Oral Presentation

Clinico-biochemical Study on Xylazine-ketamine and Isoflurane Anesthesia in Rabbits Undergoing Ovariohysterectomy

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Objective- To compare two anaesthetic protocols for ovariohysterectomy surgery in rabbits regarding adequacy of sero-biochemical and cardiovascular responses.

Design- The prospective, randomized experimental study.

Animals- Sixteen healthy adult female albino rabbits aged 150 ± 8.5 days.

Procedures- All the rabbits (n=16) were divided into two treatment groups (n=8 each). Group A was anesthetized by using combination of xylazine (3mg/kg) and ketamine (10mg/kg) through intravenous route. In Group B xylazine was used as a preanesthetic, while induction and maintenance were achieved using isoflurane (4%) with oxygen flow rate of 1L/min. Blood samples were collected from cephalic vein before the administration of anesthetic agents followed by at 5, 10, 15, 30 and 45 minutes post-administration of anesthesia (Gil et al., 2010). Serum biochemical parameters were measured by using automated serum biochemical analyzer. Cardiovascular parameters were measured by using cardiac monitor (Offinger et al., 2012). Data thus obtained were compared between groups using independent sample t-test. Differences at p<0.05 were considered significant.

Results- Rabbits administered with xylazine-ketamine anesthesia showed significant increase in serum ALT, AST and BUN as compared to isoflurane anesthesia; whereas, no statistical difference was observed for ALP, creatinine and bilirubin between two groups. Heart rate, blood pressure and saturation of oxygen were decreased in both groups but this decline was significantly lesser in isoflurane administered group as compared to xylazine-ketamine administered group.

Conclusion and Clinical Relevance- Both xylazine-ketamine and isoflurane proved to be suitable anesthetic agents for successful ovariohysterectomy in rabbits, whilst isoflurane resulted in more pronounced effect on serum biochemical and cardiovascular parameters as compared to inhalation anesthesia. Similar findings have been reported by (Grubb et al., 1997). Thus, Isoflurane inhalation anesthesia is a safer choice due to its minimum effects on biological parameters during long surgical procedures such as ovariohysterectomy.

Key Words- Rabbits, Inhalation anesthesia, Less complications, Ovariohysterectomy surgery

References

Oral Presentation

Effect of Nano-Particle of Magnesium Oxide on Ketamine-Induced Anesthesia in Rabbit

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Objective -Some studies show magnesium has analgesic effect in some pain models but this evaluation was not carried on nano-Magnesium Oxide (MgO).

Design- present study was designed to evaluation effect of MgO nanoparticles and conventional MgO on ketamine-induced anesthesia in rabbits.

Animals- At this study, 20 adult rabbits were used in 4 groups.

Procedures- Ketamine was intrapritonealy injected in all groups and xylazine, MgO nanoparticle and MgO suspension was administrated 15 min before ketamine injection in 3 last groups. The rectal temperature, respiratory rate and heart rate were measured before drug administration and during of anesthesia Duration of anesthesia and recovery time was recorded.

Results- The mean of body temperature and heart rate changed in groups but this change was not significant except group1 which received only ketamine. The mean of respiratory rate significantly decreased before and after anesthesia in all groups but this decreasing was greater (nearly 3 fold) in group 2 which received ketemine and xylazine. Also duration of anesthesia was longer significantly in this group.
Conclusion and Clinical Relevance- Thus quality and duration of ketamine-induced anesthesia did not differ by MgO-nanoparticles with comparison to conventional MgO.

Key Words- Anesthesia, Ketamine, Mgo nano-particles, Rabbit

References

Procedures- The study was done with cross method. First all birds were divided to two groups randomly. Group A taked 20mg/kg Thiopental-Na by intraosseous route and group B taked intravenously. After one week that needs for Washing out of drug, group A recived 20 mg/kg Thiopental-Na by intravenous route and group B recived intraosseously. Heart rate (HR), respiratory rate (RR) and cloacal temperature (CT) were taked before (0 min) and 1, 5, 10, 20 and 30 min after anaesthetic drug administration and measured by Repeated Measures ANOVA statistical method. Also different Variance of intraosseous and intravenous groups were analysed with paired t test (P-Value=0.05). Software of IBM® PASW/SPSS® Statistics 18.0 – 2009 was used.

Results- Statistical assessment showed RR in two groups was different in 1 min after drug administration (P-Value=0.036). There was not statistically difference in other minutes for RR, HR and CT in two groups (P-Value>0.05). Also no significant alterations were recorded for recovery time for both groups.

