------|--|--|
| Groups | Mean ± SD | P-value | | |
| Group A | 5±1.5 | | | |
| Group B | 6±2.1 | | | |
| Group C | 2±1.1 | 0.015 | | |
| Group D | 3±1.5 | | | |

Table No. 4.25: Comparative analysis of induction of anesthesia of Group A, B, C and D.

Statistical analysis of this study showed that there was significance ($P \le 0.05$) difference in the induction of anesthesia time among all groups. As compared to all, groups D and C (xylazine-propofl) hadrelatively shorter induction of anesthesia time. While groups A and B (xylazine-ketamine) showed the longer time for the induction of anesthesia.



Graph 4.4 Comparative Mean values of Induction of Anesthesia in All Groups

| Comparative analysis of duration of anesthesia (min) | | | |
|--|-----------|---------|--|
| Groups | Mean ± SD | P-value | |
| Group A | 45±9.6 | | |
| Group B | 40±6.7 | | |
| Group C | 25±4.2 | 0.000 | |
| Group D | 20±4.2 | | |

Table No. 4.26: Comparative analysis of duration of anesthesia of Group A, B, C and D.

Statistical analysis of our study showed that there was significance ($P \le 0.05$) difference in the duration of anesthesia time among all groups. As compared to all, groups D and C (xylazine-propofl) had relatively shorter duration of anesthesia time. While groups A and B (xylazine-ketamine) showed the longer time for the duration of anesthesia.



Graph 4.5 Comparative Mean values of Duration of Anesthesia in all Groups

| Comparative analysis of induction of anesthesia (min) | | | |
|---|-----------|---------|--|
| Groups | Mean ± SD | P-value | |
| Group A | 9±2.3 | | |
| Group B | 12±3.5 | | |
| Group C | 6±2.7 | 0.05 | |
| Group D | 7±3.1 | | |

Table No. 4.27: Comparative analysis of recovery of anesthesia of Group A, B, C and D.

Statistical analysis of showed that there was significance ($P \le 0.05$) difference in the recovery period of anesthesia time among all groups. As compared to all, groups D and C (xylazine-propofl) had relatively shorter recovery period of anesthesia time. While groups A and B (xylazine-ketamine) showed the longertime for the recovery of anesthesia.



Graph 4.6 Comparative Analysis of Mean values of Recovery Time of all groups

| Time | Individua and polyg | l ALT (U/L) glactin 910 sutu | Cetamine Mean± S.D | | |
|----------|------------------------|---------------------------------|-----------------------|----|------------|
| | A1 | A2 | | | |
| Baseline | 23 | 25 | 24 | 27 | 24.75±1.70 |
| 15 mint | 28 | 31 | 30 | 32 | 30.25±1.70 |
| 30 mint | 36 | 37 | 38 | 39 | 37.50±1.29 |
| 45 mint | 38 | 39 | 42 | 40 | 39.75±1.70 |
| 60 mint | 43 | 41 | 43 | 43 | 42.50±10 |
| 16 hour | 32 | 33 | 34 | 35 | 33.50±1.29 |
| 24 hour | 22 | 26 | 24 | 27 | 24.75±2.21 |

Table No.4.28 : ALT of group A calves

The results of LFT showed that ALT was first increased then returned to baseline in group A. the values of ALT were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 24.75 ± 1.70 , 30.25 ± 1.70 , 37.50 ± 1.29 , 39.75 ± 1.70 and 42.50 ± 10 which showed overall increased in ALT values within Group A. At 16 and 24 hours- the values were 33.50 ± 1.29 and 24.75 ± 2.21 which showed overall decreased and then returned to normal baseline value (table 4.28).

4.5 BIOCHEMICAL PARAMETRS

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| Time | Individua and Chro | Ketamine Mean± S.D | | | | | |
|----------|-----------------------|-----------------------|----|----|------------|--|--|
| | B1 | B1 B2 B3 B4 | | | | | |
| Baseline | 22 | 24 | 26 | 22 | 23.50±1.91 | | |
| 15 mint | 24 | 26 | 29 | 27 | 26.50±2.08 | | |
| 30 mint | 37 | 29 | 37 | 35 | 34.50±3.78 | | |
| 45 mint | 39 | 32 | 38 | 38 | 36.75±3.20 | | |
| 60 mint | 41 | 43 | 40 | 42 | 41.50±1.29 | | |
| 16 hour | 31 | 30 | 29 | 31 | 30.25±0.95 | | |
| Baseline | 22 | 24 | 26 | 22 | 23.50±1.91 | | |

 Table No. 4.29:
 ALT of group B calves

The results of LFT showed that ALT was first increased then returned to baseline in group B. the values of ALT were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 23.50 ± 1.91 , 26.50 ± 2.08 , 34.50 ± 3.78 , 36.75 ± 3.20 and 41.50 ± 1.29 which showed overall increased in ALT values within Group B. At 16 and 24 hours- the values were 30.25 ± 0.95 and 24.75 ± 1.50 which showed overall decreased and then returned to normal baseline value (table 4.29).

| Time | Individua and poly | Individual ALT (U/L) of calves injected with Xylazine-Propofol and polyglactin 910 suture material | | | | |
|----------|-----------------------|--|----|----|------------|--|
| | C1 | C2 | C3 | C4 | | |
| Baseline | 26 | 29 | 21 | 19 | 23.75±4.34 | |
| 15 mint | 30 | 31 | 29 | 27 | 29.25±4.55 | |
| 30 mint | 39 | 38 | 37 | 35 | 37.25±3.13 | |
| 45 mint | 41 | 43 | 44 | 42 | 42.50±1.59 | |
| 60 mint | 40 | 41 | 41 | 39 | 40.25±5.31 | |
| 16 hour | 31 | 30 | 32 | 29 | 30.50±4.74 | |
| Baseline | 25 | 27 | 19 | 21 | 23.00±3.65 | |

Table No. 4.30: ALT of group C calves

The results of LFT showed that ALT was first increased then returned to baseline in group C. the values of ALT were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 23.75 ± 4.34 , 29.25 ± 4.55 , 37.25 ± 3.13 , 42.50 ± 1.59 and 40.25 ± 5.31 which showed overall increased in ALT values within Group C. At 16 and 24 hours- the values were 30.50 ± 4.74 and 23.00 ± 3.65 which showed overall decreased and then returned to normal baseline value (table 4.30).

| Time | Individual and Chroi | Propofol Mean± S.D | | | |
|----------|-------------------------|-----------------------|----------|----|------------|
| | D1 | D2 | D2 D3 D4 | | |
| Baseline | 27 | 23 | 25 | 21 | 24.00±2.58 |
| 15 mint | 32 | 29 | 30 | 26 | 29.25±2.50 |
| 30 mint | 38 | 37 | 36 | 36 | 36.75±0.95 |
| 45 mint | 42 | 41 | 40 | 42 | 41.25±0.95 |
| 60 mint | 40 | 40 | 39 | 41 | 40.00±0.81 |
| 16 hour | 35 | 31 | 30 | 29 | 31.25±2.62 |
| Baseline | 28 | 23 | 26 | 22 | 24.75±2.75 |

 Table No. 4.31: ALT of group D calves

The results of LFT showed that ALT was first increased then returned to baseline in group D. the values of ALT were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From ominute to 60 minutes, the values ranged from 24.00 ± 2.58 , 29.25 ± 2.50 , 36.75 ± 0.95 and 41.25 ± 0.95 whichshowed overall increased in ALT values within Group D. At 16 and 24 hours- the

values were 40.00 ± 0.81 and 31.25 ± 2.62 which showed overall decreased and then returned to normal baseline value (table 4.31).

| Time | Comparative mean v | alues of ALT of grou | ips A, B, C andD | | P -value |
|----------|--------------------|----------------------|------------------|------------------|----------|
| | Group A Mean± SD | Group B Mean± SD | Group C Mean± SD | Group D Mean± SD | |
| Baseline | 24.75±1.70 | 23.50±1.91 | 23.75±4.34 | 24.00±2.58 | |
| 15 mint | 30.25±1.70 | 26.50±2.08 | 29.25±4.55 | 29.25±2.50 | |
| 30 mint | 37.50±1.29 | 34.50±3.78 | 37.25±3.13 | 36.75±0.95 | |
| 45 mint | 39.75±1.70 | 36.75±3.20 | 42.50±1.59 | 41.25±0.95 | 0.000 |
| 60 mint | 42.50±10 | 41.50±1.29 | 40.25±5.31 | 40.00±0.81 | |
| 16 hour | 33.50±1.29 | 30.25±0.95 | 30.50±4.74 | 31.25±2.62 | |
| 24 hour | 24.75±2.21 | 24.75±1.50 | 23.00±3.65 | 24.75±2.75 | |

Table No. 4.32: Comparative analysis mean values of ALT (U/L) of Group A, B, C and D.

There was overall increase in the ALT values in all groups. This increase continued till 60 minute during the surgical procedure after that the values turned to normal. Statistical analysis showed the increase in all groups was significance (P \leq 0.05). Groups A and showed less variation in values as compared to groups C and D.



Graph 4.7 Comparative analysis of mean values of ALT of all groups

| 4.5.2 | ASPARTATE | AMINO | TRANFERASE (AST) | : |
|-------|-----------|-------|-------------------------|---|
|-------|-----------|-------|-------------------------|---|

| Time | Individuation and poly | al AST (U/L) glactin 910 sut | etamine Mean± S.D | | |
|----------|------------------------|---------------------------------|----------------------|-----|-------------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 79 | 83 | 87 | 91 | 85.00±5.16 |
| 15 mint | 84 | 89 | 94 | 96 | 90.75±5.37 |
| 30 mint | 87 | 97 | 99 | 104 | 96.75±7.13 |
| 45 mint | 96 | 104 | 107 | 112 | 104.75±6.70 |
| 60 mint | 102 | 109 | 112 | 117 | 110.00±6.27 |
| 16 hour | 93 | 93 | 99 | 104 | 97.25±5.31 |
| 24 hour | 80 | 81 | 88 | 92 | 85.25±5.73 |

 Table No. 4.33: AST value of group A

The results of LFT showed that AST was first increased then returned to baseline in group A. the values of AST were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 85.00 ± 5.16 , 90.75 ± 5.37 , 96.75 ± 7.13 , 104.75 ± 6.70 and 110.00 ± 6.27 which showed overall increased in AST values within Group A. At 16 and 24 hours- the values were 97.25 ± 5.31 and 85.25 ± 5.73 which showed overall decreased and then returned to normal baseline value (table 4.33).

