A Comparison of Xylazine, Diazepam, Chlorpromazine and Promethazine in Relation to Certain Clinical and Hematological Parameters of Indigenous Sheep (Ovis aries)

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Abstract: The effect of various tranquilizer and sedative agents was studied in sheep. The respiration rates, pulse rates and rectal temperature in sheep reduced significantly (P< 0.01) with all the tranquilizing and sedative agents except promethazine hydrochloride. The chlorpromazine hydrochloride produced longest onset and shortest duration of sedation and recovery period, while xylazine hydrochloride produced shortest onset and longest duration of sedation and recovery period. Xylazine hydrochloride and diazepam decreased the rumen motility significantly (P< 0.01) whereas chlorpromazine hydrochloride and promethazine hydrochloride decreased insignificantly. Hemoglobin (Hb) and packed cell volume decreased significantly (P< 0.01) compared with the pre-sedative control values with all the above tranquilizers and sedatives except promethazine hydrochloride. Xylazine hydrochloride reduced the PCV in a marginally significant (P< 0.05) level. Promethazine hydrochloride significantly (P< 0.01) increased the Hb but PCV insignificantly. Xylazine hydrochloride and diazepam produced good sedation in sheep but chlorpromazine hydrochloride produced moderate sedation whereas promethazine hydrochloride only tranquillizes the sheep.

Key words: Xylazine hydrochloride, diazepam and chlorpromazine hydrochloride and promethazine hydrochloride, hemoglobin, packed cell volume

Introduction
There are many surgical, obstetrical and other aetiological effects which need surgical treatment where various sedatives and tranquillizers play an important role as they act as painkillers of the animals and help in controlling the animals. These drugs are needed in veterinary practice and are indispensable as they help in overcoming resistance of the animal during examination, maintaining depth of anesthesia, reducing the amount of anaesthetic agents and increasing the margin of safety. Sedation of animals before examination, treatment of surgical intolerance e.g. amputation of tail, removal of winder, dehorning, examination of rectum, uterus, vagina, abscess opening and operations under local anesthesia are also done. Their value in quelling and calming unfriendly and apprehensive animals has been beneficial in preparations of patient for neuroleptanaesthesia and general anaesthesia (Gros and Booth, 1995). The comparison of the effect of drugs into degrees of sedation or depression produced by many chemically unrelated and related compounds is extremely difficult. Despite this difficulty, there is some value in attempting to categorize their effects. In this experiment xylazine hydrochloride, diazepam, chlorpromazine hydrochloride and promethazine hydrochloride were used. So, the experiment was carried out to fulfill the following objectives of the mentioned tranquilizers and sedatives:
1. To determine the general effect of clinical useful doses of the sedatives and tranquillizers and to study their suitability in sheep.
2. To evaluate the potentiality of sedatives and tranquillizers in sheep.
3. To study the effect of various sedatives or tranquillizers on clinical and hematological parameters in sheep.

Materials and Methods
Ten apparently healthy indigenous sheep were used in four replications to assess various sedatives and tranquillizers on clinical and hematological parameters. The sheep were purchased from different local markets. They were of both sexes and median age was 1 year and median weight was 11 Kg. The sheep were then examined clinically to detect pathological condition.

Experimental design: The experimental sheep were divided into four (4) different groups and the following tranquilizer and sedative agents were administered.

Group 1: Xylazine hydrochloride (Roumpan, Bayer AG, Leverkusen) 10 ml vial, 20 mg/ml. One vial was used at the dose rate of 0.16-0.2 mg/kg, intramuscularly.

Group 2: Diazepam (Seduxen, Richter, Hungary) 0.5% solution, 2 ml ampoule, 5 mg/ml. Sixteen ampoules were used at the dose of 1.43-1.55 mg/kg, intramuscularly.

Group 3: Chlorpromazine hydrochloride (Largactil, Rhone poulenc Rorer Bangladesh Ltd.) 2 ml ampoule, 25 mg/ml. Seventeen ampoules were used at the dose rate of 7.5-8.5 mg/kg.

Group 4: Promethazine hydrochloride (Phenergan, Rhone poulenc Rorer Bangladesh Ltd.) 2.5% solution w/v, 2 ml ampoule, 25 mg/ml. Fifteen ampoules were used at the dose rate of 5.7-6.3 mg/kg.

