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T3.2 Workshops for the academic and visiting staff of Veterinary Medicine programmes

November 27-29, 2023

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Development of Veterinary Faculties at Georgian HEIs to Create a New Pool of Young Veterinary Professionals in Georgia

Title: Application of cases in teaching and case series studies in final theses

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Estonian University of Life Sciences (Estonia)

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ERASMUS-EDU-2022-CBHE-STRAND 1-101082479

Eesti Maaülikool

Estonian University of Life Sciences

Application of cases in teaching and case series studies in final theses

Kristel Peetsalu

Small animal medicine and general pathology lecturer, DVM, PhD

Head of the veterinary medicine curriculum

Aims of the lecture

TEACHING

- Cases as part of the veterinary medicine teaching process

(RESEARCH) MASTER'S THESIS

- Case study (series) and final thesis (Master's thesis)

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Miller's pyramide of clinical competence

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In veterinary medicine teaching, cases are often used as a fundamental educational tool

that help students develop:

- clinical reasoning
- problem-solving skills
- Theoretical+practical knowledge
- discussion skills
- Etc.

- **Veterinary educators use cases to simulate real-world (clinical) practice and to prepare students for the challenges they will face in their future careers.**

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Definitions

- Cases
- (Clinical cases)
- Cased based learning
- Case reports
- Case study
- Case series study

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- The terms "cases" and "clinical cases" are often used interchangeably,

but they can carry slightly different nuances depending on the context.

- Usage: The term "cases" is broad and can refer to any situation or instance involving an animal patient that requires veterinary attention or management

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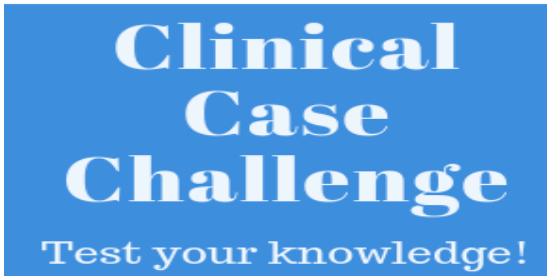
- Usage: "Clinical cases" specifically emphasizes the aspect of clinical or medical examination, diagnosis, and treatment.

- Clinical case (one definition)

a case of illness that matches the criteria established for the identification of a certain disease



CASES refer to the broader set of:

- **situations**
- **problems**
- or **scenarios**

- encountered in veterinary medicine education

- These can include **hypothetical** or **real-life scenarios.**

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- Defining **cases** in veterinary medicine teaching involves

creating structured scenarios or clinical situations

that students can analyze, diagnose, and treat

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Cases can be used in various ways, such as:

in classroom discussions

Computer-based tasks

assignments

or as part of written or oral examinations

Etc.

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Clinical cases

serve as practical teaching and learning opportunities, allowing students to apply their knowledge and clinical skills to real-life scenarios.

- These cases can encompass a wide range of species, from companion animals like dogs and cats to livestock, horses, wildlife, and exotic animals.

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- Each clinical case includes essential information such as:
  - Patient's species
  - Breed
  - Age
  - Sex
  - Presenting signs and symptoms
  - Medical history
  - Diagnostic findings
  - Any relevant background information

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Case-based learning

- An educational approach that centers on the use of real or simulated cases as a foundation for teaching and learning

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Designed to help veterinary students develop:

- problem-solving skills
- clinical reasoning
- and practical knowledge

by engaging with and analyzing scenarios that mimic real-life situations they may encounter in their future careers

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- Case-based learning can be delivered in a number of formats

many of which incorporate active learning:

- the use of cases as part of a lecture
- whole classroom discussions
- small group or individual case study sessions, computer simulations
- "clicker cases"
- role-play exercises

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- Case-based learning also includes clinic-based teaching, which is ubiquitous in medical and veterinary education.

- The use of technology and online resources has also expanded the possibilities for delivering case-based learning in veterinary education.

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- Case-based learning in veterinary medicine offers a dynamic and engaging approach to education that prepares students for the multifaceted and ever-evolving challenges of clinical practice.

- It encourages lifelong learning

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?

- Why case-based learning is important part of teaching veterinary medicine?
- 1. .....
- 2. .....
- 3. .....
- 4. .....

Key features of case-based learning in veterinary medicine include:

1. Realistic Clinical Scenarios:

Students are presented with detailed, authentic (clinical) cases that mirror the complexities and challenges they will face in veterinary practice.

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2. Active Learning:

Instead of passive lectures, case-based learning encourages active participation and engagement.

Students work in groups or individually

to analyze the case, make decisions,

and develop treatment plans.

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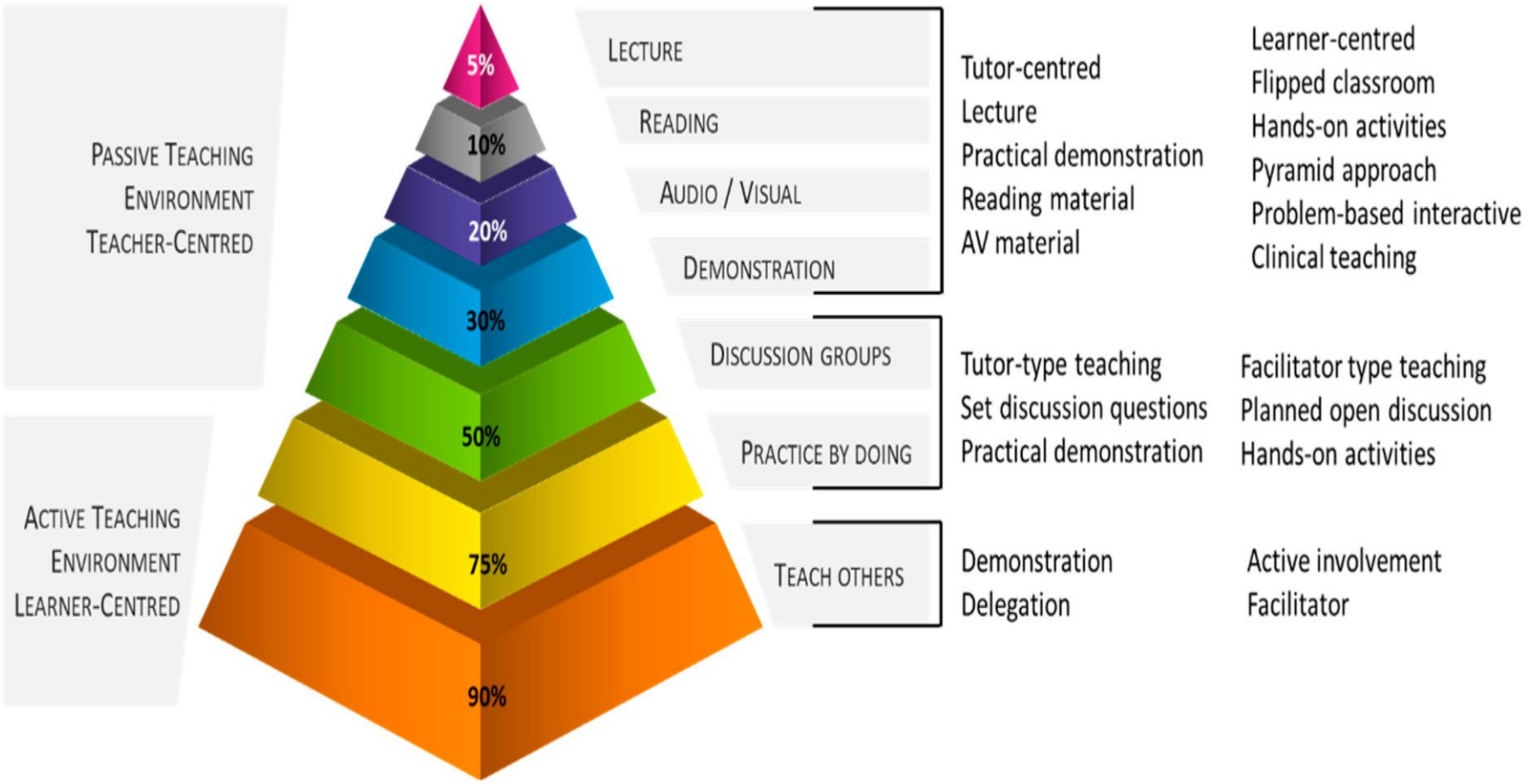
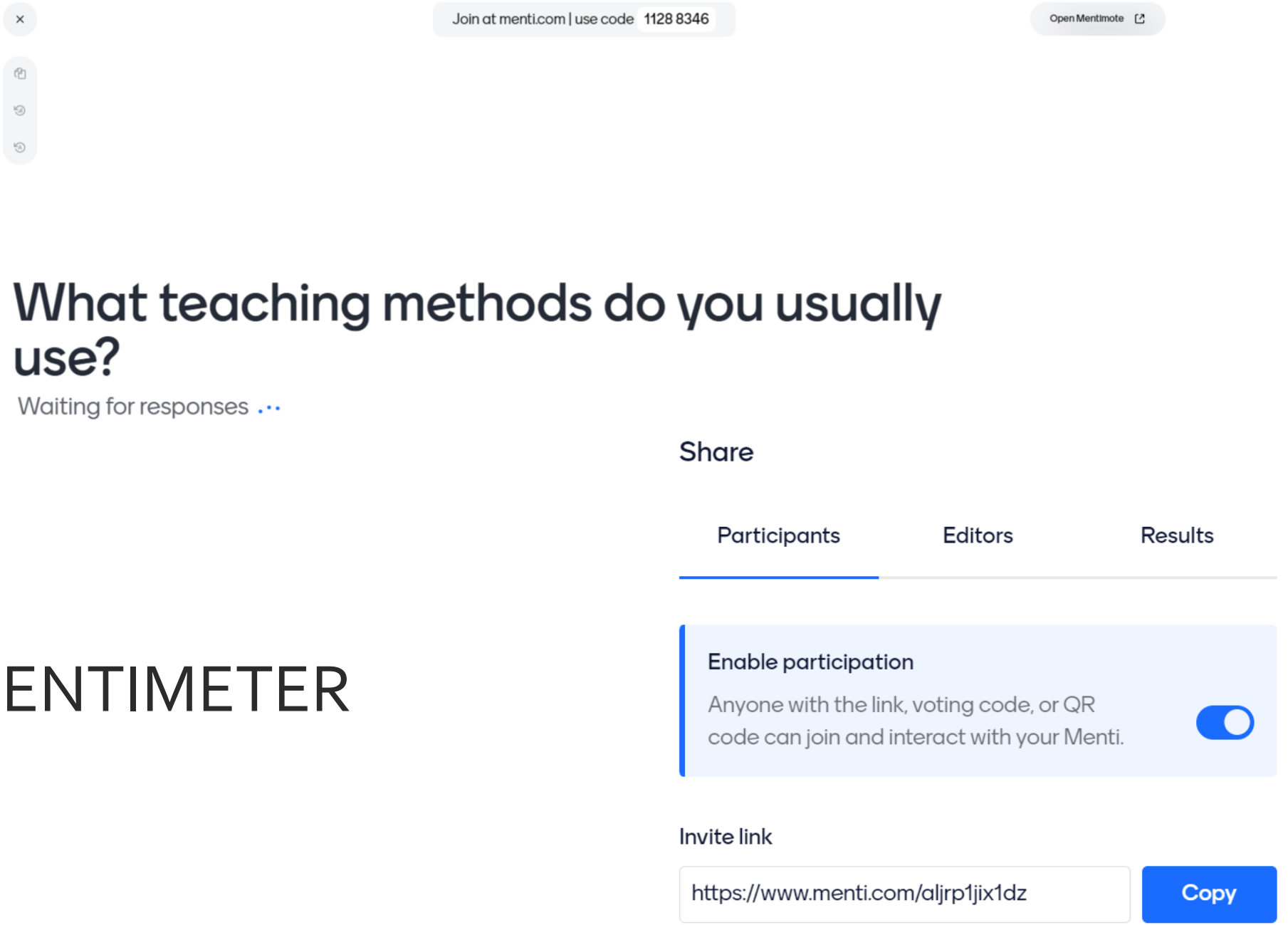