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| Time | Individu Ketamin | azine- Mean± S.D | | | | | |
|----------|---------------------|---------------------|-----|-----|---------------------|--|--|
| | B 1 | B1 B2 B3 B4 | | | | | |
| Baseline | 80 | 93 | 86 | 89 | 87 .00 ±5.47 | | |
| 15 mint | 83 | 96 | 91 | 93 | 90.75±5.56 | | |
| 30 mint | 89 | 99 | 93 | 97 | 94.50±4.43 | | |
| 45 mint | 93 | 102 | 97 | 101 | 98.25±4.11 | | |
| 60 mint | 99 | 105 | 102 | 103 | 102.25±2.50 | | |
| 16 hour | 87 | 97 | 94 | 96 | 93.50±4.50 | | |
| 24 hour | 80 | 92 | 87 | 89 | 87.00±5.09 | | |

Table No. 4.34: AST value of group B

The results of LFT showed that AST was first increased then returned to baseline in group B. the values of AST were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 87.00 ± 5.47 , 90.75 ± 5.56 , 94.50 ± 4.43 , 98.25 ± 4.11 and 102.25 ± 2.50 which showed overall increased in AST values within Group B. At 16 and 24 hours- the values were 93.50 ± 4.50 and 87.00 ± 5.09 which showed overall decreased and then returned to normal baseline value (table 4.34).

| Time | Individua polyglact | al AST (U/L) of tin 910 suture m | ofol and Mean± S.D | | |
|----------|------------------------|-------------------------------------|-----------------------|-----|-------------|
| | C1 | C2 | | | |
| Baseline | 82 | 87 | 86 | 79 | 83.50±3.69 |
| 15 mint | 87 | 91 | 90 | 84 | 88.00±3.16 |
| 30 mint | 93 | 97 | 96 | 89 | 93.75±3.59 |
| 45 mint | 99 | 100 | 101 | 97 | 99.25±1.70 |
| 60 mint | 104 | 109 | 106 | 108 | 106.75±2.21 |
| 16 hour | 101 | 100 | 99 | 100 | 100.00±0.81 |
| 24 hour | 84 | 89 | 87 | 83 | 85.75±2.53 |

Table No. 4.35: AST value of group C

The results of LFT showed that AST was first increased then returned to baseline in group C. the values of AST were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From o minute to 60 minutes, the values ranged from 83.50 ± 3.69 , 88.00 ± 3.16 , 93.75 ± 3.59 , 99.25 ± 1.70 and 106.75 ± 2.21 which showed overall increased in AST values within Group C. at 16 and 24 hours- the values were 100.00 ± 0.81 and 85.75 ± 2.53 which showed overall decreased and then returned to normal baseline value (table 4.35).

| | Individua Chromic | ofol and | | | |
|----------|----------------------|----------|-----|-----|-------------|
| Time | D1 | D2 | D3 | D4 | Mean± S.D |
| Baseline | 83 | 80 | 88 | 85 | 84.00±3.36 |
| 15 mint | 86 | 87 | 93 | 91 | 89.25±3.30 |
| 30 mint | 89 | 94 | 101 | 98 | 95.50±5.19 |
| 45 mint | 100 | 103 | 114 | 107 | 106.00±6.05 |
| 60 mint | 112 | 117 | 121 | 119 | 117.25±3.86 |
| 16 hour | 101 | 99 | 111 | 106 | 104.25±5.37 |
| 24 hour | 82 | 81 | 94 | 89 | 86.50±6.13 |

Table No. 4.36: AST value of group D

The results of LFT showed that AST was first increased then returned to baseline in group D. the values of AST were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From ominute to 60 minutes, the values ranged from 84.00±3.36, 89.25±3.30, 95.50±5.19, and

 $106.00\pm6.05\ 117.25\pm3.86$ which showed overall increased in AST values within Group D. at 16 and 24 hours- the values were 104.25 ± 5.37 and 86.50 ± 6.13 which showed overall decreased and then returned to normal baseline value (table 4.36).

| Time | Group A | Group B | Group C | Group D | P Value |
|----------|------------|------------|-------------|-------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 85±5.16 | 87±5.47 | 83.5±3.69 | 84.00±3.36 | |
| 15 mint | 90.75±5.37 | 90.75±5.56 | 88±3.16 | 89.25±3.30 | |
| 30 mint | 96.75±7.13 | 94.5±4.43 | 93.75±3.59 | 95.50±5.19 | |
| 45 mint | 104.75±6.7 | 98.25±4.11 | 99.25±1.71 | 106.00±6.05 | |
| 60 mint | 110±6.27 | 102.25±2.5 | 106.75±2.22 | 117.25±3.86 | |
| 16 hour | 97.25±5.31 | 93.5±4.51 | 100±0.82 | 104.25±5.37 | 0.000 |
| 24 hour | 85.25±5.73 | 87±5.09 | 85.75±2.75 | 86.50±6.14 | 0.000 |

Table No. 4.37: Comparative analysis means values of AST (U/L) of Group A, B, C and D.

There was overall increase in the AST values in all groups. This increase continued till 60 minute during the surgical procedure after that the values turned to normal. Statistical analysis showed the increase in all groups was significance (P \leq 0.05). Groups A and B showed less variation in values as compared to groups C and D.



Graph 4.8 Comparative analysis of mean values of AST of all groups

| Time | Individua polyglact | amine and Mean± S.D | | | |
|----------|------------------------|------------------------|-----|-----|--------------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 288 | 246 | 273 | 291 | 274.50±20.56 |
| 15 mint | 297 | 258 | 289 | 311 | 288.75±22.42 |
| 30 mint | 324 | 273 | 302 | 339 | 309.50±28.68 |
| 45 mint | 347 | 286 | 324 | 349 | 326.50±29.28 |
| 60 mint | 386 | 295 | 356 | 377 | 353.50±40.97 |
| 16 hour | 314 | 260 | 321 | 324 | 304.75±30.12 |
| 24 hour | 293 | 245 | 289 | 293 | 280.00±23.40 |

4.5.3 ALKALINE PHOSPHATASE (ALP):

 Table No. 4.38: ALP value of group A

The results of LFT showed that ALP was first increased then returned to baseline in group A. the values of ALP were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From ominute to 60 minutes, the values ranged from 274.50 ± 20.56 , 288.75 ± 22.42 , 309.50 ± 28.68 , 326.50 ± 29.28 and 353.50 ± 40.97 which showed overall increased in ALP values within Group A. at 16 and 24 hours-the values were 304.75 ± 30.12 and 280.00 ± 23.40 which showed overall decreased and then returned to normal baseline value (table 4.38)

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| Time | Individual Xylazine-Ke | ALP (U/L) tamine and | of calves d Chromic | injected with catgut suturematerial | Mean± S.D |
|----------|---------------------------|-------------------------|------------------------|--|--------------|
| | B1 | B2 | B3 | B4 | |
| Baseline | 257 | 269 | 283 | 295 | 276.00±16.53 |
| 15 mint | 269 | 287 | 309 | 324 | 297.25±24.19 |
| 30 mint | 291 | 301 | 328 | 344 | 316.00±24.34 |
| 45 mint | 324 | 332 | 344 | 386 | 346.50±27.58 |
| 60 mint | 341 | 361 | 392 | 408 | 375.50±30.16 |
| 16 hour | 298 | 288 | 331 | 339 | 314.00±24.80 |
| 24 hour | 260 | 268 | 287 | 297 | 278.00±16.99 |

Table No. 4.39: ALP value of group B

The results of LFT showed that ALP was first increased then returned to baseline in group B. the values of ALP were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From ominute to 60 minutes, the values ranged from 276.00 ± 16.53 , 297.25 ± 24.19 , 316.00 ± 24.34 , 346.50 ± 27.58 and 375.50 ± 30.16 which showed overall increased in ALP values within Group B. at 16 and 24 hours-the values were 314.00 ± 24.80 and 278.00 ± 16.99 which showed overall decreased and then returned to normal baseline value (table 4.39).

| | Individual A | ALP (U/L) | of calves in | jected with Xylazine- | |
|----------|--------------|---------------|---------------|-----------------------|--------------|
| Time | Propofol and | polyglactin 9 | 10 suture mat | terial | Mean± S.D |
| | C1 | C2 | C3 | C4 | |
| Baseline | 246 | 253 | 291 | 304 | 273.50±28.36 |
| 15 mint | 276 | 286 | 324 | 331 | 304.25±27.30 |
| 30 mint | 298 | 297 | 376 | 371 | 335.50±43.92 |
| 45 mint | 356 | 324 | 398 | 393 | 367.75±34.66 |
| 60 mint | 376 | 386 | 412 | 417 | 397.75±19.87 |
| 16 hour | 301 | 317 | 356 | 360 | 333.50±29.08 |
| 24 hour | 251 | 260 | 307 | 306 | 281/00±29.67 |

Table No. 4.40: ALP value of group C

The results of LFT showed that ALP was first increased then returned to baseline in group C. the values of ALP were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From 0

minute to 60 minutes, the values ranged from 273.50 ± 28.36 , 304.25 ± 27.30 , 335.50 ± 43.92 , 367.75 ± 34.66 and 397.75 ± 19.87 which showed overall increased in ALP values within Group C. at 16 and 24 hours-the values were 333.50 ± 29.08 and $281/00\pm29.67$ which showed overall decreased and then returned to normal baseline value (table 4.40).

| Time | Individua Propofol | Individual ALP (U/L) of calves injected with Xylazine- Propofol and Chromic catgut suture material | | | | |
|----------|-----------------------|---|-----|-----|--------------|--|
| | D 1 | D2 | D3 | D4 | | |
| Baseline | 219 | 247 | 276 | 310 | 263.00±39.02 | |
| 15 mint | 244 | 286 | 312 | 336 | 294.50±39.37 | |
| 30 mint | 298 | 324 | 363 | 379 | 341.00±36.81 | |
| 45 mint | 324 | 348 | 414 | 419 | 376.25±47.54 | |
| 60 mint | 363 | 391 | 436 | 451 | 410.25±40.52 | |
| 16 hour | 286 | 311 | 341 | 386 | 331.00±43.01 | |
| 24 hour | 220 | 260 | 280 | 317 | 269.25±40.44 | |

| Table No. 4.41: ALP value of group | D |
|---|---|
|---|---|

The results of LFT showed that ALP was first increased then returned to baseline in group D. the values of ALP were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From 0

minute to 60 minutes, the values ranged from 263.00±39.02, 294.50±39.37, 341.00±36.81, 376.25±47.54 and 410.25±40.52 which showed overall increased in ALP values within Group D. at 16 and 24 hours-the values were 331.00±43.01 and 269.25±40.44 which showed overall decreased and then returned to normal baseline value (table 4.41).

| Time | Group A | Group B | Group C | Group D | P Value |
|----------|--------------|--------------|--------------------|--------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 274.50±20.56 | 276±16.53.00 | 273.50±28.36 | 263.00±39.02 | |
| 15 mint | 288.75±22.42 | 297.25±24.19 | 304.25±27.31 | 294.50±39.37 | |
| 30 mint | 309.50±28.68 | 316.00±24.34 | 335.50±43.92 | 341.00±36.81 | |
| 45 mint | 326.50±29.28 | 346.50±27.58 | 367.75±34.66 | 376.25±47.54 | |
| 60 mint | 353.50±40.97 | 375.50±30.16 | 397.75±19.87 | 410.25±40.53 | 0.000 |
| 16 hour | 304.75±30.12 | 314.00±24.81 | 333.50±29.08 | 331.00±43.01 | |
| 24 hour | 280±23.41.00 | 278.00±16.99 | 281.00 ± 29.67 | 269.25±40.44 | |

Table No. 4.42: Comparative analysis means values of ALP (U/L) of Group A, B, C and D.