Sedation: Each morning experiment was performed in the operation theater of the Department of Surgery and Obstetrics. The animals were starved of both food and water for 12 hours before sedation and then were restrained physically by an assistant and the drug was injected intramuscularly. Immediately after injection, the animals were observed for various behavioral changes i.e. change in attitude, cutback and posture and time parameter like onset time, down time and recovery time. The depth of sedation and analgesia was assessed by monitoring various oculer reflexes, pinprick reflexes, relaxation of neck, jaw, tail and anus, salivation, lacrimation, urination and grunting at 0 hr (before administration of drug) and at 15th, 30th minutes post administration of the drug. Respiration rate, heart rate, rectal temperature and rumen motility were also recorded.

Respiration rate: The respiration was recorded by counting the abdominal movements. Care must be taken not to excite the animal before and during monitoring.

Pulse rate: Pulse rate was recorded by auscultation with a stethoscope placed over the left side of the chest.

Rectal temperature: The rectal temperatures were taken by inserting a clinical thermometer at least 1.5-2.0 cm into the rectum.
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and keep it in the position for 1 minute.

**Rumen motility:** Rumen motility rates were measured by hearing the motility sound of rumen with the help of stethoscope.

**Collection of blood samples:** A total of two blood samples were collected from jugular vein of each experimental animal 15 minutes prior to administration of tranquilizers and sedatives and 15th minute after sedation and tranquilization. Immediately after collection of blood, samples were transferred to a glass vial containing Potassium EDTA (2.5 mg) as anticoagulant. The vial was gently shaken to mix the blood with the anticoagulant. The samples thus collected were subjected to following hematological tests.

**Determination of hemoglobin:** Sahli hemoglobinimeter technique was used for determination of hemoglobin

**Determination of packed cell volume (PCV):** The packed cell volume was determined by Wintrobe hematocrit tube and read by percentage (%).

**Statistical analysis:** The data obtained in the experiment were calculated and mean ± SD for each group was determined. The differences were analyzed using "F" test and student paired "T" test.

**Results**

**General signs after administration of tranquilizers and sedatives in indigenous sheep**

**Xylazine hydrochloride:** Drooping of the upper eyelids, droopy head, salivation and lateral recumbency were observed in all the sheep after onset of sedation with xylazine hydrochloride at the dose rate of 0.18 mg/kg. There was milk fever like recumbency and muscle relaxation was observed. The sheep of this group showed severe droveness 5-10 minute after administration of xylazine hydrochloride.

**Diazepam:** Diazepam at the dose rate of 1.48 mg/kg produced droveness, walking in circle, drooping of the upper eyelids and droopy head in all the sheep. Sleepy impression, lateral deviation of the head and relaxation of the muscle were found to have good sedation.

**Chlorpromazine hydrochloride:** Chlorpromazine hydrochloride at the dose rate of 8 mg/kg produced drooping of the upper eyelids, droopy head and remained standing in most (nine out of ten) of the sheep. Muzzle rested on the floor, lateral deviations of the head and muscle relaxation were also found. Eight sheep out of ten of this group were found to have moderate to good sedation.

**Promethazine hydrochloride:** The animal became unrest, mild tremor of the hind limbs was observed in most (eight out of ten) of the sheep. In this group there was no sedation in all the sheep after administration of promethazine hydrochloride at the dose rate of 6.88 mg/kg.

**Clinical parameters:** The effects of xylazine hydrochloride, diazepam, promethazine hydrochloride, chlorpromazine hydrochloride sedation and/or tranquilization on the temperature, respiration rates, pulse rates and rumen motility in sheep are presented in Table 1.

**Xylazine hydrochloride:** The mean value of respiration rates, pulse rates and rectal temperature, 15 minutes before xylazine hydrochloride sedation were 27.3 ± 3.37, 85.4 ± 5.66 and 103.02 ± 0.22 °F respectively. These values 15th minute of sedation were 21.9 ± 3.25, 74.7 ± 6.48 and 102.33 ± 0.33 °F. The values during 30th minute of sedation were 19.5 ± 3.34, 70.6 ± 6.72 and 102.12 ± 0.55 °F respectively. The respiration rates, pulse rates and rectal temperature were decreased significantly (P<0.01) at 15th minute and also 30th minute of sedation. The mean value of rumen motility rate 15 minutes before xylazine hydrochloride administration was 1.4 ± 0.16 per minute. This value at 15th minute of xylazine hydrochloride administration was 0.58 ± 0.13. The value during 30th minute of sedation was 0.38 ± 0.15 per minute. The rumen motility rate was significantly reduced at 15th minute and 30th minute of xylazine hydrochloride sedation.