https://www.mdpi.com/2306-7381/9/1/17


Join at menti.com | use code 1128 8346
Open Mentimote
What teaching methods do you usually use?
Waiting for responses
Share
Participants
Editors
Results
Enable participation
Anyone with the link, voting code, or QR code can join and interact with your Menti.
Invite link
https://www.menti.com/aljrp1jix1dz
Copy

MENTIMETER

Mentimeter

What teaching methods do you usually use?

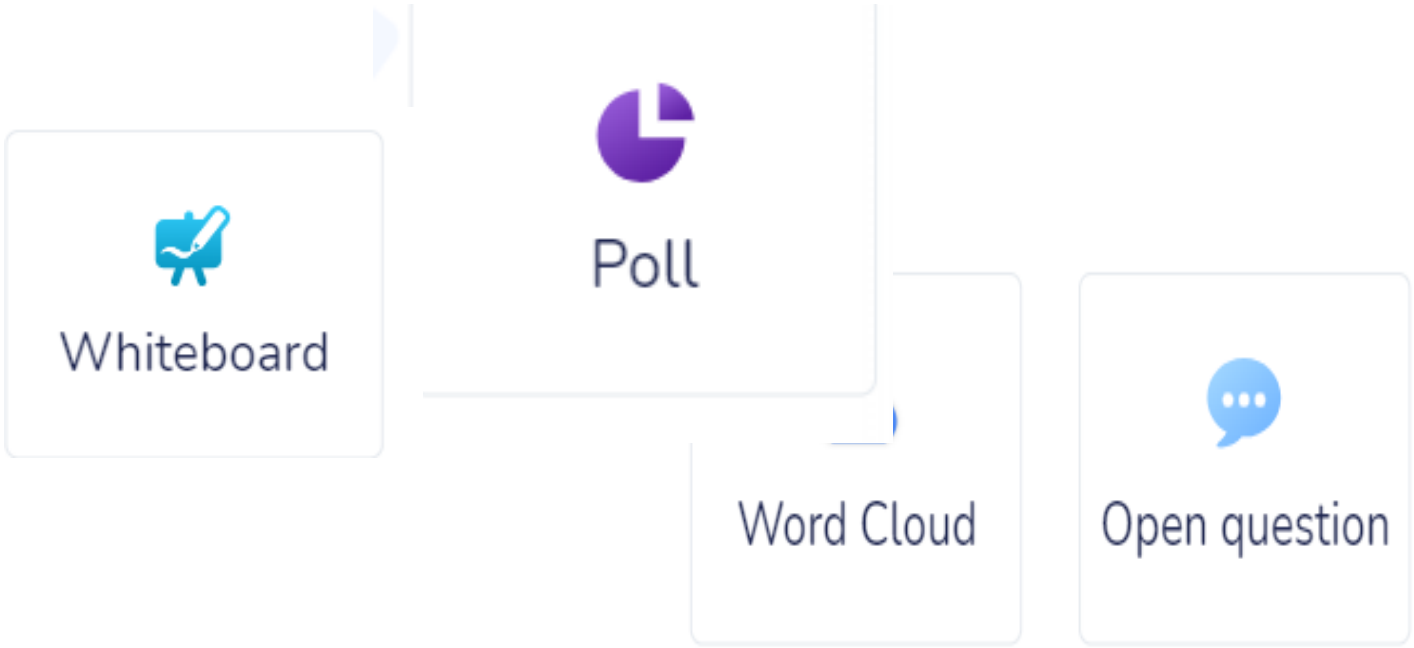
lecture	18
Enter another word	25
Enter another word	25

Submit

How are you feeling?

Mentimeter

wooclap



Eesti Maaülikool

3. Problem-Solving and Critical Thinking

Students are required to think critically,

identify potential diagnoses (differential diagnoses), and consider various therapeutic options

based on the information provided in the case.

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4. Interdisciplinary Approach:

Case-based learning often promotes interdisciplinary collaboration.

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5. Practical Application:

This approach connects theoretical knowledge with practical skills.

It allows students to apply what they have learned in the classroom to real-world situations, fostering clinical competence.

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6. Communication Skills:

Case-based learning also emphasizes the importance of effective communication with each other and teachers (+ veterinarians, clients etc).

https://theeducationdaily.com/communication-in-medical/

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7. Active Feedback:

Teachers provide feedback, guidance, and constructive critiques as students work through the case,

helping them refine their decision-making and clinical reasoning skills.

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8. Reflective Practice:

After completing a case, students may participate in debriefing sessions where they reflect on their decisions,

discuss what they learned,

and identify areas for improvement.

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How We Teach | Generalizable Education Research

Use of case-based or hands-on laboratory exercises with physiology lectures improves knowledge retention, but veterinary medicine students prefer case-based activities

Renee M. McFee, Andrea S. Cupp, and Jennifer R. Wood

04 APR 2018 // https://doi.org/10.1152/advan.00084.2017

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ASE Anatomical Sciences Education

Descriptive Article | Full Access

A method of developing and introducing case-based learning to a preclinical veterinary curriculum

Emma Crowther, Sarah Baillie

First published: 07 May 2015 | https://doi.org/10.1002/ase.1530 | Citations: 15

First published: 07 May 2

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Original Research | Published: 16 January 2018

Case-Based Studies and Clinical Reasoning Development: Teaching Opportunities and Pitfalls for First Year Veterinary Students

Mary Mauldin Pereira, Elpida Artemiou, Anne Conan, Liza Köster & Luis Cruz-Martinez

Medical Science Educator **28**, 175–179 (2018) | Cite this article

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Educational Research Report

Climbing the Integration Ladder: A Case Study on an Interdisciplinary and Case-Based Approach to Teaching General Pathology, Parasitology and Microbiology in the Veterinary Curriculum

Hanne Jahns, Bryan K. Markey, Theo de Waal, Joseph P. Cassidy

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https://doi.org/10.3138/jvme-2020-0085

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How to create a case for students

1. Identify the Learning Objectives:

- **Determine the specific learning objectives you want to achieve with the case.**

- These objectives can vary depending on the level of the students (undergraduate, graduate, or continuing education)

and the subject matter (e.g., small animal medicine, equine surgery, etc.).

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2. Select the Case Type:

- Choose the type of case that aligns with your objectives and the course's focus.

Common case types in veterinary medicine teaching include:

clinical cases

problem-based cases

virtual or simulated cases

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3. Create a Detailed (Clinical)Case Scenario:

- Develop a comprehensive case scenario that includes the following elements:

Owner Information:

Present information about the owner's observations and concerns.

Patient Information:

Describe the patient's species, breed, age, sex, and relevant history (chief complaint, medical history, vaccination status, etc.).

Environment:

If relevant, describe the patient's living conditions, diet, and any potential environmental factors.

Physical Examination:

Describe the findings from a thorough physical examination.

Clinical Presentation:

Provide information about the presenting signs and symptoms, including the duration and severity.

Diagnostic Data:

Include laboratory results, imaging findings, and any other relevant test data.

Etc.