Conclusion and Clinical Relevance- Intraosseous injection in birds is compensable with intravenous route.

Key Words- Intraosseous injection, Anesthesia, Pigeon

References

Oral Presentation

Evaluation of Total Intraosseous Anesthesia (TIOA) with Propofol in Rabbit

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Objective- To evaluate the feasibility of IO administration of propofol and its IO effects regarding anesthetic behavior, selected clinical and paraclinical parameters and physiological variables during general anesthesia in rabbits.

Design- Prospective study

Animals- 18 male New Zealand White rabbits
**Procedures**- Rabbits received IO (n=6) bolus (12.5 mg kg\(^{-1}\)) of propofol followed by a constant rate infusion of propofol (1 mg kg\(^{-1}\) min\(^{-1}\)) via the same route for 30 minutes (IOm). Control group received same volume of normal saline IO (n=6) as the procedure described for IOm group (CIOm), and in other control group (CIO) IO cannulation was performed, and maintained in place for 30 minutes without any administration (n=6). Physiologic variables, induction, anesthesia and recovery times were recorded. Complete blood hematological, serum biochemistry and blood coagulation profiles were assayed before induction and after recovery of anesthesia, 72 hours after anesthesia and 30 days later in all groups. The ratio M:E in BM were evaluated before and then 30 days later.

**Results**- Adverse effects were not detected clinically. HR was increased after propofol administration. The Mean RR, SpO\(_2\) and BP decreased compared with the baseline value; however, the BP value remained > 60 mm Hg at all-time points. During study all hematological and biochemical parameters remained within normal limits. Decrease in platelet count and increase in PT and PTT times were significant (P<0.05). The M:E ratio remained unchanged after 30 day in all IO groups.

**Conclusion and Clinical Relevance**- Based on the least significant physiological, hematological and biochemical effects, the IO injection of propofol appears to be safe and suitable method of anesthesia in rabbits with limited vascular access.

**Key Words**- Propofol, Intraosseous, Anesthesia, Rabbit

**References**


Oral Presentation

**Evaluation of Low Level Laser Effects on Epidural Anaesthesia in Horse**

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**Objective**- To evaluate and compare the analgesic effects of caudal epidural administration of lidocaine (LIDO), caudal laser radiation and epidural lidocaine plus laser radiation in horses.

**Design**- experimental study

**Animals**- Five healthy horses, 15.7 +/- 4.9 years of age, weighing 240 +/- 37 kg

**Procedures**- The animals were randomly assigned to receive four treatments (group NS: saline (0.9% NaCl) solution via caudal epidural injection, group L: lidocaine (2 mg/kg of body weight) via caudal epidural injection, group III: laser radiation (3000hrtz- for 10 minute) and group 11: caudal epidural lidocaine injection plus laser radiation at intervals of at least 1 week. A 20 gauge 55×0.9 mm needle was placed in the first intercoccyeal space (C01-Co2) in awake standing horses restrained in stocks for epidural injections. Motor and sensory blockade evaluations used by TENS machine. Degree of perineal analgesia, Positive pain response, Anal and vaginal tone was also recorded.

**Results**- Statistic analysis were done by one way ANOVA and Post Hoc Test, LSD, between times 0 to 60 minutes in groups 1to 4 showed significant difference (p>0.05) in t25 and 160 of left and t20 of right side motor neuron stimulation. p>0.05 was also seen in times 20 and 10 of left side and time 10 of right side sensory neuron stimulation. Motor neuron stimulation of left side at time 60 had shown p>0.05 in groups 1 and 3, 2 and 4 and 3 and 4.

**Conclusion and Clinical Relevance**- We conclude that low level laser in combination with caudal epidural lidocaine treatments provided sufficient analgesia in horses, and this treatment is offered a longer duration of analgesia than laser, lidocaine caudal administration although the sensory and motor stimulation did not show significant difference between groups. Low level laser may be effective adjuvants in caudal epidural anesthesia in horses. Our results showed that LLL plus lidocaine may be preferable to a high dose of epidural lidocaine.

**Key Words**- Low Level Laser, Epidural, Lidocaine, TENS, Horse, Analgesia, Local anesthesia

**References**

Preanesthesia in Equine Clinical Anaesthesia

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Objective- General equine anaesthesia by providing safe induction, maintenance and smooth recovery is a challenge for practitioners. Detomidine and Xylazine were used in equine pre anesthesia and because of the difference in duration of action, cardiovascular and respiratory effects, there are some controversies in clinical anesthesia following usage of these medications. Midazolam, a water soluble benzodiazepine, has a rapid onset of action in comparison with diazepam. Its advantages include good cardiovascular stability, transient and mild respiratory depression in comparison with other benzodiazepines. The aim of the current study is evaluation of two different pre anaesthetic regimens on clinical equine anaesthesia.

