



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

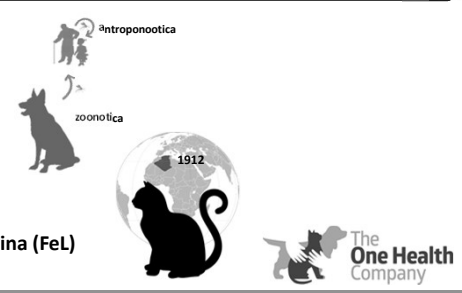
INFEZIONE DA *LEISHMANIA INFANTUM* NEI GATTI: STUDIO EPIDEMIOLOGICO E CLINICOPATOLOGICO IN EMILIA-ROMAGNA

Lorenza Urbani, **Alessandro Tirolo**, Daniela Salvatore, Michele Tumbarello, Sofia Segatore, Mara Battilani,
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Servizio di patologia clinica - Dipartimento di Scienze Mediche Veterinarie

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La Leishmaniosi



Leishmaniosi umana (Hul)

Leishmaniosi canina (CaL)

Leishmaniosi felina (FeL)

antropoonotica

zoonotica

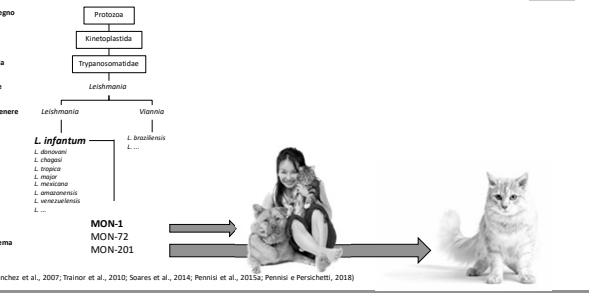
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The One Health Company

(Soares et al., 2014)

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Il parassita



Sottoregno: Protozoa

Ordine: Kinetoplastida

Famiglia: Trypanosomatidae

Genere: Leishmania

Sottogenere: Leishmania

Specie: *L. infantum*, *L. chagasi*, *L. tropica*, *L. major*, *L. mexicana*, *L. amazonensis*, *L. vinivaxiensis*, *L. braziliensis*

Zimodema: MON-1, MON-72, MON-201

(Martín-Sánchez et al., 2007; Trainor et al., 2010; Soares et al., 2014; Pennisi et al., 2015a; Pennisi e Persichetti, 2018)

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Vie di trasmissione

Ordine: **Digitata**
 Sottordine: **Nematocera**
 Famiglia: **Phlebotomidae/Phlebotominae**
 Sottofamiglia: **Phlebotominae**
 Genere: **Phlebotomus**
 Specie: **P. perniciosus, P. papatasi, P. perfiliewi, P. neglectus, P. sergenti, P. ...**

Altre vie di trasmissione?

- **Transplacentare ?**
- **Venerica ?**
- **Trasfusioni sanguigne**

(Solano-Gallego et al., 2009; Salvatore et al., 2014; Soares et al., 2014; Pennisi, 2015)

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Epidemiologia

Ospite secondario o accidentale ?

Assenza di sintomatologia

Forma infettante per il vettore nel sangue

Aree endemiche

Guarigione solo con terapia

(Soares et al., 2016)

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Epidemiologia


- Italia → Sicilia, Spagna, Portogallo, Francia, Grecia, Albania, Turchia, Cipro, Iran, Egitto, Israele
- Brasile
- **Sieroprevalenza 0 – 68,5%**
Positività alla PCR 0 – 60,7%
(Pennisi et al., 2015a; Otranto et al., 2017; Dedola et al., 2018)
- **Stagionalità**
(Pennisi et al., 2012)
- **Altitudine**
(Nasreddin et al., 2008)
- **Habitat rurale**
(Cardone et al., 2003)
- **Gatti outdoor**
(Osoin et al., 1998)
- **Genere maschile**
(Cardone et al., 2003; Sobrinho et al., 2012)
- **Età adulta**
(Cardone et al., 2003; Aglón et al., 2012; Akhtardaneh et al., 2007; Latta et al., 2019)
- **Area geografica (Sud Italia)**
(Jatta et al., 2019)
- **Immunodeficienza felina (FIV) ?**
 • Leucemia felina (FeLV)
 • Coronavirus felino (FCov)
 • *Toxoplasma gondii*

(Pennisi et al., 2015a; Otranto et al., 2017; Dedola et al., 2018)