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4. Establish a Case Progression:

- Define how the case will evolve.
- Consider how the patient's condition may change over time or in response to interventions.
- This helps students learn to monitor and adapt their treatment plans.

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5. Incorporate Learning Resources:

- Provide students with access to learning resources, such as:
  - textbooks
  - articles
  - online references
- which they can use to research and gather information for their diagnosis and treatment plans.

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6. Encourage Critical Thinking:

- Pose open-ended questions and challenges to stimulate critical thinking.

Encourage students to consider differentials, formulate hypotheses, and make evidence-based decisions.

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7. Assessment:

- Design assessment methods, such as:
  - quizzes
  - written reports
  - or oral presentations
- to evaluate students' understanding,
- decision-making,
- and communication skills in relation to the case.

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9. Use Technology:

- Consider using technology, including virtual cases, simulation software, or online platforms, to enhance the learning experience.

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Message ChatGPT...

ChatGPT can make mistakes. Consider checking important information.

- **Breed:** Domestic Shorthair
- **Age:** 12 years
- **Sex:** Female, spayed
- **Weight:** 4.5 kg

Chief Complaint:

The owner brings in their 12-year-old cat, named Whiskers, with a concern about increased water consumption, weight loss, and changes in urination habits.

History:

Whiskers has a history of routine veterinary care, but the owner noticed a grac
water intake over the past few months. The cat has also been losing weight de

How can I help you today?

10. Adaptability:

- Be prepared to adapt the case as needed.
- Student questions and discussions may lead to unexpected avenues of exploration and learning.

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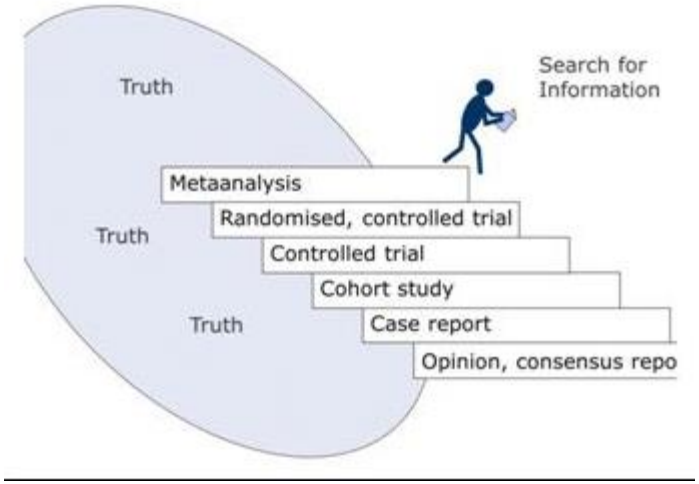
Moodle is a Learning Management System (LMS) used to manage, deliver and measure training and learning online. Moodle is perhaps the most well-known LMS platform of its kind and is certainly widely used.

CASE SERIES STUDY

CASE REPORT
CASE STUDY

ERASMUS-EDU-2022-CBHE-STRAND 1-101082479

Case Report



- Reports a single patient with

a rare clinical case

a newly recognized disease,

a new method of diagnosis,

or a novel treatment.

- Objective/purpose:

To identify and disseminate rare clinical case, newly recognized diseases, new methods of diagnosis, or novel treatments to the broader veterinary community

Often published in veterinary journals or presented at conferences

https://avmajournals.avma.org/page/157

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Kahoot!

Question type

Quiz

Time limit

20 seconds

Points

Standard

Answer options

Multi-select

Image reveal

Delete

Duplicate

Case study

- an in-depth and detailed examination of a specific clinical case involving an animal patient

- It typically presents **a comprehensive analysis** of the patient's medical condition, including the history, clinical signs, diagnostic findings, treatment, and outcomes.

- Case studies are used for educational, research, and clinical purposes in veterinary medicine.

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- Veterinary medicine case studies are valuable tools for teaching, learning, and sharing knowledge among veterinarians and students.

- They help individuals improve their diagnostic and problem-solving skills, gain insights into clinical decision-making, and contribute to the body of veterinary knowledge.

- Case studies can be published in veterinary journals, presented at conferences, or used as teaching materials in veterinary education.

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Case Studies (34)

Go To Letter Refine By

(3)

11-year-old dog with limp

12-year-old dog with bloody urine

14-yr-old dog unable to walk

A (1)

Australian Shepherd with mammary mass

C (4)

Cat with lethargy and anorexia

Cat with vomiting and anorexia

Cat with weight loss and a distended abdomen

Chicken turtle with lethargy

D (6)

Dalmatian with Bite Wounds

Disoriented cat with stumbling gait

Dog straining to urinate

Dog with a swollen left elbow

Dog with anorexia, lethargy, and vomiting

Domestic Shorthaired cat with a nose mass

J Med Libr Assoc. 2019 Jan; 107(1): 1–5.
Published online 2019 Jan 1. doi: 10.5195/jmla.2019.615
PMCID: PMC6300237
PMID: 30598643

Distinguishing case study as a research method from case reports as a publication type

Kristine M. Alpi, MLS, MPH, PhD, AHIP

OHSU Library, Oregon Health & Science University, Portland, OR, krisalpi@gmail.com

John Jamal Evans, PhD

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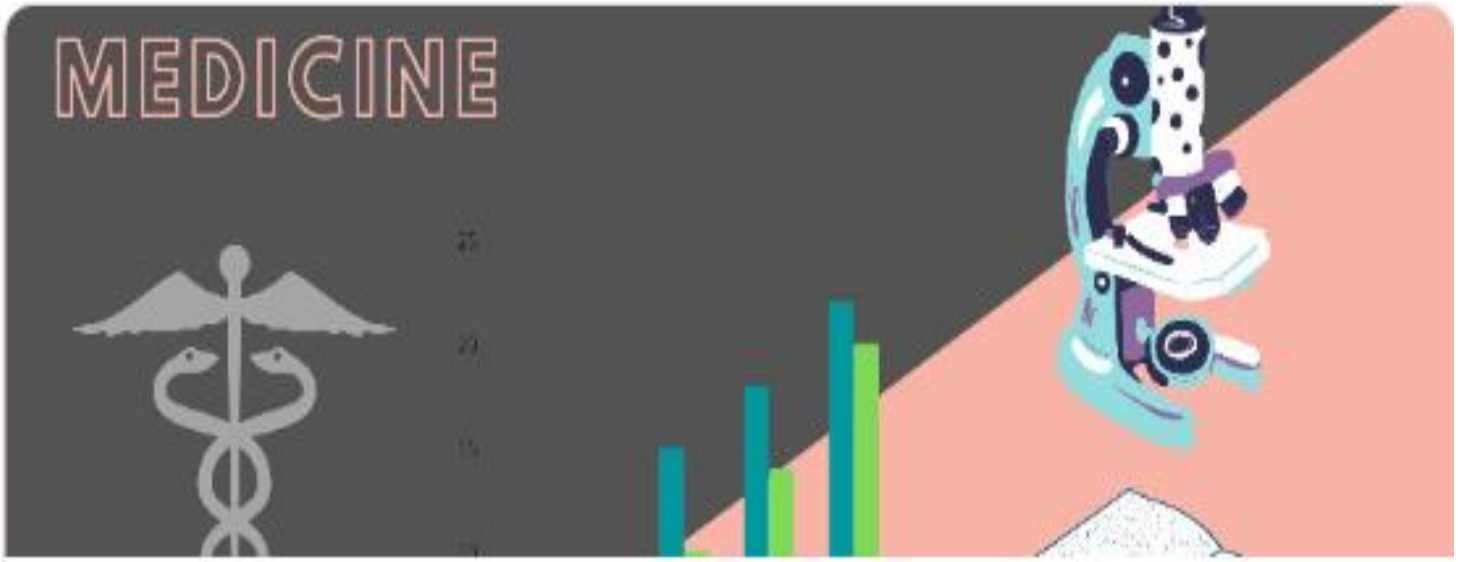

Veterinary medicine thesis topic selection 2024 ...

Read carefully and do the following activities in each section on this page:

1. Check Final thesis topics "**1. Final thesis topics list**"
2. Register the Final thesis topic on page "**2. Final thesis topic registration**"
3. Fill and send the registration form "**3. Send filled registration form**"
4. **Contact supervisor** after you have selected the topic.

- One of my topic's for final thesis….
- Serum gammaglutamyl transferase activity and immunoglobulin concentration connection in neonate calves.
- But….

A case series study

- A type of **observational** study

focuses on a collection of **cases with similar characteristics or medical conditions**

- These studies are typically used to describe and analyze a series of clinical cases, often related to a specific disease, condition, treatment, or set of clinical findings.

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- A case series provides valuable insights into clinical practice

- Can help identify

  patterns

  trends

  potential associations

within a group of animals with similar characteristics or experiences

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Key features of a case series study in veterinary medicine include:

1. Data Collection:

Researchers or veterinarians gather data from multiple cases that share common features,

such as patients with the same medical condition,

exposure to a specific environmental factor,

or response to a particular treatment.

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2. Descriptive Analysis:

The primary goal of a case series study is to describe and summarize the clinical and epidemiological characteristics of the cases.

This includes information on:

- patient demographics
- clinical signs
- diagnostic findings
- treatments administered
- outcomes

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3. No Control Group:

Unlike experimental studies, case series studies do not include a control group for comparison.

Instead, they provide a detailed account of the cases under investigation.

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4. Hypothesis Generation:

Case series studies are often exploratory in nature and can serve as a starting point for generating hypotheses or research questions.

They may lead to further investigations, including controlled clinical trials or analytical epidemiological studies.

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5. Limited Generalizability:

Findings from case series studies are not generalizable to a larger population because they lack control groups and randomization.