Design- Clinical study

Animals- Clinical anaesthesia was done on 20 horses operated for limb disorders.

Procedures- Standard pre anaesthetic evaluations (PCV, Total Protein, tWBC, Heart rate, Respiratory rate, CRT) were done before anesthesia. Clinical anesthesia was done in two groups. Fourteen horses were included in group XD that pre anesthesia were done by Xylazine (Alfasan, Inc., 1.1 mg/kg) and Diazepam (Zepadic, Caspian, Inc., 0.2 mg/kg), six horses were in group DM, that Detomidine (Detomovet, 20µg/kg) and Midazolam (Daroupaksh, Inc., 0.2mg/kg) (DM group) were used before anesthesia. Induction was done by intravenous Ketamine (Alfasan, Inc., 2.2mg/kg). Horses were intubated with appropriate tube size and anaesthesia was maintained with Isoflurane in oxygen. General anesthesia was monitored by measuring heart rate, respiratory rate, O₂ saturation, Tec set, CRT and temperature each 10 minutes. Results are expressed as mean ± SEM. Statistical analysis were done using Two-way ANOVA. P values under 0.05 consider as significant.

Results- No statistically significant difference was recorded between the duration of anaesthesia (XD: 113.2±10.3, DM: 107.3±8.8) and surgery (XD: 83±8.9, DM: 67.8±10.7). Although α2 agonists are reported to produce decrease in heart rate, there were no differences among the groups with baseline values for HR (XD: 42.9±1.3, DM: 45.7±1.9), and also no significant difference were observed among the groups in RR (XD: 20.8±1.5, DM: 16.4±2), SpO₂ (XD: 96.2±0.38, DM: 96.58±0.53) CRT and temperature. Significant difference in Tec set (median) during maintenance of anaesthesia between the groups were observed (XD: 3-4, DM: 2-3) that was lower in DM group.

Conclusion and Clinical Relevance- Both anaesthetic drugs combination provided clinically acceptable anaesthesia in horses. Since all volatile agents cause dose dependent cardiopulmonary depression, Use of per preanesthesia which help to reduce Isoflurane demands, will reduce the cardiopulmonary depression. Midazolam and Detomidine reduced the dose requirement for inhalation anesthesia in horses undergoing surgery.

Key Words- Xylazine-Diazepam, Detomidine-Midazolam, Preanesthesia, Equine

References
**Procedures**- Methadone (5 mg/kg) were injected intramuscularly (IM) in groups 1. Physiologic saline (0.5 ml) was injected (IM) to the pigeons in group 2 as the control group. Before injection and 30, 60 and 180 minutes post injection, heart rate (HR) and cloacal temperature (CT) were measured and clinical signs and response to the pain test were recorded in all birds in both groups.

**Results**- Results showed significant decrease in HR after methadone administration from 30 to 180 minutes post injection. Decrease in CT at time 60-180 was significant in this group. Observed clinical signs in the birds of methadone group were consisted of stupor and ataxia, sedation and sleepiness, eyelid drop, wing dropping, sitting down and incoordination during standing and walking. Tail up-head down position was seen in some birds. Pain reflex was reduced markedly after methadone injection. Decrease in CT at time 60-180 was significant in this group. Observed clinical signs in the birds of methadone group were consisted of stupor and ataxia, sedation and sleepiness, eyelid drop, wing dropping, sitting down and incoordination during standing and walking. Tail up-head down position was seen in some birds. Pain reflex was reduced markedly after methadone injection and it continued to time 180. There was not seen any changes in clinical status in controls.

**Conclusion and Clinical Relevance**- This study showed that methadone can be suggested as an appropriate and effective analgesic and sedative in pigeon.

**Key Words**- Pigeon, Methadone, Analgesic, Sedative

**References**


**Design**- To study the effect of tramadol drug on amount of blood hemoglobin before and after the anesthesia with Propofol in cats

**Animals**- 4 adult male cats were in two separated groups.

**Procedure**- Control group has been given just propofol and NaCl0.9% and sample group received propofol plus tramadol. In the control group Propofol and NaCl were injected as infusion with speed of 0.6 mg/(kg×min). In Sample group 2 mg/kg tramadol with speed of 0.5 mg/(kg×min) plus Propofol were injected as infusion. In both groups, propofol dose was 10 mg/kg. The NaCl volume in the control group was as same as the tramadol volume in sample group.