**Diazepam:** The mean value of respiration rates, pulse rates and rectal temperature, 15 minutes before diazepam sedation were 26.1 ± 78.09, 100 ± 9.07 and 103 ± 0.41 °F respectively. After administration of diazepam, these mean values were 20.6 ± 7.30, 98.0 ± 10.45 and 101.96 ± 0.64 °F during 15th minute and 18.2 ± 5.31, 85.1 ± 10.38 and 101.64 ± 0.83 °F at 30th minute of sedation, respectively. The respiration rates, pulse rates and rectal temperature were significantly reduced at 30th minute of sedation. The mean value of rumen motility rate 15 minutes prior to diazepam administration was 1.4 ± 0.28 per minute. After administration of diazepam, this value was 0.92 ± 0.19 and 0.5 ± 0.17 per minute during 15th minute and 30th minute respectively. The rumen motility rate was significantly decreased after 15th minute and 30th minute of diazepam sedation.

**Chlorpromazine hydrochloride:** The mean value of respiration rates, pulse rates and rectal temperature, 15 minutes before chlorpromazine hydrochloride sedation were 29.1 ± 6.66, 95.5 ± 14.59 and 102.79 ± 0.32 °F respectively. These values reduced to 15th minute of sedation 19.5 ± 4.74, 77.9 ± 11.69 and 101.72 ± 0.40 °F at 15th minute of sedation and 13.6 ± 4.70, 74.6 ± 6.00 and 101.44 ± 0.41 °F, at 30th minute of sedation respectively. The respiration rates, pulse rates and rectal temperature were significantly reduced after 15th minute and 30th minute of sedation. The mean value of rumen motility rate 15 minutes before chlorpromazine hydrochloride administration was 1.2 ± 0.16 per minute. This value after chlorpromazine hydrochloride administration was 1.1 ± 0.19 and 1.08 ± 0.21 per minute at 15th minute and 30th minute of sedation, respectively.

**Promethazine hydrochloride:** The mean value of respiration rates, pulse rates and rectal temperature, 15 minutes before promethazine hydrochloride sedation were 19.1 ± 5.88, 95.0 ± 9.30 and 103.24 ± 0.69 °F respectively. After administration of promethazine hydrochloride, these values at 15th minute of sedation were 22.1 ± 10.39, 101.0 ± 3.89 and 103.09 ± 0.68 °F per minute respectively. During 30th minute of sedation the values were 22.4 ± 9.11, 101.8 ± 8.51 and 103.09 ± 0.7 °F respectively. The respiration rates and rectal temperature were significantly increased but pulse rates increased significantly (P<0.01) at 15th minute and 30th minute of sedation. The mean value of rumen motility rate 15th minute prior to promethazine hydrochloride administration was 1.2 ± 0.21 per minute. This value was 1.12 ± 0.21 and 1.16 ± 0.20 per minute at 15th and 30th minute of promethazine hydrochloride administration. The rumen motility rate was non-significantly reduced at 15th and 30th minute of sedation.

**Hematological parameters**

**Xylazine hydrochloride:** The mean volume of Hb and PCV 15 minutes before xylazine hydrochloride sedation were 8.8 ± 0.52 g/dL and 36.4 ± 9.03% respectively. The mean value of hemoglobin and PCV at 15th minute of administration were 8.42 ± 0.55 g/dL and 33.7 ± 9.85% respectively. The mean value of Hb significantly reduced and PCV also significantly (P<0.05) decreased (Table 2).

**Diazepam:** The mean value of hemoglobin (Hb) and packed cell volume (PCV) 15 minutes before sedation were 8.86 ± 0.38 g/dL and 32.7 ± 9.42% respectively. Fifteen minutes after sedation the mean value of Hb and PCV were 8.54 ± 0.30 g/dL and 31.2 ± 8.31% respectively. The mean values of both Hb and PCV reduced significantly (P<0.01).