However, they can offer insights into the experiences of similar cases.

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Illustration of Clinical Practice:

Case series studies can demonstrate real-world clinical scenarios, including challenging cases, rare conditions, or unusual responses to treatment.

They provide a practical perspective on veterinary medicine.

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- While case series studies have limitations, they play a crucial role in veterinary medicine by

highlighting clinical observations,

unusual presentations of diseases,

or potential treatment options

that can guide further research and clinical decision-making.

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- They are often the first step in exploring and understanding specific aspects of veterinary practice

and can lead to more rigorous research,

such as controlled trials or analytical epidemiological investigations.

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ACVIM American College of Veterinary Internal Medicine
JOURNAL OF VETERINARY INTERNAL MEDICINE Open Access

Standard Article | Open Access

What's in a Name? The Incorrect Use of Case Series as a Study Design Label in Studies Involving Dogs and Cats

J.M. Sargeant, A.M. O'Connor, J.N. Cullen, K.M. Makielski, A. Jones-Bitton

First published: 24 May 2017 | https://doi.org/10.1111/jvim.14741 | Citations: 9

Case series	Study population selected based on the presence of a disease or condition of interest (the outcome)	Description of disease condition, may describe prognosis/survival time for individual study subjects

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EXAMPLES

Large animal teaching case

A farmer calls you because of a sick cow.

A cow has calved 5 days ago. She has red-brown watery foul-smelling discharge from uterus.

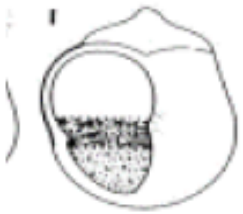
- Cow is inappetite, slightly depressed, body temperature is 39.8C and she has a watery diarrhoa. The bodyweight of this cow is 600 kg.
- Please read an additional material (extra paper) and find an appropriate active ingredients, which could „kill" these bacteria during the antibiotic therapy.
- Please write at first treatment principles (which active ingredients you would like to use).
- For the treatment protocol, please you medicine and dosage information from the database. http://vet.eudrapharm.eu/vet/welcome.do

Large animal case II

- A farmer compains, that one cow seems „unhappy" and he asks to examine that cow. Cow is inappetite, milk yield has dropped from 35 kg to 15 kg per day. Cow has milked 38 days, she is a first lactating dairy cow. She calved normally, without retained placenta. She doesn´t lame.
- You start with clinical examination.
- The temperature is 38,9C.
- Does cow have a fever? Yes/ no, because .....
- Heart rate is 78x/ minute. This is too slow/ normal/ too fast (underline correct answer)
- Rumen contractions are 4 times per five minute. Rumen sounds are audible, but quietly. This is rumen atony/ hypotony/ hypertony.

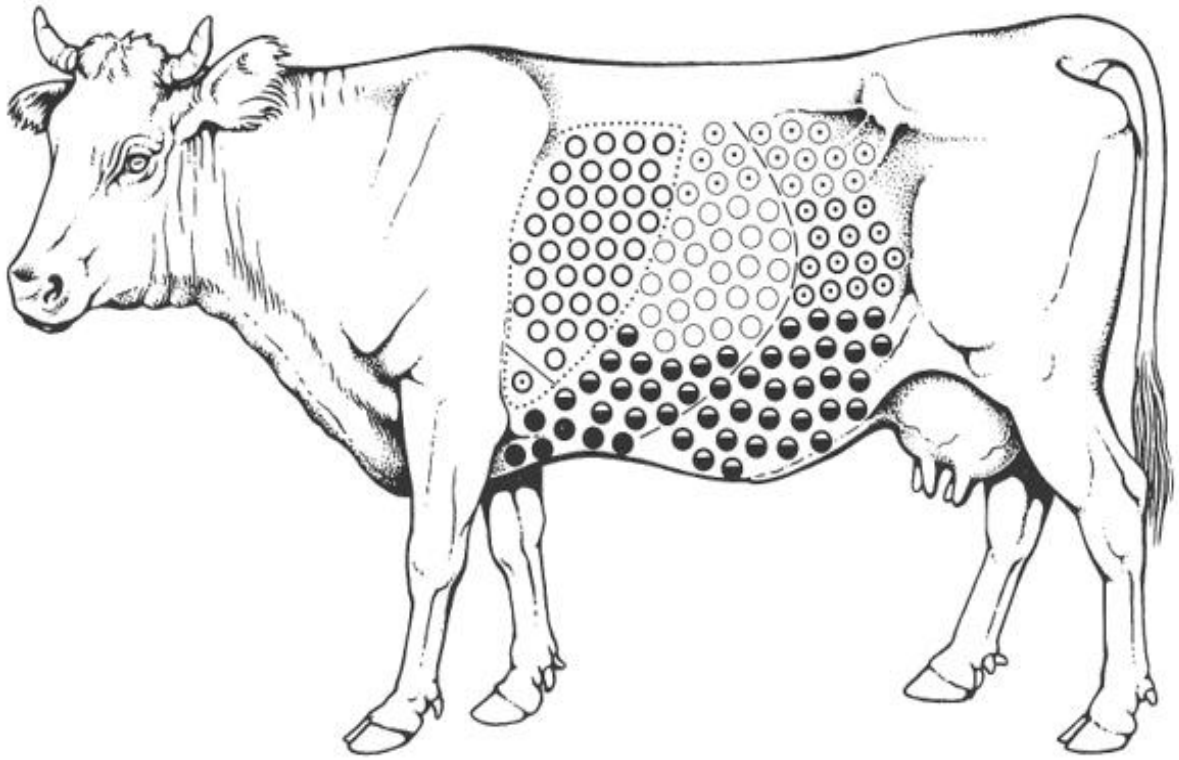
- A cow stands like in this picture.
- This is normal standing position/not normal standing position.
- This standing position is caused by:
  ……

The contour of the abdoomen(viewed from rear) and composition of rumen (gas, rough material, fluids).

	Is it normal?	Which disease?
		
		
		
		

- You perform one clinical diagnostic test for diagnosing of left displacement abomasum.
- Which one?.....
.....

Circle the region, where do you do this clinical dignostic test.



Also, you look for reasons of possible abdominal pain.

Name most common forestomach disease causing abdominal

pain.....

Name most common abomasal disease causing abdominal pain

.....

You take blood sample for diagnosing of ketosis. Which blood parameter is most accurate for ketosis? ……

You found, that this parameter is 2,9 mmol/l. Cow **has/ has not** ketosis

What could be the most suitable diagnoses (for example two) for this cow?

……

……

Examples from 2. course pathophysiology semianars

- ✓ Young German shepherd, the complaint of the owner is that the dog often vomits immediately after eating, the vomited food is undigested. The dog does not gain weight, during the last month, the dog has also developed a cough. Muscle weakness occurs. About half a year ago, foreign body was removed from the dog's esophagus (endoscopy).

- Please find out the possible causes of the problem and describe their etiology and pathophysiology, and briefly also the possible prognosis.

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- Five-year-old labrador has diagnosed glomerular disease. Describe how such a diagnosis has been reached (which diseases/conditions have been precluded) and describe the disease further.

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- ✓ Cholangiohepatitis was diagnosed in an older cat. What exactly does this mean, which etiology and pathophysiological processes are involved? What is the difference between cholangiohepatitis and cholangitis?

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- On a farm, about two, three-month-old calves suffer from pneumonia.

What could be the clinical signs of animals, the etiology of the disease, the pathophysiology, and what could have been the preventive methods?

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- ✓ This is an older cat with occasional vomiting, the cat is skinny. Muscle mass decreases, and the cat drinks and urinates more.
  - Diagnosis confirmed - chronic kidney disease.
  - Describe the causes and development of this disease and how the cat's clinical symptoms are related to this disease process.

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Clinical case

SIGNALMENT: Simon, 1 year old French bulldog,

ANAMNESIS MORBI:

- The owner noticed the first skin lesions about 4 weeks ago. The problem progresses, the spots become larger and new ones are occure
- Mild itching
- The general condition is good
- There is a cat in the family, cat has no problems
- Both animals received flea control

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QUESTIONS

1. **Name 1 (one) most important skin change (5)**

……

2. **Name 3 (three) main differential diagnoses that may result in such a clinical picture/signs (15)**

    1) ……

    2) ……

    3) ……

3. **You take skin scrape and find parasites (see picture). Identify the parasite (10)**

……

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4. This parasite can also be found on… .. (select 1 wrong answer) (10):

a. Scotch test (tape)

b. Trichogram

c. Biopsy

d. Wood lamp

e. Cytology

f. PCR (polymerase chain reaction)

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5. What is the cause of this disease in this case? Select 1 correct answer (20):

a. It is not a disease, because these parasites are normal inhabitants/organisms of the skin

b. Infection from the cat, as cats are often asymptomatic carriers of this parasite

c. Infection from other dogs

d. Hereditary defect of the immune system

e. Simon has a serious primary systemic pathology that causes this disease to appear

6. Your next step (select 1 most suitable answer) (20):

a. Don't do anything, we'll watch

b. Blood sample

c. Advantix (imidacloprid + permethrin) spot 1x per month

d. Advantix (imidacloprid + permethrin) spot 1x per week

e. Advantix (imidacloprid + permethrin) spot-1x weekly for both (Simon and Cat)

f. Stronghold (selamectin) spot-1x per week

g. Bravecto (fluralaner) 1 tablet

h. Milprazon (milbemycin + praziquantel) 1 tablet

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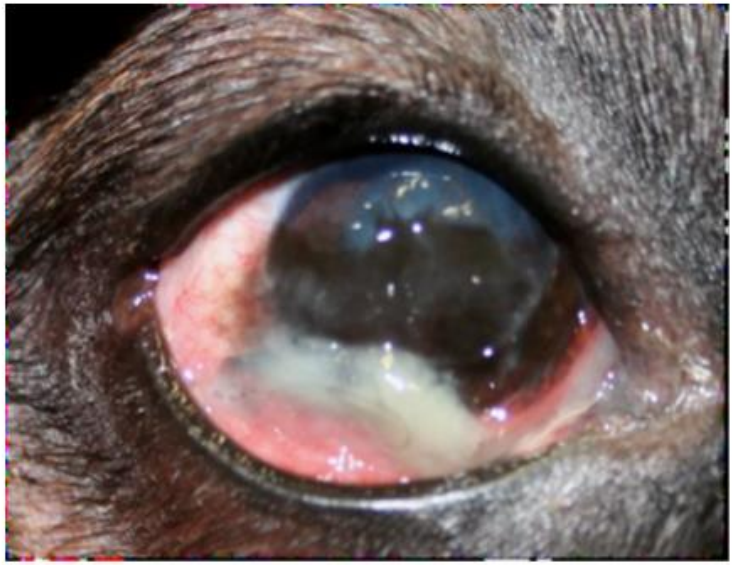
CASE 3.