**Results**- After induction in this experiment the amount of hemoglobin was sensibly diminished within 30 minutes (P <0.05).

In control group the level of blood hemoglobin reached from 14.6 gr/dl to 12 gr/dl but in sample group the level of blood hemoglobin reduced from 14.3 gr/dl to 11.7 gr/dl.

**Conclusion and Clinical Relevance**- In both groups, reduction of amount of blood hemoglobin was equal. But when propofol without tramadol used, the results show that the initial amount of blood hemoglobin and other characteristics of blood is better.

**Key Words**- Tramadol, Propofol, Hemoglobin, Anesthesia, Cat

**References**


**Poster Presentation**

**Comparison of Total Intravenous Anesthesia with Propofol, Propofol/Dobutamine and Propofol/Epinephrine in Rabbit**

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Objective- Rabbits are routinely utilized as research subjects for in vivo studies. They are the third most commonly anesthetized species but have at least seven times more risks of anesthetic-related death compared to dogs and cats. Total intravenous anesthesia with propofol can be applied instead of inhalants. Propofol administration induces time and dose-dependent hypotension, negative ionotropy and decreased systemic vascular resistance, resulting in the decreasing of the cardiac output. Mechanisms by which propofol induces hemodynamic changes include decreases in preload, afterload and myocardial contractility. Propofol reduces the baroreceptor reflex set point, allowing slower heart rates, despite decreases in arterial pressure. It is important to ensure that during all the procedures where propofol is being given, the vital signs are closely monitored. To overcome the mentioned hypotension we used total intravenous dobutamine and epinephrine in combination with propofol.

Design- An animal experimental study

Animals- We had three different groups of white New-Zealand rabbits (2.2 to 2.7 kg), each consisted of five.

Procedures- Our rabbits were divided to three groups: 1. Propofol (n=5) 2. Propofol/Dobutamine (n=5) 3. Propofol/Epinephrine (n=5). Each rabbits received ketamine (35 mg/kg, IM) and xylazine (3mg/kg, IM) then we injected propofol (7.5 mg/kg, IV) and intubation was performed. Rabbits in first group received total intravenous propofol (1.2 mg/kg/min, IV), the second group received the same dose of propofol in combination with total intravenous dobutamine (10 microgram/kg/min, IV) and the third group received the same dose of propofol with total intravenous epinephrine (1 microgram/kg/min, IV). All animals were anesthetized an hour and received oxygen via ventilator in mode of assist BIPAP. We recorded heart rate, respiratory rate, rectal temperature, SpO2, EtCO2 every 5 minutes from time 0(min) to time 60(min). We also recorded arterial blood pressure every 10 minutes and analyzed blood gas parameters on times 0(min), 30(min), 60(min). We took ECG of all rabbits on times 0(min), 30(min) and 60(min). We recorded the recovery time (Discontinuation of drug infusion to sternal recumbency) as well.

Results- In our propofol group blood pressure fell down during the study; recovery time was longer than propofol/dobutamine and propofol/epinephrine groups. Propofol/epinephrine group had the best recovery time but in propofol/dobutamine group blood pressure was constant during the study in contrast to propofol/epinephrine group which blood pressure was undulating. In propofol/dobutamine group arrhythmia was seen (arterial premature complex).

Conclusion and Clinical Relevance- Maintaining blood pressure in normal range during operation is an important criteria. Low blood pressure as a complication of anesthetic drug is a big concern. Our study has shown dobutamine could maintain blood pressure in normal range and has better function in comparison with epinephrine.

Key Words- Total intravenous anesthesia, Rabbit, Propofol, Dobutamine, Epinephrine

References
weight per minute. Anesthesia lasted for 120 minutes. In the second group, Acepromazine was injected intramuscularly with the dose of 0.1 mg per kg of body weight as premedication. After about 20 minutes, mixture of Ketamine with the dose of 6 mg per kg of body weight and Diazepam with the dose of 0.28 mg per kg of body weight was injected intravenously and slowly to induce anesthesia. Then the tracheal tube placed into trachea and the animal was connected to the anesthetic machine. To continue the anesthesia, we used Isoflurane (between 2-3 percent) and anesthesia lasted for 120 minutes. Venous blood samples were collected from all animals by jugular or cephalic venipuncture into sterile tubes with or without anticoagulant before the start of anesthesia and at 60 and 120 minutes and 24 hours after anesthesia. The activity of enzymes superoxide dismutase, glutathione peroxidase, and glucose 6-phosphate dehydrogenase and value of malondialdehyde in the erythrocyte hemolysate and the amount of total antioxidant capacity in serum were measured.