**Chlorpromazine hydrochloride:** The mean value of Hb and PCV 15 minutes before sedation were 8.58 ± 0.50 and 35.6 ± 9.09 g/dL respectively.
Table 1: Effects of xylazine hydrochloride, diazepam, chlorpromazine hydrochloride and promethazine hydrochloride on respiration rates, pulse rates, rectal temperature and rumen motility in indigenous sheep (Ovis aries)

<table>
<thead>
<tr>
<th>Treatment and Parameters</th>
<th>15min. before sedation (mean ± SD)</th>
<th>15 min. after sedation (mean ± SD)</th>
<th>30min. after sedation (mean ± SD)</th>
<th>P values</th>
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</thead>
<tbody>
<tr>
<td><strong>Xylazine hydrochloride</strong></td>
<td></td>
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<tr>
<td>Respiration rates</td>
<td>27.3± 3.37</td>
<td>21.9± 3.28</td>
<td>19.5± 3.34</td>
<td>P&lt; 0.01</td>
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<tr>
<td>Pulse rates</td>
<td>85.4± 5.66</td>
<td>74.7± 6.48</td>
<td>70.6± 6.72</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rectal temperature</td>
<td>103.0± 0.22</td>
<td>102.2± 0.33</td>
<td>102.1± 0.55</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rumen motility</td>
<td>1.4± 0.16</td>
<td>0.56± 0.13</td>
<td>0.38± 0.15</td>
<td>P&lt; 0.01</td>
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<tr>
<td><strong>Diazepam</strong></td>
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<tr>
<td>Respiration rates</td>
<td>26.1± 7.09</td>
<td>20.6± 7.38</td>
<td>18.2± 5.31</td>
<td>P&lt; 0.05</td>
</tr>
<tr>
<td>Pulse rates</td>
<td>100.0± 9.07</td>
<td>88.9± 10.45</td>
<td>85.1± 10.38</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rectal temperature</td>
<td>103.9± 0.41</td>
<td>101.9± 0.64</td>
<td>101.6± 0.93</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rumen motility</td>
<td>1.4± 0.28</td>
<td>0.62± 0.19</td>
<td>0.5± 0.17</td>
<td>P&lt; 0.01</td>
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<tr>
<td><strong>Chlorpromazine hydrochloride</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Respiration rates</td>
<td>29.1± 6.66</td>
<td>19.5± 4.74</td>
<td>18.6± 4.70</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Pulse rates</td>
<td>95.5± 14.59</td>
<td>77.9± 11.60</td>
<td>74.6± 8</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rectal temperature</td>
<td>102.7± 0.32</td>
<td>101.7± 0.4</td>
<td>101.4± 0.41</td>
<td>P&lt; 0.01</td>
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<tr>
<td>Rumen motility</td>
<td>1.2± 0.16</td>
<td>1.1± 0.19</td>
<td>1.0± 0.21</td>
<td>P&lt; 0.05</td>
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<tr>
<td><strong>Promethazine hydrochloride</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Respiration rates</td>
<td>19.1± 5.88</td>
<td>22.1± 10.39</td>
<td>22.4± 9.11</td>
<td>P&lt; 0.05</td>
</tr>
<tr>
<td>Pulse rates</td>
<td>85.0± 9.30</td>
<td>101.0± 0.89</td>
<td>101.8± 0.51</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Rectal temperature</td>
<td>103.7± 0.69</td>
<td>103.0± 0.68</td>
<td>103.0± 0.77</td>
<td>P&lt; 0.05</td>
</tr>
<tr>
<td>Rumen motility</td>
<td>1.2± 0.21</td>
<td>1.1± 0.21</td>
<td>1.1± 0.20</td>
<td>P&lt; 0.05</td>
</tr>
</tbody>
</table>

Table 2: Effects of xylazine hydrochloride, diazepam, chlorpromazine hydrochloride and promethazine hydrochloride on hemoglobin (Hb) and packed cell volume (PCV) in indigenous sheep (Ovis aries)