(Patients A and B)

PATIENT A, 40 points



SIGNALMENT: 4 a female mixed breed dog (about 15 kg). Regularly vaccinated.

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ANAMNESIS MORBI:

- ✓ Problem about 4 months, yellow mucus discharge for about 6 months from the right eye, redness of the eye
- ✓ No eye holding/blepharospasm and no problem with vision
- ✓ Treatment with eye drops Fucithalmic ® (fusidic acid)
- ✓ Redness and discharge decreased, but occurred again after 2 weeks

ADDITIONAL INFORMATION:

- ✓ The intraocular structures of the eye have been examined (pupil, iris, lens, intraocular pressure) and are without abnormalities/changes.
- ✓ The other eye is normal
- ✓ The general condition is normal

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QUESTIONS.

1. Describe changes / findings by photo and their localization, at least 3 most important (10)

1)……

2. Two (2) most common causes of such changes ? (10)

1)……

2)……

3. What kind of diagnostic test do you need to do in case of these changes? (10)

……

4. Which primary treatment is recommended in case of these changes? (10)

……

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Millie Anttila

FELINE DIABETES MELLITUS – OWNER EXPERIENCES IN CLIENT COMMUNICATION AND EDUCATION AFTER THE DIAGNOSIS: CASE SERIES STUDY

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- **The aim** of this descriptive study was to describe ten clinical cases of cats diagnosed with diabetes mellitus including signalment, clinical signs, treatment protocol, and current treatment status.

- The main aim was to investigate and describe the owners' experience with client communication and education after the DM diagnosis, and whether they received adequate support from the veterinary team to carry out disease management at home.

- The ultimate aim was to gain knowledge of the potential improvements or considerations that could help veterinarians better educate owners and implement efficient home monitoring strategies.

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- **To describe the data**, the median (range) was calculated to describe continuous variables (e.g. body weight, age, blood glucose concentration, and serum fructosamine level) and counts as well as percentages for grouping variables.

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Table 3. Summary of the signalment, treatment duration, and the current treatment status

Cat (num.)	Sex/ neutering status	Age (years)	Breed	Weight (kg)	Treatment duration (days)	Current treatment status
1	M/C	15.5	Devon rex	4.6	339	Euthanasia
2	F/S	13.5	Burmese	4.7	187	Diabetic control
3	M/C	10	Birman	6.2	130	Insulin adjustment
4	M/C	8	Russian blue	6.2	103	Remission
5	M/C	7	Crossbred	5.6	1288	Diabetic control
6	F/S	12	Burmese	3.0	33	Insulin adjustment
7	M/C	11.5	Crossbred	5.7	1187	Diabetic control
8	F/S	14.5	Crossbred	4.7	1188	Insulin adjustment
9	F/S	15	Crossbred	4.3	44	Insulin adjustment
10	M/C	10	Crossbred	8.6	596	Diabetic control

Abbreviations: M/C = male castrated; F/S = feline spayed

4. RESULTS 4.1. Signalment, clinical history, and current treatment status

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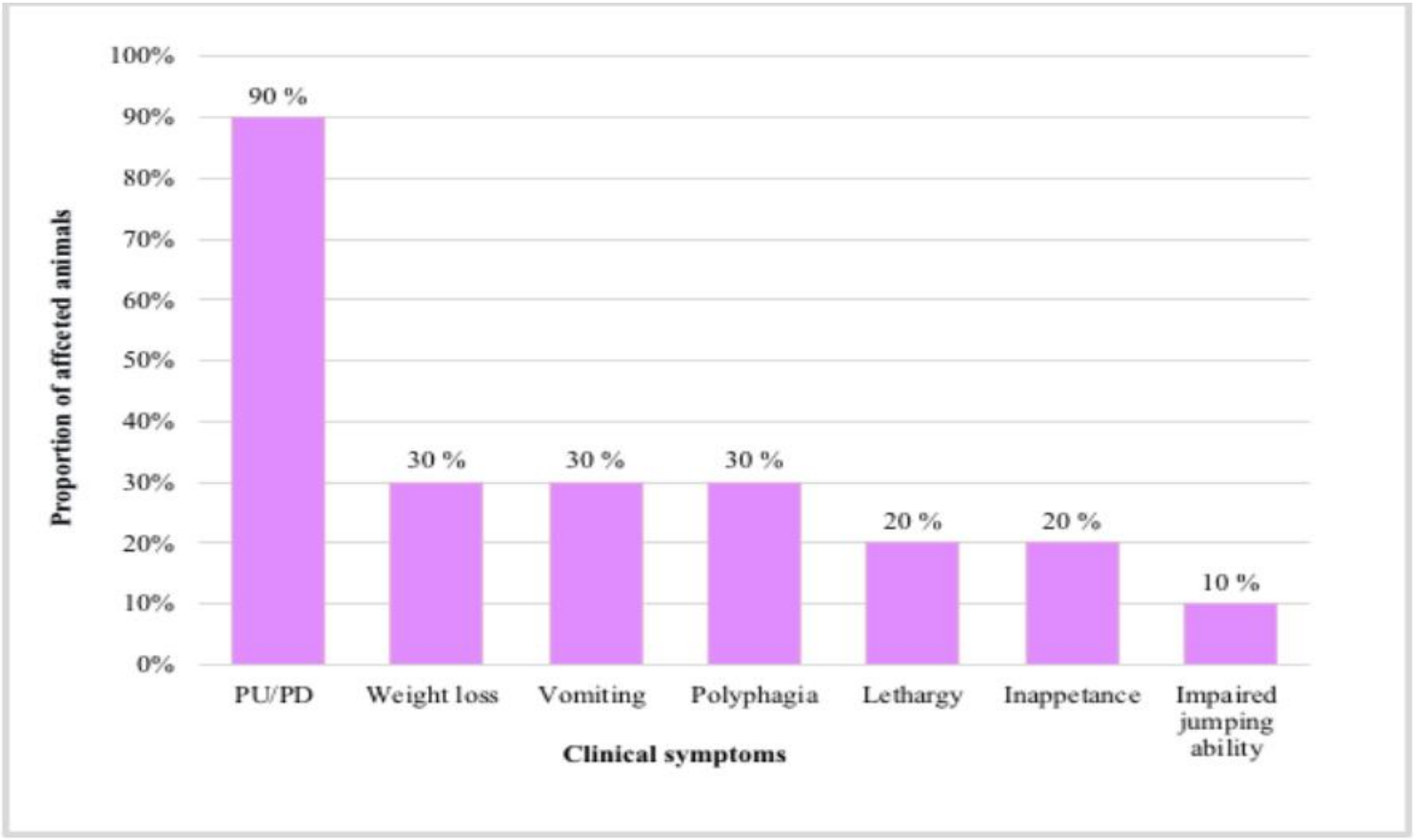

Figure 1. Clinical signs reported by the owners at the time of DM diagnosis

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- 4.2. Laboratory results
- At the time DM was diagnosed, the median blood glucose concentration for all ten cats was 24.05 (range 19.9–30.28) mmol/L (433 [358–545] mg/dL).
- Serum fructosamine concentration was measured at the initial visit from seven of the ten cats and the median was 473 (range 389– 877) µmol/L.

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- 4.3. Treatment protocols
  - 4.3.1. Insulin type and dose
  - 4.3.2. Home monitoring
  - 4.3.3. Dietary management
  - 4.4. Client communication and education

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Julia Eeva-Maria Sulonen

XYLITOL TOXICOSIS IN DOGS: CASE SERIES STUDY

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- 2. The aim of the thesis was to describe eight clinical cases of xylitol ingestion in dogs including clinical sings, associated laboratory value changes, treatment and outcome.

- The second aim was to compare this information from the case material to the literature.

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4. RESULTS

4.1.Dog 1

Signalment and history: A seven-year-old male dog weighting 22.4 kg was evaluated at the veterinary clinic due to shivering and weakness after ingestion of xylitol pastilles. Approximately one hour prior to presentation, the dog had ingested 30 grams of pastilles containing 95% xylitol. The ingested dose was approximately 1,030 mg/kg (method two) to 1,272 mg/kg (method one) hence exceeding both risk limits. The dog had no previously diagnosed significant diseases or allergies. There were no ongoing medications.