There was overall increase in the ALP values in all groups. This increase continued till 60 minute during the surgical procedure after that the values turned to normal. Statistical analysis showed the increase inall groups was significance ($P \le 0.05$). Groups A and showed less variation in values as compared to groups C and D.



Graph 4.9 Comparative analysis of mean values of ALP of all groups

4.5.4 : KIDNEY FUNCTION TEST

a) **CREATININE**

| Time | Individua Xylazine- | ith Mean± S.D | | | |
|----------|------------------------|------------------|---------------|----------------------|-----------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 0.92 | 0.86 | 0.91 | 0.89 | 0.89±0.02 |
| 15 mint | 1.21 | 1.16 | 1.19 | 1.07 | 1.16±0.06 |
| 30 mint | 1.29 | 1.23 | 1.22 | 1.31 | 1.26±0.04 |
| 45 mint | 1.36 | 1.39 | 1.36 | 1.39 | 1.38±0.01 |
| 60 mint | 1.42 | 1.48 | 1.44 | 1.47 | 1.45±0.02 |
| 16 hour | 1.31 | 1.21 | 1.36 | 1.32 | 1.30±0.06 |
| 24 hour | 1.16 | 1.01 | 1.14 | 1.11 | 1.11±0.06 |
| | Tah | le No. 4 43. Cr | eatinine leve | l (mg/dl) in group A | |

| Table No. 4.43: | Creatinine le | evel (mg/dl) | in group A |
|-----------------|---------------|--------------|------------|
|-----------------|---------------|--------------|------------|

The results of RFT showed that Creatinine was first increased then returned to baseline in group A. the values of Creatinine were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours.

From 0 minute to 60 minutes, the values ranged from 0.89 ± 0.02 , 1.16 ± 0.06 , 1.26 ± 0.04 , 1.38 ± 0.01 and 1.45 ± 0.02 which showed overall increased in Creatinine values within Group A. at 16 and 24 hours- the values were 1.30 ± 0.06 and 1.11 ± 0.06 which showed overall decreased and then returned to normal baseline value (table 4.43).

| Time | Individu Xylazino | Individual Creatinine (mg/dl) of calves injected with Xylazine-Ketamine and Chromic catgut suture material | | | | | |
|----------|----------------------|--|-----------|-----------|-----------|--|--|
| | B1 | B2 | B3 | B4 | | | |
| Baseline | 0.93 | 0.86 | 0.87 | 1.13 | 0.94±0.12 | | |
| 15 mint | 1.17 | 1.07 | 0.99 | 1.26 | 1.12±0.11 | | |
| 30 mint | 1.22 | 1.35 | 1.27 | 1.38 | 1.30±0.07 | | |
| 45 mint | 1.37 | 1.41 | 1.41 | 1.47 | 1.41±0.04 | | |
| 60 mint | 1.46 | 1.49 | 1.52 | 1.53 | 1.50±0.03 | | |
| 16 hour | 1.31 | 1.32 | 1,33 | 1.29 | 1.30±0.01 | | |
| 24 hour | 1.06 | 1.09 | 0.99 | 1.19 | 1.08±0.08 | | |

 Table No. 4.44: Creatinine level (mg/dl) in group B

The results of RFT showed that Creatinine was first increased then returned to baseline in group B. the values of Creatinine were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours.

From 0 minute to 60 minutes, the values ranged from 0.94 ± 0.12 , 1.12 ± 0.11 , 1.30 ± 0.07 , 1.41 ± 0.04 and 1.50 ± 0.03 which showed overall increased in Creatinine values within Group B. at 16 and 24 hours- the values were 1.30 ± 0.01 and 1.08 ± 0.08 which showed overall decreased and then returned to normal baseline value (table 4.44).

| Time | Individual Xylazine-Pi | Mean± S.D | | | |
|----------|---------------------------|-----------|------|------|-----------|
| | C1 | C2 | C3 | C4 | |
| Baseline | 1.4 | 1.73 | 2.02 | 1.92 | 1.76±0.27 |
| 15 mint | 1.35 | 1.59 | 2 | 1.69 | 1.65±0.26 |
| 30 mint | 1.27 | 1.53 | 1.89 | 1.57 | 1.56±0.25 |
| 45 mint | 1.16 | 1.46 | 1.76 | 1.49 | 1.46±0.24 |
| 60 mint | 1.18 | 1.44 | 1.73 | 1.5 | 1.46±0.22 |
| 16 hour | 1.29 | 1.51 | 1.81 | 1.73 | 1.58±0.23 |
| 24 hour | 1.36 | 1.67 | 1.99 | 1.9 | 1.73±0.28 |

 Table No. 4.45: Creatinine level (mg/dl) in group C

The results of RFT showed that Creatinine was first decreased then returned to baseline in group C. the values of Creatinine were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours.

From 0 minute to 60 minutes, the values ranged from 1.76 ± 0.27 , 1.65 ± 0.26 , 1.56 ± 0.25 , 1.46 ± 0.24 and 1.46 ± 0.22 which showed overall decreased in Creatinine values within Group C. at 16 and 24 hours- the values were 1.58 ± 0.23 and 1.73 ± 0.28 which showed overall increased and then returned to normal baseline value (table 4.45).

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| Time | Individua Propofol a | ylazine- Mean± S.D | | | |
|----------|-------------------------|-----------------------|------|------------|-----------|
| | D1 | D2 | D3 | D 4 | |
| Baseline | 1.6 | 1.77 | 1.23 | 1.38 | 1.49±0.23 |
| 15 mint | 1.53 | 1.63 | 1.21 | 1.35 | 1.43±0.18 |
| 30 mint | 1.42 | 1.51 | 1.11 | 1.23 | 1.31±0.18 |
| 45 mint | 1.36 | 1.46 | 1.01 | 1.17 | 1.25±0.20 |
| 60 mint | 1.29 | 1.33 | O.98 | 1.08 | 1.23±0.13 |
| 16 hour | 1.43 | 1.39 | 1.04 | 1.12 | 1.24±0.19 |
| 24 hour | 1.62 | 1.67 | 1.19 | 1.29 | 1.44±0.23 |

Table No. 4.46: Creatinine level (mg/dl) in group D

The results of RFT showed that Creatinine was first decreased then returned to baseline in group D. the values of Creatinine were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours.

From 0 minute to 60 minutes, the values ranged from 1.49 ± 0.23 , 1.43 ± 0.18 , 1.31 ± 0.18 , 1.25 ± 0.20 and 1.23 ± 0.13 which showed overall decreased in Creatinine values within Group D. at 16 and 24 hours- the values were 1.24 ± 0.19 and 1.44 ± 0.23 which showed overall increased and then returned to normal baseline value (table 4.46).

| Time | Group A | Group B | Group C | Group D | P Value |
|----------|-----------|-----------|-----------|-----------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 0.89±0.02 | 0.94±0.12 | 1.76±0.27 | 1.49±0.24 | |
| 15 mint | 1.15±0.06 | 1.12±0.12 | 1.65±0.26 | 1.43±0.18 | |
| 30 mint | 1.26±0.04 | 1.31±0.07 | 1.56±0.25 | 1.32±0.18 | |
| 45 mint | 1.37±0.02 | 1.42±0.04 | 1.46±0.24 | 1.25±0.2 | |
| 60 mint | 1.45±0.02 | 1.50±0.03 | 1.46±0.23 | 1.23±0.13 | 0.002 |
| 16 hour | 1.30±0.06 | 1.31±0.02 | 1.58±0.23 | 1.24±0.19 | 0.002 |
| 24 hour | 1.11±0.06 | 1.08±0.08 | 1.73±0.28 | 1.44±0.24 | |

Table No. 4.47: Comparative analysis mean values of Creatinine (mg/dl) of groups A, B, C and D.

Statistical analysis showed the significance difference in all groups. Group A and B showed the increase in Creatinine values up to 60 minutes and after that it turned to normal. In groups C and D (xylazine- propofl) showed the decreased in the creatinine values up to 60 minutes that it turned to normal/ baseline values.



Graph 4.10 Comparative analysis of mean values of creatinine in all groups

| Time | Individua polyglact | Individual BUN (mg/dl) of calves injected withXylazine-Ketamine and polyglactin 910 suture material | | | | |
|----------|------------------------|--|------|------|----------------|--|
| | A1 | A2 | A3 | A4 | | |
| Baseline | 7.41 | 7.12 | 8.15 | 7.76 | 7.61±0.44 | |
| 15 mint | 8.45 | 8.23 | 8.89 | 8.54 | 8.52±0.27 | |
| 30 mint | 9.05 | 8.97 | 9.76 | 9.21 | 9.24±0.35 | |
| 45 mint | 9.01 | 8.64 | 9.53 | 8.89 | 9.01±0.37 | |
| 60 mint | 8.76 | 8.02 | 9.03 | 8.62 | 8.60±0.42 | |
| 16 hour | 8.3 | 7.76 | 8.89 | 8.07 | 8.25±0.47 | |
| 24 hour | 7.61 | 7.43 | 8.63 | 7.91 | $7.89 \pm .52$ | |

4.5.5 BLOOD UREA NITROGEN (BUN)

Table No. 4.48: BUN value (mg/dl) in group A

The results of RFT showed that BUN value was first increased then returned to baseline in group A. the values of BUN were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From 0minute to 30 minutes, the values ranged from 7.61 ± 0.44 , 8.52 ± 0.27 and 9.24 ± 0.35 which showed overall increased in BUN values within Group A. At 45 and 60 minutes, 16 and 24 hours-the values were 9.01 ± 0.37 , 8.60 ± 0.42 , 8.25 ± 0.47 and $7.89\pm.52$ which showed overall decreased and then returned to normal baseline value (table 4.48).

