HT Vista – Training Syllabus

Introduction

- Personnel intro
- HTVet – the company
- HTVista – The first non-invasive medical device that allows veterinarians to rule out cancer of subcutaneous and dermal masses, on the spot and in the clinic. [**AVOID** saying malignant or benign / diagnose cancer]

The unmet need

- **Give some numbers/statistics and describe clinical guidelines**:
    - How many lumps and bumps do you see in a month?
    - Tumors of the skin and subcutaneous tissues are the most common tumors in dogs, accounting for **one-third of all tumors** encountered in the species.
    - Even the most experienced veterinarian or oncologist cannot look at or palpate a mass and know whether it is malignant or not.
    - **Guidelines:** All skin and SQ masses that are **>1 cm** and have been **present for 1 month** should be aspirated for cytologic evaluation.
- **Describe the current clinical practice and the disadvantages of FNA:**
    - Invasive
    - Stressful (Dog, owner, and sometimes vet)
    - Expensive (especially external diagnosis)
    - Timely (Sampling, Staining, Interpreting)
    - Requires experience and performed only by vets
    - It may be **nondiagnostic (20%)** or equivocal. This may be due to a **small number of cells** in the sample, **poor exfoliation** of the cells, or **poor sample quality**.

HTVista

- **Normal and abnormal tissues transfer heat differently** due to their differences in metabolism, tissue morphology, heat capacity and more. We extract these differences (decay rate, signal noise, start and end temperature, etc.) with the help of mathematical models.

- HTVista **is not** designed to replace cytology, but to be used as a 1st line non-invasive "screening" test, that can also be easily and quickly performed by assisting staff.

- **Technology in short** – **H**eat **D**iffusion **I**maging: A 50-sec scan. Heating the tissue to no more than a couple of degrees above body temperature. Collect Signals while it heats and is left to cool. Signals sent to the cloud > AI, Computer vision, signal analysis > results return to console and clinic's email in a few minutes, depending on the WIFI connection.

- Data is based on a validations study that included ~400 masses: 98% NPV, 85% sensitivity.

- HTVista can be used to scan **any dermal or SQ mass that is a maximum of 0.5 cm deep, excluding**:
    - Lymph nodes
    - Testicular masses
    - Mammary glands
    - Facial masses (unless under sedation)
    - Footpads & phalanx
    - Infected/secretin masses

- **Benefits:**
    - Non-invasive & pain free test
    - Easy to use (vets & assistants)
    - Relieves stress
    - On-the-spot result
    - Innovative
    - Increases compliance for further diagnosis
    - Affordable

Quick demo (on model 1)

- Connect to electricity, show outlets at the back of the device, turn on & connect to WIFI (option to use offline)
- Show different screens
- Add new patient: explain “test” option, recommend putting in Last name and Chip number.
- Explain there are three requirements for a good scan, first – proper clipping.
- **Prepare dog**, **explain** about proper clipping:
- Suspicious & healthy area, no need for massive shaving for small masses
- gentle clipper
- avoid bruising
- “Scan new mass”, Choose location (**mention** that it doesn’t affect algorithm) >> one-minute calibration: short calibration is required for the thermal camera to adjust to room temperature.
- Repeat three requirements for a good scan and present the second, stay still. **Show** the difference between moving the scanner over the skin compared to moving “with the dog”.
- Placing the scanner
    - perpendicular and tight to the skin
    - Include healthy & suspicious
    - Mass should be located close to the center
- “Start scan” – 3 sec press/touch screen
    - Heating phase- safe blue light- signals collected when the tissue is heated and left to cool.
    - Stay focused on the dog – Flickering light=test ongoing, Blinking light = test has ended.
- Explain about RED MASKS– **RED=signals were not collected properly** due to movement / fur / insufficient heating.
- Repeat 3 requirements for a good scan: 1) proper clipping 2) No movement and lastly Labeling**:**
    - Mark “Suspicious” and “Healthy” – keep away from each other and from RED MASK as much as possible.
    - Mark the center of the mass (especially in small masses)

- Comparing sites on the same patient- age, medical condition, medication does not affect the results.

- Results:
  - Back to console and clinic's email in a few minutes, depending on the WIFI connection.
  - 5-10 result means the mass is benign, with a 98% certainty.

    1-4 result **doesn't necessarily mean the tumor is malignant.** The device couldn't determine with 98% certainty whether it is benign, thus further investigation is recommended.
  - Most of the results are on the edges of the scale (1-2/9-10), the probability of the mass being benign increases from 5 to 10.