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Clinical examination: The behavior and mentation of the dog were fairly alert and it was able to walk. The BCS of the dog was 2.5/5 with normal muscle mass. The mucous membranes were light pink and moist with capillary refill time within reference range. The heart rate was 120 beats/min. Heartbeat synchronized with femoral pulse and metatarsal pulse was moderate. The breathing type was costoabdominal and without hearable abnormalities in breathing sounds. Sings of abdominal pain were not elicited. No abnormalities were detected in superficial lymph node palpation.

Laboratory results: The initial diagnostics included biochemistry panel (Chem 10), AST, electrolytes, insulin metabolism, lactate and blood coagulation parameters. The serum insulin concentration was slightly increased from the reference (Table 1). The plasma ALT enzyme concentration was slightly increased and AST was almost four times over the reference value (Table 1). The dog had mild hypoglycemia and mild hypokalemia (Table 1). The dog had moderate hyperlactatemia as lactate was 4.33 mmol/l. The blood coagulation parameters (PT, aPTT) were within reference limits (Table 1). Other measured values were within reference limits.

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Table 1. Laboratory findings dog 1

Parameter	Reference range	Time from the initial test
		0 h
Insulin µIU/ml	8-32	35.8
Glucose mmol/l	4.11-7.95	2.90
Potassium mmol/l	3.5-5.8	3.4
AST U/l	0-50	190
ALT U/l	10-125	173
PT s	14-19	17.8
aPTT s	75-105	98

Note. AST – aspartate aminotransferase, ALT – alanine aminotransferase, PT – prothrombin time, aPTT – activated partial thromboplastin time.

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Treatment: Therapy included the induction of vomiting with apomorphine, maropitant for antiemetic treatment. The vomitus contained food and some xylitol pastilles. Intravenous Lactated ringer's solution bolus was administered followed by constant rate infusion for two and a half hours. The dog was fed once per hour with tryptophan and dextrose. Vitamin B was administered IM. The dog was discharged on the same day with NAC first dose of 232 mg/kg followed by 58 mg/kg PO every eight hours for six to 12 times. Feeding was advised to be given every two hours for the next 24 hours. Control visit was recommended in 24-48 hours. The owner didn't bring the dog to the control visit at least no to the same clinic.

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4.9.Summary of the cases

In the case study there were more female dogs than male (Table 11). The average age was 4.6 years (Table 11). The average weight was 21.4 kg (Table 11). The clinical signs varied from the dog number five and eight that showed no clinical signs at clinic to the number two that had poor mental status and was not reacting. The most common clinical signs reported were vomiting, apathy or lethargy and shivering (Table 11).

Table 11. Signalment and recorded clinical sings (CS)

Dog (num.)	Sex (F/M)	Age (year)	Weight (kg)	CS at clinic	CS owner reported
1	M	7	22.4	Fairly alert, still able to walk	Shivering, feeble
2	F	3	35.0	Mental status poor, not reacting	Wellbeing got worse in car, peed on itself
3	F	2	11.2	Apathetic	
4	F	7	21.3	Shivering, carried into examination room	Vomiting, shivering, apathetic
5	F	8	23.9		Vomited once
6	F	0.4	20.2	Increased temp, vomited	Tried to vomit
7	M	0.3	5.1	Slightly apathetic	
8	F	9	32		Vomited once

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The average quantity of xylitol gum ingested was 36.4 pieces, this also included calculation of pastilles. The estimated amount of xylitol calculated by two different methods resulted in highly similar amounts of ingested xylitol (Table 12). The estimated amounts exceeded the hypoglycemia risk limit of 100 mg/kg in all the dogs and the risk limit for liver failure 500 mg/kg in both methods (Table 12). The average ingested dose calculated by method one was 1,956.5 mg/kg and by the method two was 2,271.9 mg/kg.

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Table 12. Estimated ingested amount of xylitol compared by two different methods

Dog (num.)	Estimated product intake (g) (xylitol concentration)	Estimated xylitol intake (g) Method 1	Estimated xylitol intake (mg/kg) Method 1	Estimated xylitol intake (g) Method 2	Estimated xylitol intake (mg/kg) Method 2	Estimated number of gums ingested
1	30 (95%)	28.5	1,272.3	23.1	1,030.2	23.1
2	40 (64%)	25.6	731.4	30.8	879.1	30.8
3	80 (68%)	54.4	4,857.1	61.5	5,494.5	61.5
4	Not known					
5	90 (68%)	61.2	2,560.7	69.2	2,896.7	69.2
6	Not known					
7	18 (50%)	9.0	1,764.7	13.8	2,705.9	13.8
8	26 (68%)	17.7	552.5	20.0	625.0	20.0

Notes:

Method 1. Amount of ingested xylitol estimated based on calculation of total amounts of sugar alcohols.

Method 2. Amount of ingested xylitol estimated based on each piece containing 1 gram of xylitol.

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Table 13. Descriptive statistics of selected laboratory values

Parameter	Min Value	Average Value	Max Value	Reference Low	Reference High	Number of Tests
Insulin	8.1	64.0	220.0	8.0	32.0	6
Glucose	1.9	4.8	7.6	4.1	8.0	13
ALT	36.0	310.8	894.0	10.0	125.0	13
AST	36.0	152.5	221.0	0.0	50.0	4
aPTT	97.3	97.7	98.0	75.0	105.0	2
PT	17.8	17.9	18.0	14.0	19.0	2
Platelets	121.0	234.2	317.0	148.0	484.0	5
Total bilirubin	3.0	6.3	15.0	0.0	15.0	8
Phosphorus	0.3	1.2	2.1	0.8	2.2	9
Potassium	2.9	3.7	4.2	3.5	5.8	5

Note. ALT – alanine aminotransferase, AST – aspartate aminotransferase, aPTT – activated partial thromboplastin time, PT – prothrombin time.

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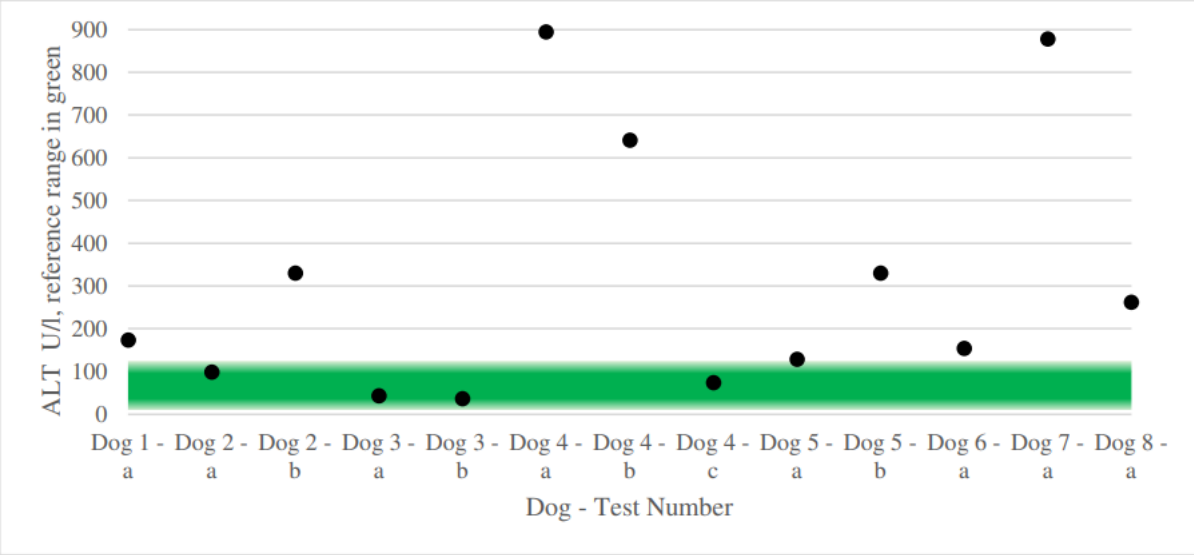

Figure 4. Alanine aminotransferase (ALT) U/l in a given dog with test order from a to c.

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THEOBROMINE TOXICOSIS IN DOGS: CASE SERIES STUDY

ESTONIAN UNIVERSITY OF LIFE SCIENCES
Institute of Veterinary Medicine and Animal Sciences

Oona Annie Alexandra von Bagh

SPONTANEOUS CHRONIC CORNEAL EPITHELIAL DEFECTS IN DOGS: CASE SERIES STUDY

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2. AIMS OF THE STUDY

The aims of the study were:

- To analyse clinical cases of dogs diagnosed with spontaneous chronic corneal epithelial defects in a private small animal clinic in Finland during the years 2020-2021 including the breed, age, gender, affected eye, clinical signs, treatment method used at the first visit, time period of healing, number of visits until healing, surgical retreatment times, and if a bandage contact lens was used in treatment.
- To compare these data with those reported in the literature.
- To describe four clinical cases of dogs diagnosed with spontaneous chronic corneal epithelial defect more closely and compare these cases with each other.

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Sonja Elisabeth Miettunen

FELINE (*Felis catus*) JUVENILE HYPERPLASTIC GINGIVITIS: CASE SERIES STUDY

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2. AIMS OF THE STUDY

1. To characterize the clinical appearance of feline juvenile hyperplastic gingivitis.

2. To describe the management options and their effectiveness on an individual patient.

3. To offer knowledge of the disease scarcely described in scientific literature, in order for veterinarians to recognize the disease, and to be aware of treatment methods.

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4.1. Patient cases

Cat 1

Patient description and history: Cat number 1 is a male neutered Maine Coon who was 7-month-old at the time of initial presentation. A referring veterinarian noticed signs suggestive of feline juvenile hyperplastic gingivitis when the cat was brought in for castration (December 2015).