Results- A significant decrease \( p<0.05 \) in superoxide dismutase activity and a significant increase \( p<0.05 \) in Glucose-6 Phosphate dehydrogenase activity at 24 hours after anesthesia, in the Isoflurane group, were observed when compared to Propofol group. On the other hand, 24 hours after the anesthesia the value of malondialdehyde was higher in the Isoflurane group than that in the Propofol group.

Conclusion and Clinical Relevance- The results of the present study showed that following anesthesia with Isoflurane, production of reactive oxygen species and subsequent oxidative damage and lipid peroxidation of red blood cells is higher than those with Propofol, so that the antioxidant system of red blood cells can not face and deal with it.

Key Words- Oxidative stress, Anaesthesia, Acepromazine, Propofol, Isoflurane, Antioxidant, Superoxide dismutase, Glutathione peroxidise, Glucose 6-phosphate dehydrogenase, Malondialdehyde

References

Poster Presentation

Anaesthesia and Recovery in Grass Carp (Ctenopharyngodon idella) Fingerlings Using Metomidate

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Objective- Anaesthesia is a useful tool for the fish veterinary surgeon and enables various tasks to be performed. Stress is defined as the non-specific response of the body to any demand upon it. Examples of stressors in fish are handling, hauling, sorting, transport and surgery. It has been suggested that if the fish is not permitted enough time to recover completely after stress and surgery too, a second, normally non-fatal, stressful occurrence can be fatal. Anaesthetic added to the tank water can be of significant help in mitigating physiological stress. Different methods can be used to relieve fish from pain and stress. The preferred methods are in the chemical category and involve the use of an anaesthetic agent.

Design- In this study the efficacy of metomidate was investigated in grass carp fingerlings using immersion method. Stages of anaesthesia such as erratic swimming, increased respiration, and reduced activity were monitored and also ability of fish handling for intra-peritoneal injection was assessed. Development of anaesthesia to stage 4 in two minutes was the main index for efficacy of the anaesthetic.

Animals- 40 fish of 20 g average weight were obtained from a commercial fish farm in Esfahan and were kept in a tank (700-liters), containing aerated re-circulating well water around 20°C for one week prior to experimentation.

Procedures- Metomidate was tested at different concentrations (0.5 mg/l, 1 mg/l and 2 mg/l).

Results- Metomidate at a concentration of 1mg/l with 3 minutes and 22 seconds and, 5 minutes and 35 seconds, respectively for induction and recovery times were the most suitable dosages for anesthetise of carp fingerlings. Also, the effects of metomidate anaesthesia on levels of plasma glucose and haematocrit after anaesthesia and during recovery period were investigated. Significantly higher glucose level were measured in the experimental groups (1 mg/l and 2 mg/l) after anaesthesia and during recovery period compared with control group and mean plasma glucose were 5.1 ± 0.9 mM (control group) and 5.2 ± 0.6 mM (experimental group). There is no
significant difference in haematocrit between different concentrations of Mtomidate.

**Conclusion and Clinical Relevance-** In conclusion, using of metomidate anaesthesia led to a reduced release of plasma glucose and probably lowers levels of plasma cortisol after a 12-h recovery period. Metomidate induced a stress response in grass carp. Despite the mentioned effect, chemical anesthesia produces a lower stress response when compared with drug-free handling and transport.

**Key Words-** Grass carp, Metomidate, Anaesthesia, Surgery

**References**

**Poster Presentation**

**Comparison of Recovery Quality and Duration of Xylazine-Diazepam and Detomidine-Midazolam Preanesthesia in Horses**

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**Objective-** Because of the size, weight and unique temperament of different breeds of horses, there is a big challenge to make safe induction, maintenance, and recovery from anaesthesia. To provide consistent, smooth and safe induction of anaesthesia, many combinations of intravenous anaesthetic drugs have been used. The aim of current study is evaluation of the effects of two different pre anaesthetic regimens for equine general anaesthesia undergoing limb surgeries in the veterinary hospital at Ferdowsi university of Mashhad.