| | Individu and Chr | -Ketamine | | | |
|----------|---------------------|-----------|------|------|-----------|
| Time | B1 | B2 | B3 | B4 | Mean± S.D |
| Baseline | 7.3 | 6.2 | 9.3 | 8.1 | 8.21±1.30 |
| 15 mint | 8.5 | 7.3 | 9.9 | 9.1 | 9.28±1.09 |
| 30 mint | 9.7 | 8.9 | 10.7 | 10.2 | 9.63±0.76 |
| 45 mint | 9.4 | 8.5 | 9.9 | 9.8 | 9.03±0.63 |
| 60 mint | 8.3 | 7.7 | 9.5 | 9.2 | 8.50±0.82 |
| 16 hour | 8 | 7.2 | 9.2 | 8.9 | 8.01±0.90 |
| 24 hour | 7.4 | 6.2 | 8.9 | 8.3 | 7.70±1.17 |

Table No. 4.49: BUN value (mg/dl) in group B

The results of RFT showed that BUN value was first increased then returned to baseline in group B. the values of BUN were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From 0 minute to 30 minutes, the values ranged from 8.21 ± 1.30 , 9.28 ± 1.09 and 9.63 ± 0.76 which showed overall increased in BUN values within Group B. At 45 and 60 minutes, 16 and 24 hours- the values were 9.03 ± 0.63 , 8.50 ± 0.82 , 8.01 ± 0.90 and 7.70 ± 1.17 which showed overall decreased and then returned to normal baseline value (table 4.49).

| Time | Individu Propofol | al BUN (mg/d and polyglact | lazine- Mean± S.D | | |
|----------|----------------------|-------------------------------|----------------------|-------|------------|
| | C1 | C2 | C3 | C4 | |
| Baseline | 13.1 | 10 | 14 | 11 | 12.02±1.84 |
| 15 mint | 16.5 | 10.76 | 15 | 11.4 | 13.41±2.77 |
| 30 mint | 17 | 11.25 | 16.7 | 11.96 | 14.22±3.04 |
| 45 mint | 17.4 | 12.01 | 16.9 | 12.25 | 14.64±2.90 |
| 60 mint | 17.9 | 12.36 | 17.1 | 12.65 | 15.00±2.90 |
| 16 hour | 15.4 | 11.96 | 16.65 | 12.05 | 14.01±2.37 |
| 24 hour | 13.5 | 10.9 | 15.83 | 11.3 | 12.88±2.27 |

Table No. 4.50: BUN value (mg/dl) in group C

The results of RFT showed that BUN value was first increased then returned to baseline in group C. the values of BUN were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours.

From 0 minute to 60 minutes, the values ranged from 12.02 ± 1.84 , 13.41 ± 2.77 , 14.22 ± 3.04 , 14.64 ± 2.90 and 15.00 ± 2.90 which showed overall increased in BUN values within Group C. At 16 and 24 hours- the values were 14.01 ± 2.37 and 12.88 ± 2.27 which showed overall decreased and then returned to normal baseline value (table 4.50).

| Time | Individual and Chror | Individual BUN (mg/dl) of calves injected withXylazine-Propofol and Chromic catgut suture material | | | | | |
|----------|-------------------------|---|-------|-------|------------|--|--|
| | D1 | D2 | D3 | D4 | | | |
| Baseline | 12.5 | 15.01 | 17 | 9.5 | 13.50±3.24 | | |
| 15 mint | 13.7 | 15.7 | 17.96 | 10.4 | 14.44±3.20 | | |
| 30 mint | 14.2 | 16.15 | 18.43 | 10.9 | 14.92±3.18 | | |
| 45 mint | 15.01 | 16.75 | 18.9 | 11.12 | 15.44±3.29 | | |
| 60 mint | 14.96 | 17.19 | 19.5 | 11.1 | 15.68±3.57 | | |
| 16 hour | 13.86 | 16.06 | 18.9 | 10.76 | 14.89±3.44 | | |
| 24 hour | 12.9 | 15.37 | 18.1 | 9.6 | 13.99±3.61 | | |

Table No. 4.51: BUN value (mg/dl) in group D

The results of RFT showed that BUN value was first increased then returned to baseline in group D. the values of BUN were recorded at baseline, 15, 30, 45, 60 minutes and then 16 and 24 hours. From 0 minute to 60 minutes, the values ranged from 13.50 ± 3.24 , 14.44 ± 3.20 , 14.92 ± 3.18 , 15.44 ± 3.29 and 15.68 ± 3.57 which showed overall increased in BUN values within Group D. At 16 and 24 hours- the values were 14.89 ± 3.44 and 13.99 ± 3.61 which showed overall decreased and then returned to normal baseline value (table 4.50).

| Time | Group A | Group B | Group C | Group D | P Value |
|----------|-----------|-----------|------------------|------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 7.61±0.44 | 8.21±1.30 | 12.02±1.84 | 13.50±3.24 | |
| 15 mint | 8.52±0.27 | 9.28±1.09 | 13.41±2.77 | 14.44±3.21 | |
| 30 mint | 9.24±0.35 | 9.63±0.76 | 14.22±3.04 | 14.92±3.18 | |
| 45 mint | 9.01±0.37 | 9.03±0.63 | 14.64±2.91 | 15.44±3.29 | |
| 60 mint | 8.60±0.42 | 8.50±0.82 | 15.002±2.9 | 15.68±3.57 | 0.000 |
| 16 hour | 8.25±0.47 | 8.01±0.90 | 14.01±2.37 | 14.89±3.44 | 0.000 |
| 24 hour | 7.89±0.52 | 7.70±1.17 | 12.88 ± 2.27 | 13.99±3.62 | |

Table No. 4.52: Comparative analysis mean values of BUN (mg/dl) of groups A, B, C and D.

Statistical analysis showed significance ($P \le 0.05$) increase in the BUN values in all groups. Increasing BUN values continued overall up to 60 minute in Group C and D and up to 30 minutes in groups A and B. In group D more increased in BUN valued showed as compared to all other groups.



Graph 4.11 Comparative analysis of mean values of BUN in all group

| Time | Individua Xylazine- | th Mean± S.D | | | |
|----------|------------------------|-----------------|------|------|-----------------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 0.47 | 0.49 | 0.53 | 0.57 | 0.51±0.04 |
| PAI | 0.44 | 0.46 | 0.51 | 0.56 | 0.49 ± 0.05 |
| 30 mint | 0.48 | 0.51 | 0.55 | 0.58 | 0.53±0.04 |
| 60 mint | 0.67 | 0.71 | 0.73 | 0.79 | 0.72±0.05 |
| 24 hour | 0.80 | 0.83 | 0.84 | 0.87 | 0.83±0.03 |
| 3 day | 0.63 | 0.66 | 0.61 | 0.71 | 0.65 ± 0.04 |
| 7 day | 0.48 | 0.47 | 0.54 | 0.56 | 0.51±0.04 |

4.5.1 : CORTISOL LEVEL

 Table No. 4.53: Cortisol level in group A

The results of cortisol showed that value was first decreased at PAI then increased up-to 24 hour and then returned to baseline in group A. The values of cortisol were recorded at baseline, PAI, 30, 60 minutes and 24, hours and then 3^{rd} and 7^{th} day. First from 0 minute 0.51 ± 0.04 to PAI interval 0.49 ± 0.05 , values decreased. From 30 minutes to 24 hour, values ranged 0.53 ± 0.04 , 0.72 ± 0.05 and 0.83 ± 0.03 which showed overall increased in cortisol values within Group A. At 3^{rd} and 7^{th} day the values were 0.65 ± 0.04 and 0.51 ± 0.04 which showed overall decreased and then returned to normal baseline value (table 4.53).

| | Individual C | ortisol (micros | gram/dl) of c | alves injected with | |
|----------|---------------|-----------------|---------------|---------------------|-----------|
| Time | Xylazine-Prop | Mean± S.D | | | |
| | B1 | B2 | B3 | B4 | |
| Baseline | 0.48 | 0.5 | 0.49 | 0.55 | 0.50±0.03 |
| PAI | 0.42 | 0.46 | 0.43 | 0.49 | 0.45±0.03 |
| 30 mint | 0.51 | 0.52 | 0.51 | 0.57 | 0.52±0.03 |
| 60 mint | 0.67 | 0.69 | 0.71 | 0.74 | 0.70±0.03 |
| 24 hour | 0.89 | 0.92 | 0.95 | 0.97 | 0.93±0.04 |
| 3 day | 0.63 | 0.7 | 0.74 | 0.7 | 0.69±0.05 |
| 7 day | 0.49 | 0.51 | 0.48 | 0.56 | 0.51±0.04 |

 Table No. 4.54: Cortisol level in group B

The results of cortisol showed that value was first decreased at PAI then increased up-to 24 hour and then returned to baseline in group B. The values of cortisol were recorded at baseline, PAI, 30, 60 minutes and 24, hours and then 3^{rd} and 7^{th} day. First from 0 minute 0.50 ± 0.03 to PAI interval 0.45 ± 0.03 , values decreased. From 30 minutes to 24 hour, values ranged 0.52 ± 0.03 , 0.70 ± 0.03 and 0.93 ± 0.04 which showed overall increased in cortisol values within Group B. At 3^{rd} and 7^{th} day the values were 0.69 ± 0.05 and 0.51 ± 0.04 which showed overall decreased and then returned to normal baseline value (table 4.54).

| Time | Individua with Xyla | Mean± S.D | | | |
|----------|------------------------|-----------|------|------|-----------------|
| | C1 | C2 | C3 | C4 | |
| Baseline | 0.47 | 0.53 | 0.49 | 0.52 | 0.50±0.03 |
| PAI | 0.46 | 0.51 | 0.47 | 0.51 | 0.48±0.03 |
| 30 mint | 0.53 | 0.57 | 0.55 | 0.56 | 0.55 ± 0.02 |
| 60 mint | 0.61 | 0.66 | 0.63 | 0.65 | 0.63 ± 0.02 |
| 24 hour | 0.72 | 0.79 | 0.75 | 0.77 | 0.75±0.03 |
| 3 day | 0.59 | 0.63 | 0.6 | 0.61 | 0.60 ± 0.02 |
| 7 day | 0.48 | 0.52 | 0.48 | 0.53 | 0.50±0.03 |

Table No. 4.55: Cortisol level in group C

The results of cortisol showed that value was first decreased at PAI then increased up-to 24 hour and then returned to baseline in group C. the values of cortisol were recorded at baseline, PAI, 30, 60 minutes and 24, hours and then 3^{rd} and 7^{th} day. First from 0 minute 0.50 ± 0.03 to PAI interval 0.48 ± 0.03 , values decreased. From 30 minutes to 24 hour, values ranged 0.55 ± 0.02 , 0.63 ± 0.02 and 0.75 ± 0.03 which showed overall increased in cortisol values within Group C. At 3^{rd} and 7^{th} day the values were 0.60 ± 0.02 and 0.50 ± 0.03 which showed overall decreased and then returned to normal baseline value (table 4.55).