Figure 1. The gingival situation at the time of castration. Photo: Kadri Kääramees

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Findings in the oral cavity: The cat had hyperplastic gingivitis on both maxillary canines, maxillary left and right 2nd premolars, supernumerary left maxillary 2nd premolar, right maxillary 3rd premolar, left and right maxillary 4th premolars, and on mandibular 3rd premolars on both sides. Other findings were stage 1 mobility (horizontal movement of 0,2-0,5mm) of mandibular 1st and 2nd incisors on both left and right side.

Treatment: Gingivectomy and gingivoplasty were performed and a 7-day-course of antibiotic therapy (amoxicillin/clavulanic acid) was initiated. Analgesia was provided according to the standard protocol described previously (buprenorphine and meloxicam).

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Response to the treatment and owner feedback: Approximately a year after the dental procedure (March 2017), it was noticed during a non-dental, emergency visit due to vague gastrointestinal signs that the cat had gingivitis on maxillary premolars. The owner also reported that the cat had had gingivitis also previously which was treated with antibiotics by a local veterinarian. The cat was prescribed a course of amoxicillin/clavulanic acid by the attending emergency veterinarian.

The long-term response is unknown since the owner could not be reached for feedback, but based on known history it is likely that this cat was at least a partial non-responder to the treatment and continued on to have oral inflammatory disease issues also later in life.

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- 4.2. Clinical characteristics of the disease
- 4.2.1 Sex and age
- 4.2.2. Breeds
- 4.2.3. Oral pathologies
- 4.2.4. Clinical signs
- 4.2.5. Location of hyperplasia
- 4.3. Treatment options and their effectiveness 4.3.1. Resolution of the disease
- 4.3.2. Therapeutic interventions

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Hélène Casenave-Péré

ANALYSIS OF CLINICAL ENDOCRINE CASES IN CATS WITH FOCUS ON DIABETES AND HYPERTHYROIDISM

KASSIDE KLIINILISTE ENDOKRIINSETE JUHTUMIDE ANALÜÜS, KESKENDUSES DIABEEDILE JA HÜPERTÜROIDISMILE

Final Thesis

Curriculum in Veterinary Medicine

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One more clinical case…

Case 1

Analyse the following case and answer the questions. The analysis consists of three parts (1, 2, 3).

Read the questions carefully. Some of the questions require a response concerning the specific patient and some of the questions are of a general nature (i.e. having regard to the general principles of clinical diagnostics and treatment). The maximum number of points to be collected is given at the beginning of each section.

PART 1 - Clinical examination and the compilation of differential diagnoses list (48 points)

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Patient: a 7-year-old female Rottweiler

Anamnesis vitae:

Lifestyle: lives in the countryside, can move freely without any restrictions; does not travel or participate in dog shows; is the only animal in the family.

Feeding: the dog is fed homemade meals and dry dog food.

Vaccinated with complex vaccine and anti-rabies vaccine, last vaccination took place 2 years ago.

Irregular dehelmintization, the last dehelmintization was performed 2 months ago.

Previous findings: cranial cruciate ligament rupture that was surgically treated a year ago.

Heat cycle regular (2 times a year), the previous one was 2.5 months ago

Anamnesis morbi:

Vomiting and watery diarrhoea for two days. The faeces is yellow, the amount of faeces is big, and the defecation frequency is 1-2 times a day. The dog does not want to eat or drink. The dog is becoming more and more lethargic. From this morning the dog is lying down and does not want to move.

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Clinical examination

- Non-ambulatory patient (the dog is brought to the reception/examination room on a stretcher), she is about 7% dehydrated, depressive, mucosa is pink, capillary refilling time is 3 seconds, heart rate 143 beats per minute, respiratory rate 24 times per minute, thoracic auscultation without pathological findings, abdominal palpation painful, especially cranial abdomen, mammary glands and vulva without pathological findings, palpable peripheral lymph nodes without pathological findings, body temperature 39.5C, during the rectal palpation yellow pasty faeces sticks onto the glove. The dog's body weight is 45 kg and her body condition index is 4.5/5.

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- Name the palpable peripheral lymph nodes.
- What is the normal body temperature range for dogs?
- Which organs are normally located in the cranial part of the dog's abdomen?
- What is the difference between vomiting and regurgitation?
- Does the patient have an acute or chronic case of vomiting? Give your reasons the answer
- Does the patient have large intestinal diarrhoea or small intestinal diarrhoea? Why do you think so? Give your reasons
- **Draw up a problem list based on the anamnesis and the results of the clinical examination.**

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- Prepare a list of differential diagnoses based on the information available (anamnesis, clinical examination, problem list).
- NB! In case a differential diagnosis could fit the list, but one attribute, for example, does not match the patient's findings, add your comment on that.
- When mentioning a disease of some organ systems, be specific about the disease.

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PART 2

Interpretation of Laboratory Diagnostic and Diagnostic Imaging Tests (66 points)

2.1. Interpretation of haematological findings

Indicator	Unit	Result	Reference value
Total number of leukocytes	x10⁹/L	30.2	6.0-12.0
Neutrophils:			
Metamyelocytes	x10⁹/L	1	0
Band neutrophils	x10⁹/L	4.9	0-0.3
Segmented neutrophils	x10⁹/L	22.1	4.3-7.6
Monocytes	x10⁹/L	1.2	0.2-0.7
Eosinophils	x10⁹/L	0.1	0.2-0.8
Basophils	x10⁹/L	0.0	0-0.02
Lymphocytes	x10⁹/L	0.9	1.1-3.0
Total number of erythrocytes (red blood cells)	10^{12}/L	5.2	5.5-8.5
Haemoglobin	g/L	117	120-180
Haematocrit	%	35	37-55
MCV	fl	68	64-79
MCHC	g/L	320	300-350
RDW	%	15	<15
Platelets	x10⁹/L	200	150-500
Reticulocytes	x10⁹/L	Not counted	

*** Comments from the laboratory: toxic neutrophils in the blood smear, the sufficient.

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- Describe the alterations reflected in the haematological analysis using appropriate terminology.
- Is there evidence of inflammation? Why do you think so?
- Is there evidence of stress leukogram? Why do you think so?
- Which hormone is related to stress leukogram?
- Does the patient's leukogram show a degenerative left shift? Give your reasons for the answer.
- Does the patient have a leukemoid reaction? Why do you think so?
- Does the patient have anaemia? Give your reasons for the answer.
- Characterize erythrocytes based on their size (volume) and haemoglobin content.

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- **Based on erythrocyte size and haemoglobin content of the blood sample described above, does this patient currently have regenerative or non-regenerative anaemia?**
- **In order to determine the extent of regeneration of anemia as accurately as possible, it is important to evaluate:**
  - a) The percentage of reticulocytes
  - b) The absolute value of reticulocytes
  - c) The total number of red blood cells
  - d) MCV and MCHC values

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2.2. Interpretation of blood biochemical analysis and urine analysis/urinalysis

Blood biochemical analysis

Indicator	Unit	Result	Reference value
Total protein	g/L	56	52-82
Albumin	g/L	26	23-40
Globulin	g/L	30	23-45
Creatinine	µmol/L	158	43-115
Urea	mmol/L	11	1,4-9,0
Alanine-Aminotransferase (ALT)	U/L	637	24-136
Aspartate-aminotransferase (AST)	U/L	234	10-57
Alkaline phosphatase (ALP)	U/L	1560	39-220
Glycose	mmol/L	8,3	4,11-7,94
Total bilirubin	µmol/L	5,75	0,26-1,13
Cholesterol	mmol/L	10,1	3,49-6,9
Triglycerides	mmol/L	12,3	0,26-1,13
Calcium	mmol/L	2,4	2,20-3,0
Phosphorus	mmol/L	1,5	0,7-1,6
Potassium	mmol/L	3,6	4,0-5,4
Sodium	mmol/L	140	144-15
Chlorine	mmol/L	105	105-12
Pancreatic Lipase Immunoreactivity (cPLI)	µg/L	1200	0-200

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Results of the urine analysis - urine sample obtained at *cystocentesis*

Indicator	Result
Colour	Yellow
Cloudiness	clear
Specific gravity with refractometer	1.039
pH (strips)	7
Glucose (strips)	Negative
Ketones (strips)	Negative
Bilirubin (strips)	1+
Protein (strips)	1+
Blood (strips)	1+
Number of erythrocytes noted per *oil-immersion field* of *view* (magnification 1000 x)	N/A
Number of leukocytes noted per *oil-immersion field* of *view* (magnification 1000 x) (norm <5)	5-10
Other findings	-

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- **List all abnormalities in blood biochemical analysis. Use appropriate terminology.**
- **List all abnormalities in the urine analysis. Use appropriate terminology.**
- **Interpret the albumin and total protein content in the blood serum of the specific patient.**
- **What is it called when the creatinine and urea content in the blood serum *increases above* the upper limit of the *reference range?***
- **Can the patient be diagnosed with azotemia? If yes, which type of azotemia can be identified?**
- a) Prerenal azotemia
  - b) renal azotemia
  - c) post-renal azotemia
  - d) not present
- **Give the reasons for your answer.**

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- Which biochemical changes in blood are the result of vomiting and diarrhoea?
- Which biochemical changes in blood refer to the possible dehydration of the patient
- Elevated levels of which liver enzyme indicate liver inflammation and necrosis in dogs?

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- **Interpretation of diagnostic imaging tests and additional studies**

- **X-ray examination:** lateral and ventrodorsal views of the thorax: without any pathological findings.

- **Lateral and ventrodoral views of abdominal cavity:** loss of definition between abdominal organs, especially in the cranial part of the abdomen. Small intestines are expanded broadened throughout their entire length and have soft tissue opacity. Gas can be observed in ascending, descending and transverse colon. No x-ray contract medium extraneous objects can be identified. Small urinary bladder.