**Design-** Clinical study

**Animal-** Sixteen horses included in this study undergoing general anaesthesia.

**Procedures-** Ten horses were pre anesthetized by Xylazine (1.1 mg/kg) and Diazepam (0.2 mg/kg) (XD group) and 6 by Detomidine (20µg/kg) and Midazolam (0.2mg/kg) (DM group) intravenously. Induction in all cases were done with intravenous injection of Ketamine (2.2mg/kg). Horses were intubated with appropriate tube size and anaesthesia was maintained with Isoflurane in oxygen. The quality of induction were assessed by observation of the time taken to achieve lateral recumbency, ease of endotracheal intubation, and the quality of recovery were evaluated by measuring the duration from Switching off the vaporizer to the times taken by the horse to their first swallow (extubation), first head lifting, sternal recumbency, standing and the number of attempt for standing (recovery score). General anaesthesia was monitored by measuring pulse rate, O2 saturation, Tec set, CRT, temperature and respiratory rate each 10 minutes.

**Result-** Both regimens provided smooth and safe induction and all the horses intubated without any difficulty. Among the recovery parameters, swallowing reflex (extubation time) was longer (P<0.05) in DM (12.00±3.46) than XD group (5.727±4.34). No significant difference recorded in other recovery parameters including first head lifting (XD: 13.27±6.65, DM: 18.5±4.72), sternal recumbency (XD: 24.4±11.768, DM: 30.0±7.87) and standing (XD: 34.5±18.253, DM: 60.0±41.78).

In DM group 4 horses stood after 2 to 3 attempts with mild ataxia and another 2 horses stood after several attempts with moderate ataxia. In XD group 7 horses stood after first attempt with mild ataxia, 2 horses stood after 2 to 3 attempts with mild ataxia and the another horse stood on several attempts with moderate ataxia. No statistically significant difference was recorded between age and weight in both regimens.

**Conclusion and Clinical Relevance-** Both anaesthetic regimens provided clinically acceptable anaesthesia in horses; smooth induction, stable anaesthesia for surgery, and smooth recovery.

**Key Words-** Horse, General anesthesia, Preanesthesia, Recovery

**References**
Stress of Transport in *Capoeta Damascina Valenciennes* with Benzocaine Hydrochloride: Anaesthesia and Recovery

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**Objective-** Anaesthesia may be administered by immersion, injection or orally in fish. Also, different methods can be used to relief fish from stress especially during handing, tagging and transporting. The preferred methods are in the chemical category and involve the use of an anaesthetic agent.

**Design-** The present study was to investigate the effects of a two hours transport on *Capoeta damascina* in freshwater with and without a benzocaine hydrochloride solution and the recovery of these fish. Stages of anaesthesia such as erratic swimming, increased respiration, and reduced activity were monitored and also ability of fish handling was assessed.

**Animals-** 100 fish of 175 g average weight were obtained from a commercial fish farm near the shahrekord.

**Procedures-** The fish were anaesthetized with 10 mg/l benzocaine and given a 2-h transport. The effects of benzocaine hydrochloride anaesthesia on levels of glucose, haematocrit, plasma cortisol in fish, after a 2-h transport and during a 24 hours recovery period were investigated.

**Results-** Glucose levels reached their highest values 10 (control) and 3 (experimental group) hours after transport. Plasma cortisol levels were significantly higher for fish in the control group at time 0, 2, 24 hours after transport. Fish in the experimental group reached significantly higher plasma cortisol levels 6 and 12 h after transport. 24 hours after transport, mean plasma cortisol values were 198.6 ± 62.2 nM (control) and 102.0 ± 22.4 nM (experimental group). Significantly higher glucose values were measured in the experimental group at time, 0 and 2 h after transport. 24 hours after transport, mean plasma glucose values were 10.2 ± 0.4 mM (control) and 7.8 ± 0.2 mM (experimental group). The use of benzocaine hydrochloride anaesthesia during transport led to a reduced release of cortisol and significantly lowers levels of plasma cortisol after a 24 hours recovery period. Plasma glucose did not return to basal level after a 24-hours period, indicating that even longer recovery may be needed for the fish to return to a pre-stress state.

**Conclusion and Clinical Relevance-** In conclusion, in *Capoeta damascina valenciennes* benzocaine hydrochloride at a concentration of 10 mg/l made satisfactory induction and recovery. Also, the results demonstrated that benzocaine hydrochloride anaesthesia combined with a recovery period lessens the stress burden imposed by hauling and transport. This perhaps increases the immunological and physiological performance of the fish and minimizes death of fish after transport.

**Key Words-** *Capoeta damascina*, Benzocaine hydrochloride, Anaesthesia, Recovery

**References**