| Time | Individu Xylazine | h Mean± S.D | | | |
|----------|----------------------|----------------|------|------|-----------------|
| | D1 | D2 | D3 | D4 | |
| Baseline | 0.51 | 0.5 | 0.49 | 0.54 | 0.51 ± 0.02 |
| PAI | 0.5 | 0.48 | 0.48 | 0.51 | 0.49 ± 0.01 |
| 30 mint | 0.58 | 0.56 | 0.57 | 0.61 | 0.58 ± 0.02 |
| 60 mint | 0.67 | 0.63 | 0.67 | 0.69 | 0.66 ± 0.03 |
| 24 hour | 0.84 | 0.79 | 0.87 | 0.9 | 0.85 ± 0.05 |
| 3 day | 0.69 | 0.63 | 0.67 | 0.63 | 0.65 ± 0.03 |
| 7 day | 0.52 | 0.51 | 0.5 | 0.53 | 0.51 ± 0.01 |

 Table No. 4.56: Cortisol level in group D

The results of cortisol showed that value was first decreased at PAI then increased up-to 24 hour and then returned to baseline in group D. the values of cortisol were recorded at baseline, PAI, 30, 60 minutes and 24, hours and then 3^{rd} and 7^{th} day. First from 0 minute 0.51 ± 0.02 to PAI interval 0.49 ± 0.01 , values decreased. From 30 minutes to 24 hour, values ranged 0.58 ± 0.02 , 0.66 ± 0.03 and 0.85 ± 0.05 which showed overall increased in cortisol values within Group D. At 3^{rd} and 7^{th} day the values were 0.65 ± 0.03 and 0.51 ± 0.01 which showed overall decreased and then returned to normal baseline value (table 4.56).

| Time | Group A | Group B | Group C | Group D | P Value |
|----------|-----------------|-----------------|-----------------|-----------------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 0.52±0.04 | 0.50±0.03 | 0.50±0.02 | 0.51±0.02 | |
| PAI | 0.49 ± 0.05 | 0.45 ± 0.03 | 0.48 ± 0.02 | 0.49±0.01 | |
| 30 mint | 0.53±0.04 | 0.52±0.03 | 0.55±0.01 | 0.58±0.02 | |
| 60 mint | 0.72±0.05 | 0.70±0.03 | 0.64 ± 0.02 | 0.66±0.03 | |
| 24 hour | 0.83±0.03 | 0.93±0.04 | 0.75±0.02 | 0.85 ± 0.05 | 0.000 |
| 3 day | 0.65 ± 0.04 | 0.69 ± 0.05 | 0.61±0.01 | 0.65±0.03 | |
| 7 day | 0.51±0.04 | 0.51±0.04 | 0.50 ± 0.02 | 0.51±0.01 | |

 Table No.4.57: Comparative analysis mean values Cortisol level (microgram/dl) of groups A, B, C and D.

There was overall increase in cortisol level in all groups. Significance ($P \le 0.5$) difference showed in all group. Group B (xylazine-ketamine along with chromic catgut) showed highest increase cortisol and group C (xylazine-propofol along with polyglactin 910) showed lowest increase in cortisol level.

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Graph 4.12 Comparative Analysis of Mean values of Cortisol level in all groups

| 4.6 | HEAMATOI | LOGICA | AL PAH | RAMETER | 5 |
|--------------|------------------|---------------|---------------|---------|---|
| a).] | RED BLOOD | CELL (| $(10^{12}/L)$ |) | |

| Time | Individual Ketamine a | Individual RBC (10 ¹² /L) of calves injected with Xylazine- Ketamine and polyglactin 910 suture material | | | | | |
|------------|--------------------------|--|------|------|-----------|--|--|
| | A1 | A2 | A3 | A4 | | | |
| Baseline | 6.92 | 6.74 | 6.17 | 6.23 | 6.51±0.37 | | |
| 45 Minutes | 5.75 | 5.35 | 5.07 | 5.19 | 5.34±0.29 | | |
| 16 Hour | 6.4 | 5.99 | 5.83 | 5.77 | 5.99±0.28 | | |
| 24 Hour | 8.12 | 7.67 | 7.49 | 7.53 | 7.70±0.28 | | |
| 48 Hour | 7.83 | 7.42 | 7.17 | 7.36 | 7.44±0.27 | | |
| 72 Hour | 7.42 | 7.23 | 6.9 | 7.01 | 7.14±0.23 | | |
| 7 Day | 6.95 | 6.8 | 6.2 | 6.24 | 6.54±0.38 | | |

Table No. 4.58: Red Blood cell of group A

There was overall decreased, increased and then value returned to baseline at day 7th.

The red blood count was noted during and after the surgical procedure in group A. At 45 minutes, the value was 5.34 ± 0.29 decreased from baseline value 6.51 ± 0.37 . The blood was taken at 16, 24 and 48 hours and values 5.99 ± 0.28 , 7.70 ± 0.28 and 7.44 ± 0.27 were noted. Then at 3rd and 7th day, values of RBC were checked which ranged 7.14 ± 0.23 and 6.54 ± 0.38 .

| Time | Individual RBC (10 ¹² /L) of calves injected with Xylazine-Ketamine and Chromic Catgut sutureMaterial | | | | Mean+ S.D |
|------------|---|------|------|------|-----------|
| | B1 | B2 | B3 | B4 | |
| Baseline | 6.45 | 6.67 | 6.81 | 6.39 | 6.58±0.19 |
| 45 Minutes | 5.24 | 5.41 | 5.59 | 5.19 | 5.35±0.18 |
| 16 Hour | 6.23 | 6.43 | 6.67 | 6.29 | 6.40±0.19 |
| 24 Hour | 8.31 | 8.29 | 8.43 | 8.54 | 8.39±0.11 |
| 48 Hour | 7.73 | 7.71 | 7.83 | 7.67 | 7.73±0.06 |
| 72 Hour | 7.28 | 7.31 | 7.46 | 7.21 | 7.31±0.10 |
| 7 Day | 6.47 | 6.7 | 6.83 | 6.43 | 6.60±0.19 |

 Table No. 4.59: Red Blood cell of group B

There was overall decreased, increased and then value returned to baseline at day 7th. The red blood

count was noted during and after the surgical procedure in group B. At 45 minutes, the value was 5.35 ± 0.18 decreased from baseline value 6.58 ± 0.19 . The blood was taken at 16, 24 and 48 hours and values 6.40 ± 0.19 , 8.39 ± 0.11 and 7.73 ± 0.06 were noted. Then at 3rd and 7th day, values of RBC were checked which ranged 7.31 ± 0.10 and 6.60 ± 0.19 .

| Time | Individua Propofol | Individual RBC (10 ¹² /L) of calves injected withXylazine- Propofol and polyglactin 910 suture Material | | | | |
|------------|-----------------------|---|------|------|------------|--|
| | C1 | C2 | C3 | C4 | | |
| Baseline | 7.19 | 6.14 | 6.9 | 6.07 | 6.575±0.55 | |
| 45 Minutes | 6.23 | 5.12 | 6.02 | 5.21 | 5.64±0.56 | |
| 16 Hour | 6.92 | 5.99 | 6.84 | 5.83 | 6.39±0.56 | |
| 24 Hour | 9.41 | 8.83 | 9.37 | 8.49 | 9.02±0.44 | |
| 48 Hour | 8.97 | 8.24 | 8.81 | 7.91 | 8.48±0.49 | |
| 72 Hour | 8.04 | 7.54 | 7.67 | 7.23 | 7.62±0.33 | |
| 7 Day | 7.23 | 6.17 | 6.89 | 6.1 | 6.59±0.55 | |

Table No. 4.60: Red Blood cell of group C

There was overall decreased, increased and then value returned to baseline at day 7th. The red blood count was noted during and after the surgical procedure in group C. At 45 minutes, the value was 5.64 ± 0.56 decreased from baseline value 6.575 ± 0.55 . The blood was taken at 16, 24 and 48 hours and values 6.39 ± 0.56 , 9.02 ± 0.44 and 8.48 ± 0.49 were noted. Then at 3rd and 7th day, values of RBC were checked which ranged 7.62 ± 0.33 and 6.59 ± 0.55 .

| | Individual and Chrm | opofol | | | |
|------------|------------------------|--------|------|------|-----------|
| Time | D1 | D2 | D3 | D4 | Mean± |
| Baseline | 5.94 | 6.19 | 6.37 | 6.45 | 6.23±0.22 |
| 45 Minutes | 5 | 5.09 | 5.43 | 5.49 | 5.25±0.24 |
| 16 Hour | 5.73 | 6.02 | 6.14 | 6.37 | 6.06±0.26 |
| 24 Hour | 8.71 | 8.67 | 8.91 | 9.01 | 8.82±0.16 |
| 48 Hour | 8.02 | 7.99 | 8.14 | 8.23 | 8.09±0.11 |
| 72 Hour | 7.11 | 7.17 | 7.67 | 7.71 | 7.41±0.31 |
| 7 Day | 6.02 | 6.21 | 6.39 | 6.43 | 6.26±0.18 |

 Table No. 4.61: Red Blood cell of group D

There was overall decreased, increased and then value returned to baseline at day 7th. The red blood count was noted during and after the surgical procedure in group D. At 45 minutes, the value was 5.25 ± 0.24 decreased from baseline value 6.23 ± 0.22 . The blood was taken at 16, 24 and 48 hours and values 6.06 ± 0.26 , 8.82 ± 0.16 and 8.09 ± 0.11 were noted. Then at 3rd and 7th day, values of RBC were checked which ranged 7.41 ± 0.31 and 6.26 ± 0.18 .

| Time | Group A | Group B | Group C | Group D | P Value |
|------------|-----------------|-----------|-----------------|-----------|---------|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 6.52±0.37 | 6.58±0.19 | 6.57±0.56 | 6.24±0.22 | |
| 45 Minutes | 5.34±0.29 | 5.36±0.18 | 5.65±0.56 | 5.25±0.24 | |
| 16 Hour | 5.99 ± 0.28 | 6.41±0.19 | 6.39±0.56 | 6.06±0.66 | |
| 24 Hour | 7.70±0.28 | 8.39±0.12 | 9.03±0.44 | 8.83±0.16 | |
| 48 Hour | 7.45 ± 0.27 | 7.74±0.06 | 8.48 ± 0.49 | 8.09±0.11 | 0.000 |
| 72 Hour | 7.14±0.23 | 7.32±0.11 | 7.62±0.34 | 7.42±0.31 | 0.000 |
| 7 Day | 6.55±0.38 | 6.61±0.19 | 6.59±0.55 | 6.26±0.18 | |

Table No. 4.62: Comparative analysis Mean value of Red Blood cell in All Groups

Overall trend of RBC first decrease initial after post anesthetic administration, then decrease showed upto 24 hours and then turned to normal values. Statistical analysis showed the significance ($P \le 0.05$) difference in all groups. Group c showed the highest variation in group among all.