- **Abdominal ultrasound examination:** liver and biliary tract without any pathological findings, normal kidney structure and renal echogenicity, slowed small intestinal peristalsis, small intestine expanded and filled with fluid, no extraneous objects/obstructions in the gastrointestinal tract observed, pancreas uniformly hypoechoic and peripancreatic fat hyperechoic; No abnormalities in the uterus and the ovaries. Small amounts of free fluid in the abdominal cavity.

- **2.3.1. Name two factors that may lead to the obscurity of the details of abdominal organs on radiog**

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- **Which of these causes is likely to apply for the patient described above?**
- **What is the excessive retention of fluids in the small intestines and slow intestinal peristalsis called?**

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Results of the abdominal effusion analysis collected by abdominocentesis

Indicator	Result
Colour	sanguineous
Cloudiness	Cloudy
Specific gravity	1.028
Total proteins (g/L)	45
Nucleated cell count cells/µL-s	8000
Dominating cell cytological types	Neutrophils, macrophages, fat vacuoles (inclusions) in macrophages
Bacteria	-
Culturing	Negative

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- Using the TABLE , decide if the effusion collected from the patient described is transudate, modified transudate or exudate?
- Why do you think so? Give your reasons.
- What could have caused the abdominal effusion in the patient?
- Give the patient a diagnosis (or diagnoses) based on the anamnesis, clinical examination, and results of the tests performed
- Decide whether the described patient will need further tests to get a definitive diagnosis? If so, what? Give your reasons.

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Treatment

3.1. Fluid therapy

3.1.1. Choose two infusion solutions that may be suitable for this patient. Each correct answer will give a point, whereas each wrong answer gives a negative point.

a) NaCl 0.9%

b) Ringer lactate

c) Ringer lactate + KCl

d) NaCl 0.9% + KCl

e) Other solution

Please give the reasons for your choice.

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- **Calculate the total volume of fluids to be administrated to the patient in 24 hours in the course of fluid therapy (the amount of fluids for replacement therapy and maintenance therapy and fluid therapy in total). Please write the formulas and the calculations you used to arrive at the solution.**

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- **Explain briefly what should be considered when deciding on the fluid administration rate of this particular patient.**
- **What would the route of fluid administration be?**
  - a) Intravenous
  - b) *Per os*
  - c) Subcutaneous
- **Give your reasons.**

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- **Medications and nutrition**
- **3.2.1. What would the most appropriate antiemetic for the patient be?**
  - a) Metoclopramide
  - b) Loperamide
  - c) Ranitidine
  - d) Maropitant
  - e) Omeprazole

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What kind of painkillers would be appropriate for the patient? Each correct answer will give a point, whereas each wrong answer gives a negative point

- a) Carprofen
- b) Buprenorphine
- c) Fentanyl
- d) Paracetamol
- e) Meloxicam

Give your reasons:

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Is antibacterial treatment indicated for the patient? (There may be more than one correct statements). Each correct answer will give a point, whereas each wrong answer gives a negative point.

a) Yes, because the patient has a leukemoid reaction.

b) No, because the disease is not caused by a bacterial infection.

c) Yes, because the patient has signs of sepsis.

d) No, because the patient's neutrophil count does not exceed $35x10^9$ / L.

e) Yes, because the patient is at risk of bacterial translocation from the gastrointestinal tract into the systemic circulation.

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- **What is the best route of drug administration for the patient?**
  - a) Parenteral
  - b) *Per os*
- **Why do you think so? Give your reasons**

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- **When is the right time to start feeding the patient? (There may be more than one correct statement).**
  - a) Initially at least 24-48 hours NPO (*nothing per os*) to allow the gastrointestinal some rest.
  - b) Feeding begins when the patient is rehydrated and the electrolyte balance has been reached.
  - c) Feeding is began in small amounts as soon as the patient stops vomiting.
  - d) Feeding starts in 24 hours when the patient is stable enough for the nasogastric tube to be inserted, because then the patient can be fed despite vomiting.

- **3.2.6. What does the prognosis of the present patient depend on and what might the possible complications be?**

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- Practical training

- + cases as part of the clinical skills teaching

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Tools for your Literature Review

Designed by: Asad Naveed

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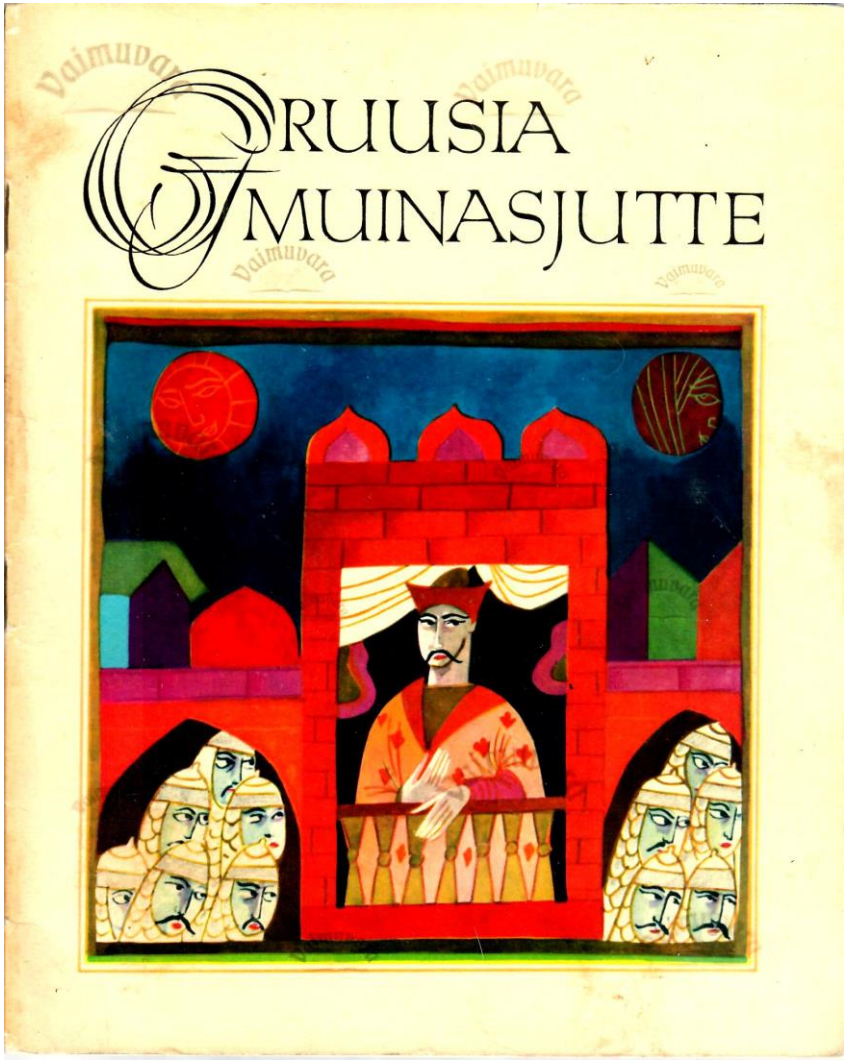
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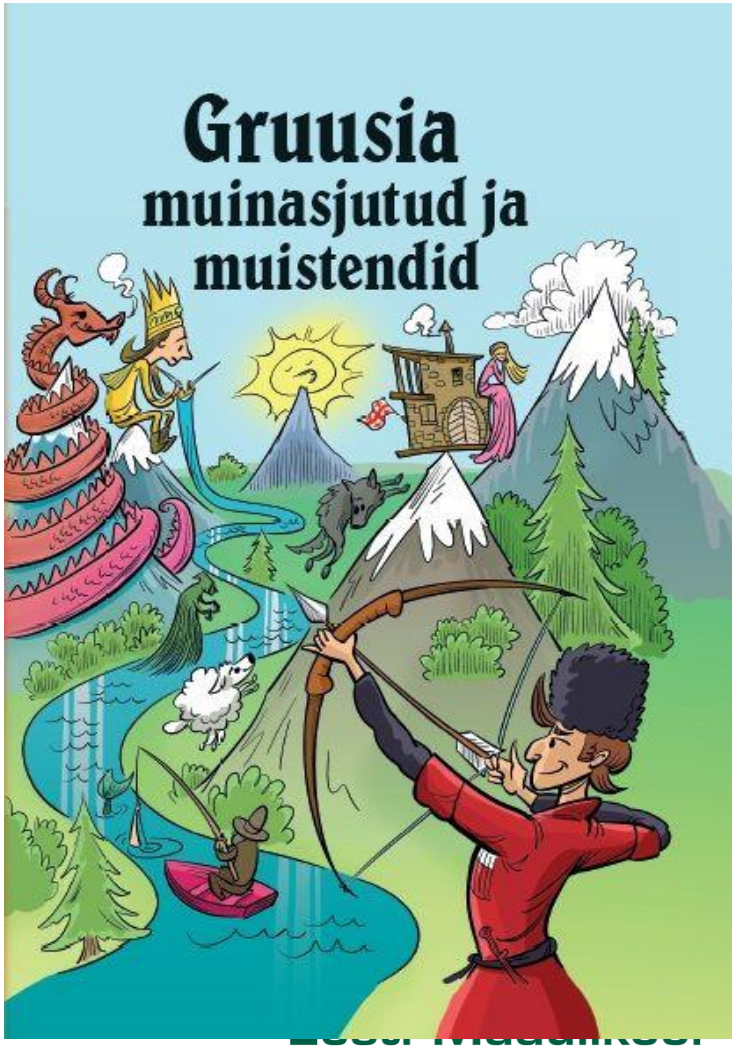
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Thank you!