



Mansoura University
Faculty of veterinary medicine
Department of Internal Medicine,
Infectious and Fish Diseases

"Ultrasonographic Evaluation of Abdominal Troubles and Clinicopathological studies in small ruminants"

Thesis presented by
Sara Ibrahim Ismail Atalla
(B.V. Sc., 2012)
(Mansoura University)

Under Supervision of

Prof. Dr.
Mohamed A. A. Youssef
Professor of Internal Medicine,
Department of Internal Medicine
Faculty of Veterinary Medicine
Mansoura University

Prof. Dr.
Essam. M. Ibraheem
Professor of Clinical-pathology,
Department of pathology,
Animal Health Research
Institute, Dokkii, Giza

Dr.
Hussam M.M. Ibrahim
Associate professor of Internal Medicine,
Department of Internal Medicine
Faculty of Veterinary Medicine
Mansoura University

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Supervision page

Title: "Ultrasonographic Evaluation of Abdominal Troubles and Clinico-pathological Studies
in Small Ruminants".

Name: Sara Ibrahim Ismail Atalla

Under Supervision of

Name	Profession	Signature
1. Prof. Dr. Mohamed A. A. Youssef	Professor of Internal Medicine, Department of Internal Medicine, Infectious and Fish Diseases, Faculty of Veterinary Medicine, Mansoura University.	
2. Prof. Dr. Essam M. Ibraheem	Pofessor of Clinical pathology, Department of pathology, Animal Health Research Institute, Dokii, Giza	
3. Dr. Hussam M. M. Ibrahim	Associate Professor of Internal Medicine, Department of Internal Medicine, Infectious and Fish Diseases, Faculty of Veterinary Medicine, Mansoura University.	

Head of Department

Prof. Dr.
Viola Hassan Zaki

Vice-Dean for Post
Graduate

Prof. Dr.
Gehad R.M. Elsayed

Dean of Faculty

Prof. Dr.
Nabil Abu Heakal Sayed Ahmed

Supervision & Approval page

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Name: Sara Ibrahim Ismail Atalla

Under Supervision of

Name	Profession
1. Prof. Dr. Mohamed A. A. Youssef	Professor of Internal Medicine, Department of Internal Medicine, Faculty of Veterinary Medicine, Mansoura University.
2. Prof. Dr. Essam M. Ibraheem	Pofessor of Clinical pathology, Department of pathology, Animal Health Research Institute, Dokii, Giza
3. Dr. Hussam M. M. Ibrahim	Associate Professor of Internal Medicine, Department of Internal Medicine, Mansoura University.

Approval committee

Name	Profession
1. Prof. Dr. Asmaa Omar Ali	Professor of Internal Medicine, Department of Animal Medicine, Faculty of Veterinary Medicine, Suez canal University.
2. Prof. Dr. Magda Saleh Elsayed	Professor of Internal Medicine, Department of Animal Medicine, Faculty of Veterinary Medicine, Alexandria University.
3. Prof. Dr. Mohamed A. A. Youssef	Professor of Internal Medicine, Department of Animal Medicine, Faculty of Veterinary Medicine, Mansoura University.
4. Dr. Hussam M. M. Ibrahim	Associate of Internal Medicine, Department of Animal Medicine, Faculty of Veterinary Medicine, Mansoura University.

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**Prof. Dr.
Viola Hassan Zaki**

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Graduate

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Gehad R.M. Elsayed**

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**Prof. Dr.
Nabil Abu Heakal Sayed Ahmed**

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List of Abbreviations

5-HT4	5-hydroxytryptamine 4
ALK	Alkaline-phosphatase
ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
B. W.	Body weight
GERD	Gastro-esophageal reflux disease
GGT	Gamma-glutamyl transferase
GI	Gastrointestinal Tract
GIT	Gastro-intestinal tract
GPT	Glutamate Pyruvate Transaminase
HB ~ Hb	Hemoglobin
ICs	Intercostal spaces
IFB,FB	Indigestible Foreign Bodies
Mg Kg⁻¹	Milligram per kilogram body weight
MHz	Mega Hertz
NUD	Non Ulcer dyspepsia
PCV	Packed cell volume
RBCs	Total erythrocytic counts
TLC	Total leukocytic count
TP	Total protein
VFA	Volatile fatty acid

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Summary

I-Field study:

A total number of seventy native breed small ruminants were used in this study, of which sixty were suffering from gastrointestinal disorders (sheep, n=Forty-five; goat, n=fifteen), as well as ten apparently healthy animals served as control group (sheep, n= five; goat, n=five). The examined sheep were aged between six month to two years, while the goat were six month to three years and weighed 10 to 50 kg⁻¹. The study was planned to investigate the gastrointestinal troubles such as; ruminal impaction with fermentable carbohydrates, ruminal impaction with foreign bodies, ruminal tympany and intestinal obstruction using ultrasound and clinicopathological evaluation of diseased cases.