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Parameters</th>
<th>15min. before sedation (mean ± SD)</th>
<th>15 min. after sedation (mean ± SD)</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xylazine hydrochloride</td>
<td>Hb (gm%)</td>
<td>8.4± 0.52</td>
<td>8.4± 0.55</td>
<td>P&lt; 0.01</td>
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<td></td>
<td>PCV (%)</td>
<td>36.4± 9.03</td>
<td>33.7± 9.89</td>
<td>P&lt; 0.05</td>
</tr>
<tr>
<td>Diazepam</td>
<td>Hb (gm%)</td>
<td>8.86± 0.30</td>
<td>8.54± 0.30</td>
<td>P&lt; 0.01</td>
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<tr>
<td></td>
<td>PCV (%)</td>
<td>32.7± 4.42</td>
<td>31.2± 3.31</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Chlorpromazine hydrochloride</td>
<td>Hb (gm%)</td>
<td>9.1± 0.41</td>
<td>8.1± 0.39</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td></td>
<td>PCV (%)</td>
<td>34.3± 6.04</td>
<td>33.0± 6.28</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td>Promethazine hydrochloride</td>
<td>Hb (gm%)</td>
<td>8.5± 0.50</td>
<td>9.1± 0.45</td>
<td>P&lt; 0.01</td>
</tr>
<tr>
<td></td>
<td>PCV (%)</td>
<td>35.8± 9.0</td>
<td>36.0± 9.73</td>
<td>P&lt; 0.05</td>
</tr>
</tbody>
</table>

Discussion
In the experiment xylazine hydrochloride was used at the dose rate of 0.18 mg/kg of body weight intramuscularly as a good sedative in all of the animals which correlate with the findings of Shokry et al. (1976) and Rapitopoulou (1990). They get sedative effects by the drug at dose rate of 0.20 mg/kg body weight. Drooping of the upper eyelids, droopy head, salivation, milk fever like recumbency, severe drowsiness and muscle relaxation appeared in all of the animals within 5 to 10 minutes after the administration of xylazine hydrochloride, which was correlated with the findings of Hoque et al. (1984) and Naylor et al. (1997). They reported that xylazine produced adequate sedation, muscle relaxation and narcosis in cattle and sheep. They also observed salivation, mild depressed palpebral and swallowing reflex. Limbs, tail, abdominal musculature and prepuital sheath were moderately relaxed. The copious secretion of saliva after xylazine administration might be due to its parasympathomimetic like action.

Diazepam was used at the dose rate of 1.48 mg/kg body weight as a good sedative in all of the experimental animals. Drowsiness, round walking, drooping of the upper eyelids and droopy head were observed in all the sheep. Sleepy impression, lateral deviation of the head and relaxation of the muscle were also observed which correspond with the findings of Kumar et al. (1999); Pratap et al. (1997). They postulated that diazepam produced slight relaxation of jaw, sluggish pupil reflex, reduced response to pin prick, decreased response to noise, slight incoordination and muscle relaxation in goats; vacant look, standing motionless with head lowered, stumbling and slight swaying in yaks.

After using chlorpromazine hydrochloride it was found in most sheep that they remained in standing position. Drooping of the upper eyelids, droopy head, muzzle rested on the floor, lateral deviation of the head and muscle relaxation were common at a dose rate of 8 mg/kg body weight. These signs were correlated to those observed by Kumar and Singh (1977); Pathan (1992). Additionally, they found stopped beating, chewing and licking habit in case of goats after a dose rate of 3.48 mg/kg.

In this experiment promethazine hydrochloride produced restlessness, mild tremor of the hind limbs and no sedation in sheep. These symptoms were similar to those observed by Jones (1987) and Pathan (1982). They reported that promethazine hydrochloride produced confusion, diarrhea, incoordination, hyper excitability, tremor and no sedative effect in goats.

Effects on clinical parameters
Respiratory rate: The respiratory rate significantly reduced with all the sedative agents except promethazine hydrochloride in indigenous sheep. These observations correspond with the findings of Lee and Rhee (1986); Doherty et al. (1986); Pandey and Sharma (1986); Shukhri (1998); Desghani et al. (1991); Mohammad et al. (1996); Celly et al. (1957); Schoffysik et al. (1998) and Kumar et al. (1999). These reductions in respiration...
rate resulted from direct depression effect of sedative or
promediant on the central nervous system (Peshin and
Kumar, 1979 and Haskins et al., 1986). Intravenous administration of
promethazine hydrochloride at a dose rate of 0.05 mg/kg caused
insignificant increase in the respiratory rate. Although
chlorpromazine is a phenothiazine drug but it did not increase
respiratory rate rather it decreased the rate; however, the
intensity of action of chlorpromazine may be possible for this
effect.