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Aspetti clinici

- **Asintomatici**
- **Leishmaniosi cutanea**
- **Leishmaniosi mucocutanea**
- **Leishmaniosi viscerale**



(Poli et al., 2002; Pennisi et al., 2015a; Otranto et al., 2017; Pennisi e Persichetti, 2018)

Segni clinici più comuni

- **Lesioni cutanee e mucocutanee** (noduli++, ulcerazioni++, dermatite esfoliativa++)
- **Linfoadenomegalia**
- **Lesioni oculari** (uveiti → panofthalmiti)
- **Blefariti/congiuntiviti**
- **Sintomi aspecifici**

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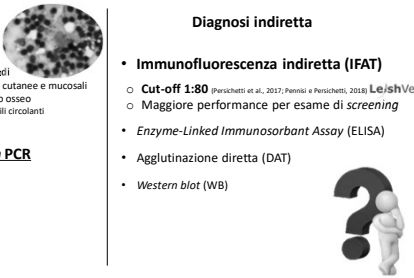
Diagnosi nella pratica clinica

Diagnosi diretta

- **Osservazione del parassita**
 - Strisci
 - Citologia
 - Istopatologia
- **Immunocistochimica**
- **Polymerase Chain Reaction PCR**
 - Linfonodi
 - Sangue
 - Tamponi congiuntivali
- **Cultura**

Diagnosi indiretta

- **Immunofluorescenza indiretta (IFAT)**
 - **Cut-off 1:80** (Persichetti et al., 2017; Pennisi e Persichetti, 2018) **LeishVet**
 - Maggiore performance per esame di **screening**
- **Enzyme-Linked Immunosorbant Assay (ELISA)**
- **Agglutinazione diretta (DAT)**
- **Western blot (WB)**




Scano et al., 2014; Pennisi et al., 2015a; Persichetti et al., 2017; Pennisi e Persichetti, 2018)

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Obiettivi dello studio

- Stimare la **prevalenza d'infezione da *L. infantum*** in gatti della regione **Emilia Romagna** utilizzando un **test sierologico** e uno **molecolare** su tre differenti matrici biologiche (**sangue, tampone congiuntivale, pelo**)
- **Comparare** le performance diagnostiche delle due metodiche
- Valutare le possibili **associazioni** tra l'**infezione da *L. infantum*** e **dati di segnalamento e anamnesi** e **dati clinico-patologici**

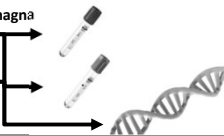


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Materiali e metodi

- **Campionamento** →  giugno – novembre 2017
- **Criteri d'inclusione** →
 - Provenienza Emilia-Romagna
 - Prelievo ematico
 - Prelievo di urine
 - Prelievo di pelo
 - Tampone congiuntivale

Valutazione positiva del Comitato Etico Scientifico



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Materiali e metodi

- **Gatti campionati**

↓

Segnalamento Anamnesi

- Età
- Sesso
- Razza
- Provincia di provenienza
- Ambiente (indoor o outdoor)

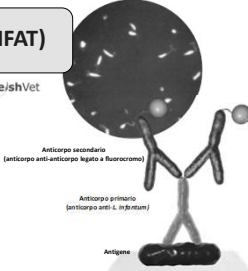


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Materiali e metodi

Test immunofluorescenza indiretta (IFAT)

- **Positivi** (titolo anticorpale $\geq 1:80$)
- **Dubbi** (titolo anticorpale 1:40)
- **Negativi**



LeishVet

Anticorpo secondario (anticorpo anti-anticorpo legato a fluorocromo)

Anticorpo primario (anticorpo anti-Leishmania)

Antigene

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Materiali e metodi

Diagnosi molecolare (real-time PCR)

Pelo

Tamponi congiuntivali

Sangue

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Materiali e metodi

Casi *Leishmania* positivi (CLP)

- Titolo anticorpale $\geq 1:80$ e/o positivi in qPCR

Casi *Leishmania* negativi (CLN)

- Titolo anticorpale negativo ($<1:40$) e negativi in qPCR

Casi *Leishmania* non confermati (CLNC)

- Titolo anticorpale uguale a $1:40$ e risultati negativi in qPCR

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Materiali e metodi

• Indagini clinicopatologiche

- Esame emocromocitometrico
- Chimica sierica
- Elettroforesi sierica
- Esame delle urine

• Analisi statistica

- Statistica descrittiva
media, mediana, deviazione standard e range
- Test del Chi quadrato
- Statistica non parametrica
Kruskal Wallis ANOVA