A-Ultrasonographic examination:

Linear transducer with a frequency of 5 MHZ and a real-time B-mode ultrasound machine were used for examination of rumen, reticulum, small intestine and large intestine. The rumen was examined in standing position at left flank and the ruminal wall was echogenic band. The reticulum was examined in standing position in the ventral mid line behind xiphoid cartilage and the reticular wall appeared as thick echogenic half-moon shape band. Reticular movements were detected through real time scanning in the form of 4-5 biphasic contractions within 4 minutes. The intestine was examined also in standing or even recumbent right side at the ventral abdomen that appeared as circular structures that contained food and mucous or gas.

Ultrasound of gastrointestinal tract troubles:

1. **Ruminal impaction with fermentable carbohydrates:** These cases were detected in Twenty- five sheep and fifteen goats that revealed "anechoic" indigestible contents.
2. **Ruminal impaction with foreign bodies:** That was diagnosed in four sheep showing echogenic mass within the rumen just below the distinctly echogenic rumen.
3. **Ruminal Tympany:** These cases were diagnosed in ten sheep and revealed "hyperechoic" indigestible contents.
4. **Intestinal obstruction:** These cases were diagnosed in six sheep that revealed "echogenic" fluids filled the lumen of Intestine.

B-Clinicopathological evaluation:

Hematologically; PCV, Hb and RBCs count were significantly higher in ruminal tympany and intestinal obstruction, and lower in ruminal Impaction with foreign bodies ($P \leq 0.05$). The total leucocytes counts were significantly higher in all diseased animals.

Biochemically; Hyperproteinemia and hyperalbuminemia were detected in intestinal obstruction, meanwhile hypoproteinemia and hypoalbuminemia were noticed in ruminal impaction with foreign bodies and ruminal tympany ($P \leq 0.05$). The serum urea nitrogen, liver enzymes and creatinine levels were significantly elevated ($P \leq 0.05$) in all diseased animals.

II-Experimental Study:

Ten healthy adult sheep were used in this study. Their ages were ranged from 6 month to 2 years and their body weight from 20 to 37 kg. None of those sheep had gastrointestinal disorders or evidence of any systemic diseases. Two weeks before starting of that study, each one was fed twice daily on 0.5 kg hay/10 kg and 0.5 kg concentrated ration with unlimited access to water. Each animal was injected with neostigmine IV, at dose rates of 0.02, 0.05 and 0.07mg/ kg⁻¹ and mosapride-citrate at dose rates of 5, 8 and 10 mg kg⁻¹ orally via stomach tube. Ultrasonographic examination was performed with a 5MHz transducer on left side from the 8th to 12th intercostal spaces (ICSs) for measuring reticulo- ruminal contractions. Heart and respiratory rates were also assessed.

1-Neostigmine:

Reticular motility was significantly increased: **At dose rate 0.02 and 0.05 mg kg⁻¹** after 30, 60, 90 and 120minutes, respectively.

Heart and Respiratory rates revealed significant tachycardia & Polypnea ($P < 0.05$) in all doses 0.02, 0.05 and 0.07mg kg⁻¹.

2-Mosapride- Citrate:

Reticular motility was significantly increased: **At dose rate of 8mg and 10mg kg⁻¹** after 30, 60 and 90 minute, respectively.

Heart rate showed significant tachycardia ($P < 0.5$) at dose rate of **10 mg kg⁻¹** after 15, 30, 60 and 90minute.

Respiratory rate revealed significant polypnea: **At dose rate of 5mg kg⁻¹** after 30, 60 and 90 minute, **At dose, rate 10 mg kg⁻¹** after 15, 30, 60, 90 and 150minute.

Conclusion and Clinical Relevance

From the aforementioned results, it could be concluded that:

1. Ultrasonography enable the clinician to get an accurate assessment of gastrointestinal tract disorders in comparison to the subjective physical examination by palpation and auscultation.
2. Ultrasound provide an inexpensive and non-invasive method to further examination in small ruminants.
3. Clinico-pathological evaluation of GIT troubles in small ruminants as confirmative diagnosis.
4. Neostigmine showed a dose-dependent prokinetic effect on ruminoreticular motility in sheep at 0.02 and 0.05mg kg⁻¹ which started immediately following the injection. There is no significant effect of neostigmine on reticular motility at dose rate 0.07 mg kg⁻¹. Neostigmine at 0.05mg kg⁻¹ seems to be the most effective dose ,which promotes reticular contraction.
5. Mosapride citrate showed a dose-dependent prokinetic effect on ruminoreticular motility in sheep at 8 and 10 mg kg⁻¹ which started after oral administration. It was rapidly absorbed from gastrointestinal tract. There was no significant effect of mosapride citrate on reticular motility at dose rate 5mg kg⁻¹. Mosapride at 8 mg kg⁻¹ seems to be the most effective dose, which promotes reticular contraction without side effects.
6. In this respect, Further studies still needed concerning the evaluation of abdominal troubles.