Demo (on models 2-3)

- Connect to electricity, show outlets at the back of the device, turn on & connect to WIFI (option to use offline)
- Show different screens
- Add new patient: explain "test" option, recommend putting in Last name and Chip number.
- Explain there are three requirements for a good scan, first – proper clipping.
- **Prepare dog**, **explain** about <u>proper clipping</u>:
- Suspicious & healthy area, no need for massive shaving for small masses
- gentle clipper
- avoid bruising
- "Scan new mass", Choose location (**mention** that it doesn't affect algorithm) >> one-minute calibration: short calibration is required for the thermal camera to adjust to room temperature.
- Repeat three requirements for a good scan and present the second, stay still. **Show** the difference between moving the scanner over the skin compared to moving "with the dog".
- Placing the scanner
  - perpendicular and tight to the skin
  - Include healthy & suspicious
  - Mass should be located close to the center

- Use grid and the notch (indicates “right”)
- Subcutaneous mass – put your finger on the border between “health” and “suspicious” and assist the grid to memorize the border
- Large mass – including part of it and always have a “healthy” area
- Mobile mass – stretch/press the adjacent skin [outside the scanned area] to fixate
- Mass on extremities – use your hand to hold the area from below while supporting the scanner

  Bottom line: Ensure that you placed the scanner correctly, that you know where the mass is, and that you feel comfortable and steady before starting the scan.

- “Start scan” – 3 sec press/touch screen
  - Heating phase- safe blue light- signals collected when the tissue is heated and left to cool.
  - Stay focused on the dog – Flickering light=test ongoing, Blinking light = test has ended.
  - Cancel test if needed, System will indicate and stop the test if there is too much fur or movement for signals to be collected.
- Explain about RED MASKS– **RED=signals were not collected properly** due to movement / fur / insufficient heating.
  - Show examples
  - RED MASK all over = scan ogain OR think if this is a suitable case
- Repeat 3 requirements for a good scan: 1) proper clipping 2) No movement and lastly Labeling**:**
  - Mark “Suspicious” and “Healthy” – keep away from each other and from RED MASK as much as possible.
  - Mark the center of the mass (especially in small masses)
  - Ensure correct marking – this will affect the reliability of the result.
  - Comparing sites on the same patient- age, medical condition, medication does not affect the results.
- Until this point, you can go back and re-scan, but once pressed “Analyze” data is sent to the cloud. [show notification]

- Results:
    - Back to console and clinic's email in a few minutes, depending on the WIFI connection.
    - Appear only on "masses" screen
    - 5-10 result means the mass is benign, with a 98% certainty.

      1-4 result **doesn't necessarily mean the tumor is malignant.** The device couldn't determine with 98% certainty whether it is benign, thus further investigation is recommended.
    - Most of the results are on the edges of the scale (1-2/9-10), the probability of the mass being benign increases from 5 to 10.

Troubleshooting:

- Settings tab: change wifi and timezone
- Refresh display: in case the screen stretches downwards/ The button "Scan new mass" disappeared
- Reset device: in case the app is stuck
- In any case of a problem contact our technical support (QR)
- If we are unavailable go to settings> Reset device. If doesnt work Restart device. If doesn't work manually unplug the power cable at the back and reconnect it.

Some extras:
At the first 5 scans each veterinarian performs, HTVet team will give them feedback on the quality of the scan so thay can learn and improve.

REFERENCES & EXTRAS

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4158346/

According to a **2009–2010 National Pet Owners Survey** reported by the Pet Products Manufacturers Association, approximately 39% of American homes own at least one dog and 24% have two dogs (NumberofNet.com 2014). Thus, there are approximately 77.4 million pure-bred and mixed-breed dogs living in the United States (Texas Veterinary Cancer Registry 2012). Cancer is the leading cause of death in dogs over 10 years, with 50% of older dogs developing the disease and approximately one in four dogs eventually dying from it (Adams et al. 2010; Animal Cancer Foundation 2014; Bronson 1982; Dobson 2013; Vail and MacEwen 2000). Not surprisingly, dogs are diagnosed with many of the same cancers as humans (Khanna et al. 2006; Merlo et al. 2008), with an underlying presentation, clinical pathology, and treatment response mirroring that observed in humans (Cadieu and Ostrander 2007; Dorn 1976). This suggests that similar genetic mechanisms cause human and canine cancers and that genetic studies of canine disease may be a powerful way to advance our understanding of cancer in humans and companion animals alike (Cadieu and Ostrander 2007; Khanna et al. 2006; Ostrander 2012).

A Practical Approach to Lumps and Bumps

WORLD SMALL ANIMAL VETERINARY ASSOCIATION CONGRESS PROCEEDINGS, 2017

Sue Ettinger, DVM, DACVIM (Oncology)

https://www.vin.com/apputil/content/defaultadv1.aspx?pId=20539&id=8506184

American Veterinary Medical Association (AVMA) – Cancer in pets

https://www.avma.org/resources/pet-owners/petcare/cancer-pets#:~:text=How%20common%20are%20neoplasia%20and,rate%20of%20cancer%20in%20cats.

MAST CELL TUMORS

Mast Cell Tumors are the most common skin tumors in dogs. Mast cell tumors can look and feel like anything, so it is impossible to diagnose without looking at cells under the microscope. After close examination, a grade of malignancy is assigned. The grade suggests how the tumor will behave and the best course of treatment. Low or intermediate-grade tumors are unlikely to spread, and surgery may be the only treatment required. High-grade tumors have a greater chance of spreading, so veterinary oncologists look very carefully for metastasis and consider using chemotherapy in addition to surgery. Radiation therapy is another option for some cases.

https://www.csuanimalcancercenter.org/2019/11/14/common-cancers-in-dogs/#:~:text=Mast%20Cell%20Tumors%20are%20the,grade%20of%20malignancy%20is%20assigned.0