P<0.05


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Risultati e discussioni

Gruppo di studio

➔

152 gatti
che rispettavano i criteri d'inclusione

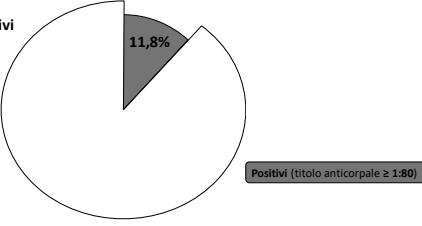


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Risultati e discussioni

Dati epidemiologici: risultati della sierologia (IFAT)

• 18/152 (11,8%) gatti positivi



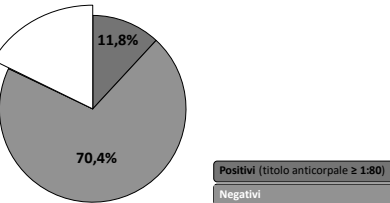
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Risultati e discussioni

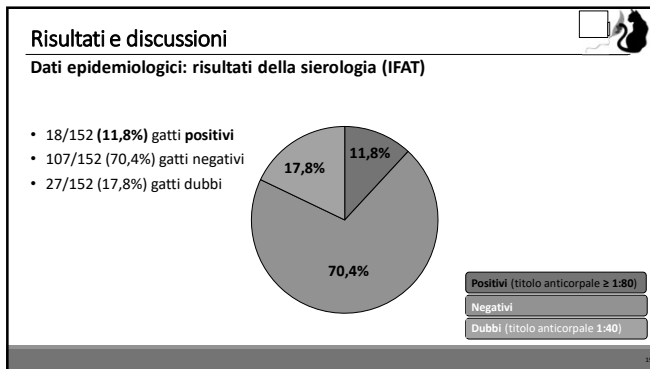
Dati epidemiologici: risultati della sierologia (IFAT)