Pulse rates: The tranquilizers and sedatives influenced the
activity of the cardiovascular system. The heart rate increased
significantly (P< 0.01) with all the tranquilizers and sedatives
except promethazine hydrochloride. After administration of
xylazine hydrochloride the heart rate decreased significantly
(P< 0.01) in indigenous sheep during 15th 30th minute of sedation.
Similar results have been reported in sheep by other investigators
(Dehghani et al., 1991; Mohammedi et al., 1996). Xylazine produces
bradycardia and hypotension due to central and peripheral
vasodilatation in sympathetic nervous system and as a result
reduction of pulse rate occurs (Lucas and Flores, 1972). Heart
rate decreased significantly (P< 0.01) with diazepam and
chlorpromazine hydrochloride in sheep. These results
conforms with the findings of Pathan (1992; Pratap et al., 1997; Kariman
et al., 1996) and Chiwale et al., (1998). The heart rate is reduced by
preventing the stimulant effect of epinephrine and norepinephrine
upon the heart (Adams, 1956). When using promethazine
hydrochloride a significant increase in heart rate was recorded
which is in agreement with the findings of Pathan (1962).

Rectal temperature: In this study a rectal temperature reduced
significantly (P<0.01) with all the sedatives and tranquilizers with
the exception of promethazine hydrochloride. The reduction of
rectal temperature with xylazine hydrochloride, diazepam,
chlorpromazine hydrochloride are agreeable with the earlier reports
(Pathan, 1982; Robertson et al., 1990; Aamarjal et al., 1995 and
Chiwale et al., 1998). It might result from depression of
thermoregulatory center in the hypothalamus (Kumar et al., 1979;
Kumar and Thunnom, 1979). Kumar et al., (1990) suggested that
reduction of body temperature is due to inhibition of
inhibitory effects of these agents on metabolism and
metabolism.

Rumen motility rate: A significant reduction in rumen motility rate
with xylazine hydrochloride, diazepam were observed in this
investigation like others (Brika et al., 1986; Dehghani et al., 1991 and
Mohammedi et al., 1996). It is postulated that xylazine
decreases sympathetic discharge and reduces release of
norepinephrine and ultimately reduces the rumen motility (Gross
and Booth, 1995). Rumen motility reduced insignificantly after the
administration of chlorpromazine hydrochloride in sheep. These
findings conform to the previous report (Souza et al., 1974).

Hematological parameters: In indigenous sheep hemoglobin and
packed cell volume reduced significantly (P< 0.01 and P< 0.05)
with all the tranquilizers and sedatives during the maximum depth of
sedation except promethazine hydrochloride, where it
increased significantly (P<0.01) increased the Hb but PCV insignificantly.
These correlate the findings of Hossain and Shahriar (1989);
and Bhattacharya and Sinameta (1998).

Packed cell volume is correlated with the size and number of
erythrocyte per unit volume of blood (Schalm et al., 1975). The
reduction of hemoglobin and packed cell volume might be
attributed to the combined effect of these drugs (Kumar and
Singh, 1990). The pooling of erythrocytes and leukocytes in the
splanchnic might in decrease of PCV and Hb (Nara et al., 1978). Similar
observations have also been reported by other workers (Peshin
and Kumar, 1978; Sanger et al., 1988).

Conclusion: Xylazine hydrochloride, diazepam, chlorpromazine
hydrochloride at the dose rate of 0.18 mg/kg, 1.48 mg/kg and 8
mg/kg body weight respectively are suitable for sedation
tranquilization and/or promediant in Indigenous sheep, because
these sedatives and tranquilizers produces short induction and long
duration of action with sufficient muscle relaxation.
Promethazine hydrochloride did not produced sedation but acted as
a good tranquilizer.

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and their combination in cattle and sheep. Veterinary
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in yaks. Indian Vet., 76: 211-212.
a combination of ketamine and xylazine in experimental and
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