Graph 4.13 Comparative analysis of RBC count in all groups

| Time | Individual W Xvlazine-Keta | BC (10 ⁹ /L) of mine and | calves injected polyglactin | alves injected with polyglactin 910 sutureMaterial | | |
|------------|-------------------------------|-------------------------------------|--------------------------------|---|-----------|--|
| - | AI | A2 | A3 | A4 | | |
| Baseline | 7.12 | 6.92 | 6.74 | 6.54 | 6.83±0.24 | |
| 45 Minutes | 6.54 | 6.11 | 6.23 | 5.92 | 6.20±0.26 | |
| 16 Hour | 6.92 | 6.89 | 6.51 | 6.34 | 6.66±0.28 | |
| 24 Hour | 8.23 | 8.43 | 8.37 | 8.19 | 8.30±0.11 | |
| 48 Hour | 8.09 | 8.11 | 8.01 | 7.91 | 8.03±0.09 | |
| 72 Hour | 7.91 | 7.87 | 7.74 | 7.63 | 7.78±0.13 | |
| 7 Day | 7.14 | 6.91 | 6.77 | 6.61 | 6.85±0.22 | |

4.6.1 WHITE BLOOD CELLS (10⁹/L)

Table No. 4.63: White Blood cell Group A

There was overall decreased, increased and then value returned to baseline at day 7th. The white blood cell count was noted during and after the surgical procedure in group A. At 45 minutes, the value was 6.20 ± 0.26 decreased from baseline value 6.83 ± 0.24 . The blood was taken at 16, 24 and 48 hours and values 6.66 ± 0.28 , 8.30 ± 0.11 and 8.03 ± 0.09 were noted. Then at 3rd and 7th day, values of WBC were checked which ranged 7.78 ± 0.13 and 6.85 ± 0.22 .

| Time | Individua and Chro | Ketamine Mean± S.D | | | |
|------------|-----------------------|-----------------------|------|------|-----------|
| | B1 | B2 | B3 | B4 | |
| Baseline | 6.14 | 5.94 | 6.23 | 6.37 | 6.17±0.18 |
| 45 minutes | 5.43 | 4.72 | 5.67 | 5.89 | 5.42±0.50 |
| 16 Hour | 6.02 | 5.51 | 6.09 | 6.11 | 5.93±0.28 |
| 24 Hour | 8.11 | 7.93 | 8.19 | 8.3 | 8.13±0.15 |
| 48 Hour | 7.87 | 7.43 | 7.67 | 7.73 | 7.67±0.18 |
| 72 Hour | 7.33 | 6.92 | 7.29 | 7.32 | 7.21±0.19 |
| 7 Day | 6.19 | 5.99 | 6.25 | 6.38 | 6.20±0.16 |

| В |
|---|
| |

There was overall decreased, increased and then value returned to baseline at day 7th. The white blood cell count was noted during and after the surgical procedure in group B. At 45 minutes, the value was 5.42 ± 0.50 decreased from baseline value 5.42 ± 0.50 . The blood was taken at 16, 24 and 48 hours and values 5.93 ± 0.28 , 8.13 ± 0.15 and 7.67 ± 0.18 were noted. Then at 3rd and 7th day, values of WBCwere checked which ranged 7.21 ± 0.19 and 6.20 ± 0.16 .

| Time | Individual WB Xylazine-Propo C1 | C (10 ⁹ /L) of foP and C2 | calves injected polyglactin C3 | l with 910 SutureMaterial C4 | Mean± S.D |
|------------|---------------------------------------|--|--------------------------------------|------------------------------------|-----------|
| Baseline | 7.11 | 6.83 | 6.79 | 7.01 | |
| 45 Minutes | 5.92 | 5.54 | 5.34 | 5.89 | 5.67±0.28 |
| 16 Hour | 6.87 | 6.67 | 6.39 | 6.81 | 6.68±0.21 |
| 24 Hour | 10.12 | 9.87 | 9.64 | 10.01 | 9.91±0.20 |
| 48 Hour | 9.23 | 9.11 | 8.97 | 9.19 | 9.12±0.11 |
| 72 Hour | 8.67 | 8.59 | 8.23 | 8.43 | 8.48±0.19 |
| 7 Day | 7.23 | 6.91 | 6.79 | 7.11 | 7.01±0.19 |

Table No. 4.65: White Blood Cell Group C

There was overall decreased, increased and then value returned to baseline at day 7th.

The white blood cell count was noted during and after the surgical procedure in group C. At 45 minutes, the value was 5.67 ± 0.28 decreased from baseline value 5.67 ± 0.28 . The blood was taken at 16, 24 and 48 hours and values 6.68 ± 0.21 , 9.91 ± 0.20 and 9.12 ± 0.11 were noted. Then at 3rd and 7th day, values of WBCwere checked which ranged 7.21 ± 0.19 and 6.20 ± 0.16 .

| Time | Individua Chromic | Individual WBC (10 ⁹ /L) of calves injected with Xylazine-Propofol and Chromic Catgut Suture Material | | | | | |
|------------|----------------------|--|------|------|-----------|--|--|
| | D1 | D1 D2 D3 D4 | | | | | |
| Baseline | 6.3 | 6.67 | 6.14 | 6.53 | 6.41±0.23 | | |
| 45 Minutes | 5.41 | 5.23 | 4.92 | 5.14 | 5.17±0.20 | | |
| 16 Hour | 6.23 | 6.14 | 5.87 | 6.14 | 6.09±0.15 | | |
| 24 Hour | 9.81 | 9.76 | 9.34 | 9.67 | 9.64±0.21 | | |
| 48 Hour | 9.19 | 8.81 | 8.67 | 8.76 | 8.85±0.22 | | |
| 72 Hour | 8.14 | 8.02 | 7.91 | 7.98 | 8.01±0.09 | | |
| 7 Day | 6.83 | 6.7 | 6.2 | 6.6 | 6.58±0.27 | | |

Table No. 4.66: White Blood Cell Group D

There was overall decreased, increased and then value returned to baseline at day 7th.

The white blood cell count was noted during and after the surgical procedure in group D. At 45 minutes, the value was 5.17 ± 0.20 decreased from baseline value 6.41 ± 0.23 . The blood was taken at 16, 24 and 48 hours and values 6.09 ± 0.15 , 9.64 ± 0.21 and 8.85 ± 0.22 were noted. Then at 3rd and 7th day, values of WBCwere checked which ranged 8.01 ± 0.09 and 6.58 ± 0.27 .

| Time | Group A | Group B | Group C | Group D | P Value | |
|------------|-----------------|-----------|-----------|-----------|---------|--|
| | Mean± S.D | Mean± S.D | Mean± S.D | Mean± S.D | | |
| Baseline | 6.83±0.24 | 6.17±0.18 | 6.94±0.15 | 6.41±0.23 | | |
| 45 minutes | 6.20±0.26 | 5.43±0.51 | 5.67±0.28 | 5.18±0.20 | | |
| 16 Hour | 6.67±0.28 | 5.93±0.28 | 6.68±0.21 | 6.09±0.15 | | |
| 24 Hour | 8.31±0.11 | 8.13±0.15 | 9.91±0.21 | 9.65±0.21 | | |
| 48 Hour | 8.03±0.09 | 7.67±0.18 | 9.13±0.12 | 8.86±0.23 | 0.000 | |
| 72 Hour | 7.78±0.12 | 7.22±0.19 | 8.48±0.19 | 8.01±0.09 | 0.000 | |
| 7 Day | 6.86 ± 0.22 | 6.20±0.16 | 7.01±0.19 | 6.58±0.27 | | |

Table No. 4.67: Comparative analysis Mean Values of WBC all Groups

Overall trend of WBC first decrease initial after post anesthetic administration, then decrease showed up to 24 hours and then turned to normal values. Statistical analysis showed the significance ($P \le 0.05$) difference in all groups. Group C showed the highest variation in group among all.



Graph 4.14 Comparative analysis of WBC count in all groups

| Time | Individua Polyglacti | nine and Mean± S.D | | | |
|------------|-------------------------|-----------------------|-------|-------|------------|
| | A1 | A2 | A3 | A4 | |
| Baseline | 9.2 | 9.23 | 9.67 | 9.14 | 9.31±0.24 |
| 45 minutes | 8.81 | 8.92 | 9.01 | 8.67 | 8.85±0.14 |
| 16 Hour | 9.11 | 9.02 | 9.34 | 8.99 | 9.11±0.15 |
| 24 Hour | 9.97 | 9.99 | 10.12 | 10.01 | 10.02±0.06 |
| 48 Hour | 9.67 | 9.7 | 9.97 | 9.89 | 9.80±0.14 |
| 72 Hour | 9.54 | 9.63 | 9.83 | 9.63 | 9.65±0.12 |
| 7 Day | 9.23 | 9.21 | 9.65 | 9.19 | 9.32±0.22 |

4.6.2 HEMOGLOBIN (mg/dl)

 Table No. 4.68: White Blood cell Group A

There was overall decreased, increased and then value returned to baseline at day 7th.

The white hemoglobin value was noted during and after the surgical procedure in group A. At 45 minutes, the value was 8.85 ± 0.14 decreased from baseline value 9.31 ± 0.24 . The blood was taken at 16,24 and 48 hours and values 9.11 ± 0.15 , 10.02 ± 0.06 and 9.80 ± 0.14 were noted. Then at 3rd and 7th day, values of Hb were checked which ranged 9.65 ± 0.12 and 9.32 ± 0.22 .

| Time | Individua Chromic | nine and Mean± S.D | | | |
|------------|----------------------|-----------------------|-------|-------|------------|
| | B1 | B2 | B3 | B4 | |
| Baseline | 8.97 | 9.87 | 9.54 | 10.12 | 9.62±0.49 |
| 45 minutes | 8.23 | 9.21 | 9.11 | 9.39 | 8.98±0.51 |
| 16 Hour | 8.87 | 9.67 | 9.39 | 9.89 | 9.45±0.44 |
| 24 Hour | 9.67 | 10.91 | 10.7 | 11.23 | 10.62±0.67 |
| 48 Hour | 9.49 | 10.67 | 10.54 | 11.01 | 10.42±0.65 |
| 72 Hour | 9.32 | 10.49 | 10.32 | 10.87 | 10.25±0.66 |
| 7 Day | 8.96 | 9.93 | 9.67 | 9.67 | 9.55±0.41 |

There was overall decreased, increased and then value returned to baseline at day 7th. The white hemoglobin value was noted during and after the surgical procedure in group B. At 45

minutes, the value was 8.98 ± 0.51 decreased from baseline value 9.62 ± 0.49 . The blood was taken at 16,24 and 48 hours and values 9.45 ± 0.44 , 10.62 ± 0.67 and 10.42 ± 0.65 were noted. Then at 3^{rd} and 7^{th} day, values of Hb were checked which ranged 10.25 ± 0.66 and 9.55 ± 0.41 .

| Time | Individual and Polygl | ofol Mean± S.D | | | |
|------------|--------------------------|-------------------|-------|-------|------------|
| | C1 | C2 | C3 | C4 | |
| Baseline | 10.14 | 9.63 | 9.41 | 9.79 | 9.74±0.30 |
| 45 minutes | 9.43 | 9.1 | 8.91 | 9.21 | 9.16±0.21 |
| 16 Hour | 9.97 | 9.53 | 9.37 | 9.59 | 9.61±0.25 |
| 24 Hour | 11.35 | 11.23 | 11.02 | 11.39 | 11.24±0.16 |
| 48 Hour | 10.97 | 11.01 | 10.87 | 10.97 | 10.95±0.05 |
| 72 Hour | 10.67 | 10.87 | 10.67 | 10.67 | 10.72±0.10 |
| 7 Day | 10.15 | 9.67 | 10.14 | 10.15 | 10.02±0.23 |

Table No. 4.70 Hb value of Group C

There was overall decreased, increased and then value returned to baseline at day 7th. The white hemoglobin value was noted during and after the surgical procedure in group C. At 45 minutes, the value was 9.16 ± 0.21 decreased from baseline value 9.74 ± 0.30 . The blood was taken at 16,24 and 48 hours and values 9.61 ± 0.25 , 11.24 ± 0.16 and 10.95 ± 0.05 were noted. Then at 3rd and

 7^{th} day, values of Hb were checked which ranged 10.72 ± 0.10 and 10.02 ± 0.23 .

| | Individual | pofol | | | |
|------------|------------|-----------------|-----------|-----------|------------|
| Time | and Chron | nic Catgut Sutu | Mean± S.D | | |
| | D1 | D2 | D3 | D4 | |
| Baseline | 8.91 | 9.19 | 9.37 | 9.74 | 9.30±0.34 |
| 45 Minutes | 8.3 | 8.67 | 8.91 | 9.16 | 8.76±0.36 |
| 16 Hour | 8.81 | 9.02 | 9.09 | 9.31 | 9.05±0.20 |
| 24 Hour | 10.97 | 11.13 | 11.19 | 11.1 | 11.09±0.09 |
| 48 Hour | 10.43 | 10.71 | 10.67 | 10.83 | 10.66±0.16 |
| 72 Hour | 9.89 | 10.35 | 9.93 | 10.34 | 10.12±0.25 |
| 7 Day | 8.93 | 9.21 | 9.23 | 9.72 | 9.27±0.32 |

Table No. 4.71: Hb value of Group D

There was overall decreased, increased and then value returned to baseline at day 7th.

The white hemoglobin value was noted during and after the surgical procedure in group D. At 45 minutes, the value was 8.76 ± 0.36 decreased from baseline value 9.30 ± 0.34 . The blood was taken at 16,24 and 48 hours and values 9.05 ± 0.20 , 11.09 ± 0.09 and 10.66 ± 0.16 were noted. Then at 3rd and 7th day, values of Hb were checked which ranged 10.12 ± 0.25 and 9.27 ± 0.32 .

| Time | Group A | Group B | Group C | Group D | P Value |
|------------|-----------------|------------------|------------------|------------------|---------|
| | Mean±S.D | Mean± S.D | Mean± S.D | Mean± S.D | |
| Baseline | 9.31 ± 0.24 | 9.63 ± 0.49 | 9.74 ± 0.31 | 9.3 ± 0.35 | |
| 45 Minutes | 8.85 ± 0.14 | 8.98 ± 0.52 | 9.16 ± 0.22 | 8.76 ± 0.36 | |
| 16 Hour | 9.12 ± 0.15 | 9.45 ± 0.44 | 9.62 ± 0.25 | 9.05 ± 0.21 | |
| 24 Hour | 10.02±0.06 | 10.63 ± 0.67 | 11.25 ± 0.16 | 11.09 ± 0.09 | |
| 48 Hour | 9.81 ± 0.14 | 10.43 ± 0.65 | 10.96 ± 0.05 | 10.66 ± 0.16 | 0.000 |
| 72 Hour | 9.65 ± 0.12 | 10.25 ± 0.66 | 10.72 ± 0.09 | 10.13 ± 0.25 | 0.000 |
| 7 Day | 9.32 ± 0.22 | 9.56 ± 0.42 | 10.03 ± 0.24 | 9.27 ± 0.33 | |

Table No. 4.72 Comparative analysis of Mean values of hemoglobin in all groups Overall trend of hemoglobin first decrease initial after post anesthetic administration, then decrease showed up to 24 hours and then turned to normal values. Statistical analysis showed the significance (P \leq 0.05) difference in all groups. Group C showed the highest variation in group among all.



Graph 4.15 Comparative mean analysis of Hb values in all groups

DISCUSSION

The study was designed to compare the effect of xylazine-ketamine and xylazine-propofol combinations for herniorraphy surgery in calves. Along with these two combinations two suture materials chromic catgut and polyglactin 910 were also evaluated. The study was conducted by subjecting calves in four groups. For medical checkup and treatment, Anesthesia is essential. Anesthetic agents are usually inhalant or injectable. The injectable anesthetics agent may produce general or local effect (Glowaski andWetmore 1999). Stress response is a collective term which included immune system, metabolic, neuroendocrine and inflammatory systems. If system overshoot during the surgical stress, it could be harmful for body in result (Dobson 2015). The main objective of our study was to evaluate the both anesthetic combinations and both suture material along with stress level produce in result of these.

The vital body signs TPR were evaluated in this study. As described in results, the body temperature of animals in all the groups was decreased overall, there was hypothermia then the temperature was raised to normal range. There was observed a significant decrease ($P \le 0.05$) for rectal temperature in all the groups during the post anesthetic periods. Our study is in accordance with other scientists, that induction of any kind of anesthesia produce hypothermia but it was also observed that hypothermia was negligible and no harmful effect was seen in any of the calves. (Anandmay *et al.* 2016; Bodh 2011; Naddaf *et al.* 2014). They also reported the similar findings. More hypothermia was noticed in xylazine-propofol treated group. The other scientist (Aslam *et al.* ; Dad Brohi *et al.* 2019; Jena *et al.* 2014) also claimed the similar results. The decrease in the rectal temperature might be endorsed to a decrease in the skeletal muscle tone, minimal metabolic actions and muscle tone relaxation, and thermoregulatory centers depression. A significant decrease in the rectal temperature was reported (Bodh 2011; Singh *et al.* 2013)). Alpha-2 adrenoceptor inhibitors induces hypothermia because of peripheral vasoconstriction. Which also help in the maintenance of body temperature (Aslam *et al.*). Condition variations and different combination my cause of slight difference in body temperature.

Pulse rate decrease over all in all combinations of xylazine-ketamine and xtlazine-propofol. After the administration of xylazine as pre-anesthetic, vasoconstriction occurred, which caused the high arterial blood pressure. But after the administration of ketamine or propofol, the values returned to normal baseline. In our study pulse rate significantly (P \leq 0.05) decreased for all combination. Similarly result wasfound for propofol and ketamine in the study of (Frias *et al.* 2003; Kanaya *et al.* 2003) and (Kilic 2008)respectively. Significant decrease in heart rate and arterial blood pressure (ABP) is often associated with if anesthesia induction is with propofol (Hug *et al.* 1993; Tramer *et al.* 1997).

In our study there was overall decrease in respiration rate (RR) in all combination of anesthetic groups. Statistical analysis revealed that there is significant difference in all group. This decrease continued till 45 minutes and after that it turned to normal. Same findings were observed by (GH *et al.* 2017; Hodgkinson and Dawson 2007). After the administration of pre-anesthetic, depression in RR was observed in all group (Jena *et al.* 2014). Induction of anaesthesia with propofol also caused a decrease in RR that was in accordance to earlier studies in dogs (Adetunji and Ajadi 2002). Respiratory depression and apnea, being the most commonly reported adverse effect of propofol anaesthesia, was proportional torate of infusion of propofol (Maney *et al.* 2013; Suarez *et al.* 2012).

Anesthesia efficiency is evaluated on base of its sedative and analgesic effects. To evaluate the sedation and analgesia different body reflexes were observed in our study. For sedation evaluation, head down, neck down, patellar reflex and gait incoordination reflexes were noted. Similarly, for the analgesia evaluation, tail pinch, toe pinch, palpebral reflex and corneal reflexes were observed. For sedation the presence of reflexes while for analgesia absence of reflex were checked. These reflexes were observed ondifferent intervals, which showed great variation in all groups. Group A and B while group C and D showed almost the same response to reflexes in our study because xylazine-ketamine combination was used in A and B groups and xylazine-propofol combination in group C and D. In this study, our data showed the overall result in accordance with earlier data (Hellebrekers et al. 1997; Ko et al. 1992). After the administration of propofol anesthesia, palpebral and corneal reflexes were lost, Indicating downward movement of eye ball. Corneal reflex abolished, had been reported after propofol administration (Genccelep et al. 2005). Xylazine belongs to Alpha2-adrenoceptor agonist drugs, they induced sedation primarily because of central effect. But they also used as analgesic agent because of action on both central nervous and spinal nervous system (Dewangan et al. 2016). Toe pinch, tail pinch reflexes are reliable and efficient indices to determine anesthetic depth for 62 surgical procedure (Hobbs et al. 1991). In our study, these reflexes showed a great similarity in disappearing and appearing time courses. In accordance with previous data, in our study palpebral and corneal reflexes showed more variability. That indicated that both these reflexes used for ascertaining the onset and depth of anesthesia and analgesia. (Jena et al. 2014). After the administration of xylazine- ketamine anesthesia palpebral reflexes lost due to severe hypoxemia (Wyatt et al. 1989). After the administration of propofol anesthesia, all reflexes were abolished in groups C and D, indicating that surgical stage had been achieved (Kinjavdekar et al. 2010). In our study, ketamine along with alpha-2 adrenogonist agent showed sedation and analgesia effect for enough time, for umbilical herniotomy (Kilic 2008).

Anesthesia monitoring effect included that the induction of anesthesia, duration of anesthesia and recovery period of anesthesia. Our study showed that significance difference in both combinations of xylazine-ketamine and xylazine-propofol in induction, duration and recovery period of anesthesia. Groups A and B showed better induction of anesthesia, this data showed the resemblance with the earlier literature (Ferreira et al. 2015). Dissociative anesthetic agents caused the excitement free anesthesia with enough muscle relaxation to help the endotracheal intubation in dogs (Beteg et al. 2010; White et al. 2001). Our study showed that rapid induction of anesthesia in xylazine-propofol groups than xylazine- ketamine groups and showed the contrary result of literature (Ferreira et al. 2015; Hellebrekers et al. 1997). Possible explanation for propofol induction characteristics included that, induction dose and rate of administration, degree of pre anesthetic sedation achieved, signalment of calves those were used in trail. In xylaxine-propofol groups rapid induction is may due to the rapid and instant uptake of propofol by the central nervous system (CNS) (Zoran et al. 1993). Our study showed the longer duration of anesthesia of xylazine-ketamine combination than xylazine-propofol and this result was verified from literature (Fathy 2018).Liver function were established to evaluate both anesthetic combinations in our studies. Results of our study revealed that values of ALT, AST and ALP increased after the administration of anesthesia. There is significant increase and this increased continued up to 60 minutes and then turned to normal values. Our study data had the similar

results like previous data of literature (Celestine Okwudili *et al.* 2014; Kilic 2008) and (GH *et al.* 2017). Increase in the liver enzymes remained for 60 minutes, and then turned to normal values. The increase in liver enzyme is comparatively lower in xylazine treated groups (Aslam *et al.*). Raised in liver enzyme of all groups as anesthesia caused hypoxemia, that damaged the cell membrane, so leakage of liver enzyme and other enzyme occurred as well (Psatha *et al.* 2011). The ALT and ALP values increased during anesthesia and then returned to baseline or pre-anesthetic level helped to rule out any possibility of pathological change in liver (Koichev *et al.* 1988). The increased in AST and ALT might due to any damage to cell membrane and alteration in their permeability because of hemodynamic changes in result of anesthetic changes. Any pathology in which liver parenchyma involved increased the leakage of liver specific enzyme ALT in blood (Ji-wan and In-ho 1999). A study performed by (Maan *et al.* 2018) in which biochemical profile of different anesthetic combination was assessed, and result showed that due to anesthesia ALT and AST values increased in all groups. But overall increase was in normal range. And increase was less pronounced in isoflurane group thanxylazine-ketamine.

In our study kidney function test were also observed for evaluation of anesthesia efficiency of both anesthetic combinations. Our study showed the increase in BUN values in xylazine-ketamine combinations and this increased continued up to 30 minutes and then turned to normal baseline in 24 hours. And our result was supported by literature (Kilic 2008; Maan *et al.* 2018). Plasma urea concentration showed significant increase in all groups. After the administration of ketamine injection, values increased, it might due to the ketamine reduced the blood flow toward the kidney. And due to less renal blood flow cause decrease in glomerular filtrate which increase the BUN level in blood (*Koichev et al.* 1988). BUN level increase in blood was reported due to increase hepatic urea production in liver from amino acid degradation also (Eichner *et al.* 1979). Our study showed that there was significant increasein BUN level due to xylazine-propofol anesthesia up to 60 minutes then it turned to normal in 24 hours. And same result claimed by other scientist (GH *et al.* 2017; Jena *et al.* 2014). Other scientist like (Lerche *et al.* 2000; Manat) also noted same result that xylazine-propofol anesthesia the increase in serum urea nitrogen in 60 minutes and then went to normal. As propofol decreased the renal blood flow resulted increase in BUN level.

Xylazine-ketamine combination showed that there is increase in creatinine level in blood after the administration of anesthesia. In our study, result showed increased values obtained till 60 minutes and then turned to normal in 24-hour period. These results were supported by literature (Ježek *et al.* 2006; Kilic 2008; Umar and Adam 2013). Xylazine caused increase in creatinine level if it administered through parental route (Mottelib and El-Gindi 1975). Our result showed that creatinine level decreased in C and D groups that was administered with xylazine-propofol anesthesia. And change in creatinine level remained in normal physiological range and values turned to normal in 24 hours. Increase in creatinine values recorded in study of (Restitutti *et al.* 2012; Singh *et al.* 2013). Decrease in our study is may be due to the IV infusion after continuous intervals. And if the renal blood remains normal that may lead to creatinine decrease. Serum cortisol value showed stress level of the animal (Ko *et al.* 2000).

Cortisol secretion is influenced by many factors. In stress cortisol is released in more quantity. Surgical procedures are accompanying a complex stress response. It characterized by metabolic changes, immunological and neuro-hormonal changes (de Mattos Junior *et al*.2009). In over study the cortisol level is observed to evaluate different anesthetic combination (xylazine- ketamine and xylazine-propofol) and different suture materials (polyglactin 910 and chromic catgutsuture material) in calves. Our study showed that both anesthetic combinations had their effect on the cortisol level as well as both suture material. In our study four groups of calves were evaluated.

All groups showed significant increase in cortisol level at 24 hours and they turned in to normal at 7th day post-surgery. Our result showed a decline in all groups just after the administration of anesthesia at Post Anesthesia interval (PAI), because of depression of central nervous system (CNS) and

cardiovascular system. And this is supported by the result of (Cassu *et al.* 2008). Alpha 2 agonist decreased the preoperative stress related hormone's level (Ko *et al.* 2000). Our study showed that group B containing catgut suture material along with xylazine-ketamine anesthesia produced more cortisol levelat 24 hours. It attained peak among four groups. Catgut suture material is a natural material that is absorbed by body through phagocytosis. It takes comparatively more time for degradation than any synthetic compound. And it produces more tissue reaction in body than polyglactin 910 (Hellebrekers et al. 1997).

Trauma, surgical procedure and infectious event produce acute pain which trigger nociceptive stimuli of surgical site which in result stimulate or increased hypothalamic neural sympathetic tone and stimulate more release of catecholamine and cortisol hormone (Gaynor and Muir 2014). Our results indicated plasma level of cortisol showed the increasing trend after post administration but during surgery there was not any significant increase in all groups these were supported by a study conducted by(Naddaf *et al.* 2014). Ds.7 observed in his study that propofol infusion had not any influence on the cortisol level. In our study, groups C showed comparatively minimal increase of cortisol level at 24 hours. And showed the normal values at 7th day post-surgery. Groups A and D showed almost similar trend in cortisol level changes in our study. In both group peak was attained at 24 hours and then turnedto normal at 7th day post-surgery.

Hematological evaluation in our study revealed that there was over all slight decrease in the RBC, WBC and HB after the administration of anesthesia and this decrease continued during surgical procedure, in which polyglactin 910 or chromic catgut suture used, and then there was seen a raise in hematological values and reached to maximum at 24 hour post and then the values turned to normal values in 7 days. Our results were supported from the literature by (DEMİRKAN *et al.* 2002; Dewangan *et al.* 2016; Fathy 2018; Kilic 2008).

Catgut suture material is natural absorbable suture material, and it produced greatest degree of inflammatory response in body, and had large cellular infiltration (Hellebrekers *et al.* 1997). Above mentioned data showed that chromic cat gut produced more inflammatory response due to a natural absorbable material as compared to polyglactin 910 that is synthetic absorbable suture material. Our research data also showed result in accordance with literature as at 24-hour interval the more significant increase in hemodynamic parameters values in group D in which xylazine-propofol anesthesia is used with chromic catgut suture material applications. And lesser increase was observed in group A in which xylazine-ketamine anesthesia along with polyglactin 910 suture material used. Our study showed the overall increase in all hemodynamic values but all this increase was in normal ranges that indicated both combination of anesthesia can be used in animal while considering other factors and similar finding aboutboth used suture materials.

In our study two different anesthetic combinations and two different suture material were evaluated. Anesthesia combination were, xylazine-ketamine and xylazine-propofol and suture materials were, polyglactin 910 and chromic catgut used. Statistical analysis of data showed that both anesthetic combinations showed variation and both can be used with their conditions. Xylazine-ketamine produced longer duration of anesthesia and smooth recovery as compared to xylazine-propofol which are characteristic feature for umbilical herniorrhaphy. Recovery from propofol anesthesia occurred with shivering. Propofol produced comparatively more respiratory depression. Biochemical parameters like LFT and RFT showed significance increase in values and all these values fell in normal ranges. Cortisol level used to evaluate stress responses of both anesthetic combinations and both suture materials. Result showed that xylazine-propofol. In case of suture materials polyglactin produced more cortisol level than chromic catgut. Hemodynamic values showed that polyglactin 910 produced less inflammatory response than chromic catgut suture materials. So, for surgical

procedures, like hernia repair and internal organ surgeries, polyglactin 910 suture materials were preferred over chromic catgut because of less inflammatory response and less cortisol level production.

Conclusion:

This study was designed to evaluate different anesthetic combinations and different suture materials. Two combinations, xylazine-ketamine and xylazine-propofol were studied along with polyglactin910 and chromic catgut. This study was conducted on clinical cases of calves those were presented on surgery clinic of university of veterinary and animal sciences Lahore with complain of umbilical hernia. Calves were divided into four groups; group A animals were anesthetized with xylazineketamine and polyglactin 910 is used as suture material. Group B animals were anesthetized with xylazine-ketamine and for herniorrhaphy procedure chromic catgut was used. In group C animals, xylazine-propofol combination was used for production of anesthesia and polyglactin 910 suture material is used. For group D animals, xylazine-propofol anesthetic combination along with chromic catgut was used. Total 16 clinical cases were selected for study and each group allocated 4 case. Xylazine used @0.03mg/kg, propofol @ 5-6mg/kg and ketamine used @ 5mg/kg intravenously.For evaluation purpose different parameters were observed in this study including, physical parameters, sedation and analgesic parameters, anesthesia monitoring effects, hematological and biochemical parameter. Observations for each parameter were noted at different interval according to study designed. Data was analyzed statistically on SPSS version 20.0 and ANOVA test with significance level 0.05% (P≤0.05). This study helped to evaluate, both anaesthesia combinations and suture materials, efficacy, competent and which one produced less stress response in animal during surgical procedure and post-surgery procedure. Result of this study showed that both anaesthetic combinations altered the physical, haematological and biochemical parameters values, but they remained in normal ranges. Induction of anaesthesia, duration and recovery period data showed that propofol anaesthesia useful for short procedure it attained surgical stage more quickly. Ketamine anaesthesia showed smooth recovery from the deep anaesthesia after the surgery. And preferred for umbilical surgery procedure because it showed longer duration of anaesthesia comparatively. Cortisol level study showed that propofol anaesthesia produced less stress response in body as compared with ketamine. This project also showed that most reliable, effective and best suture material for umbilical or soft organs surgery is polyglactin 910 as compared with other absorbable suture materials like chromic catgut. More inflammatory response and more stress were noted in group where chromic catgut material was used.

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