• 18/152 (11,8%) gatti positivi

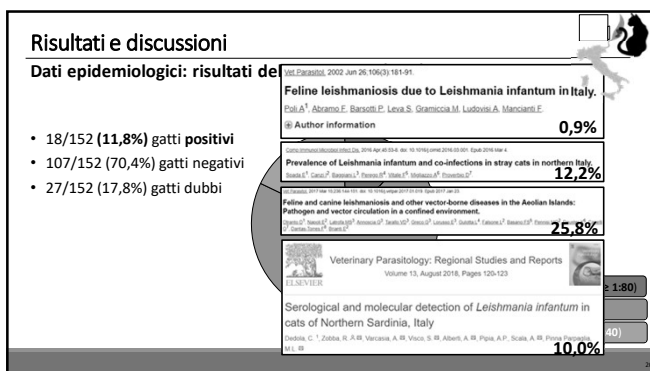
• 107/152 (70,4%) gatti negativi



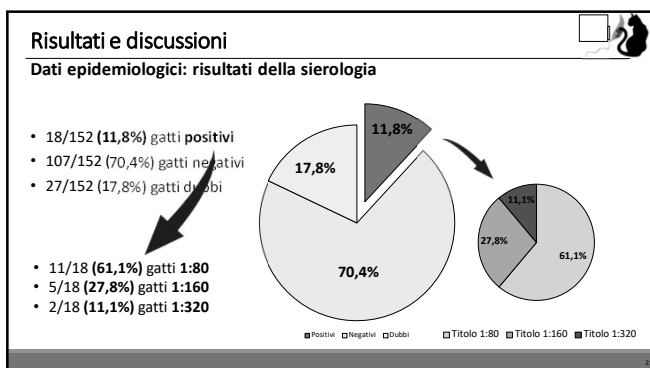
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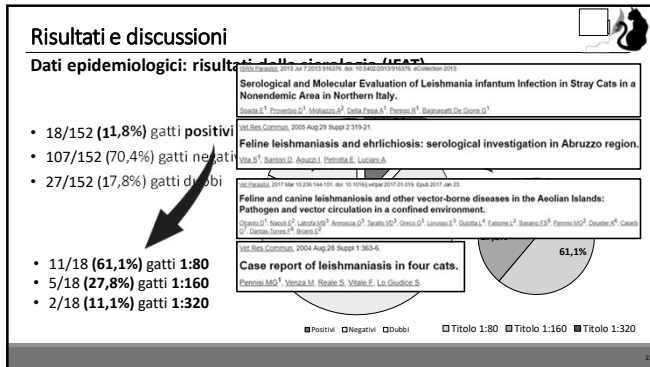
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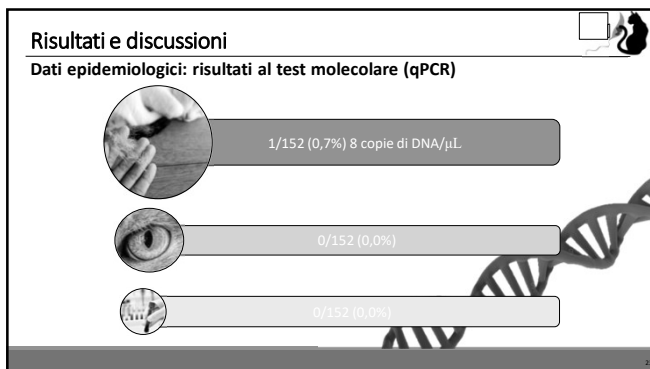
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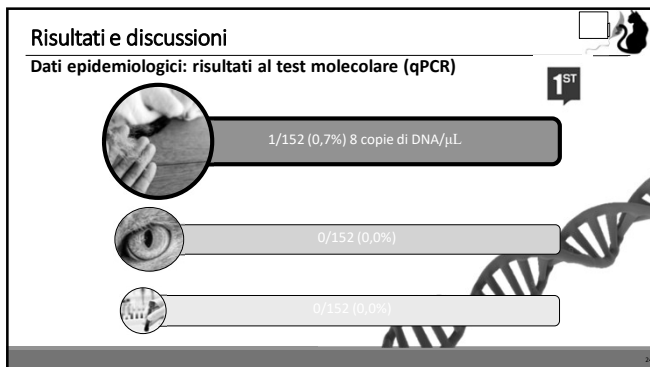
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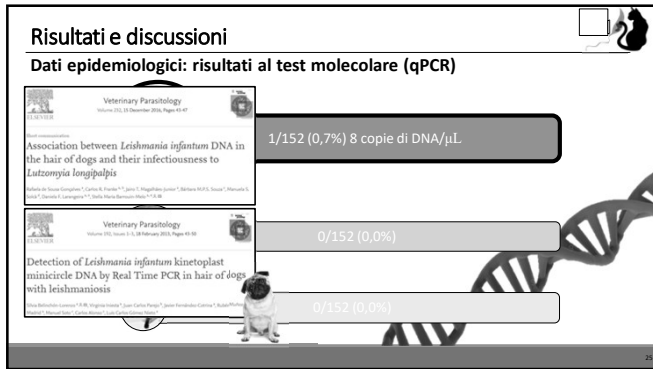
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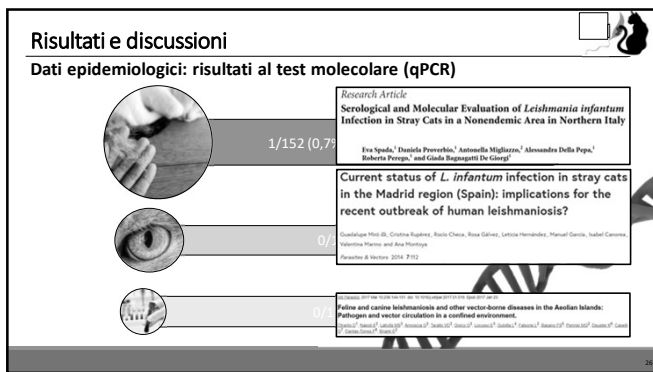
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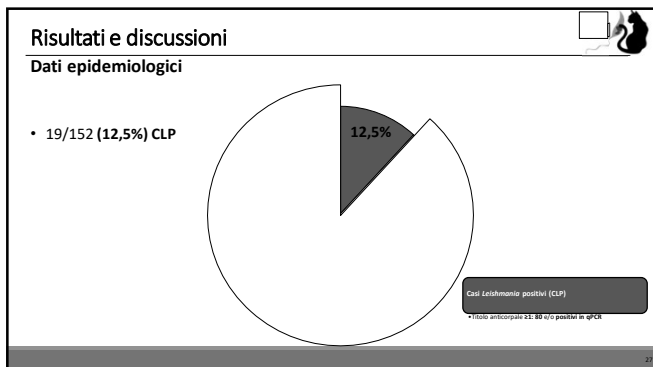
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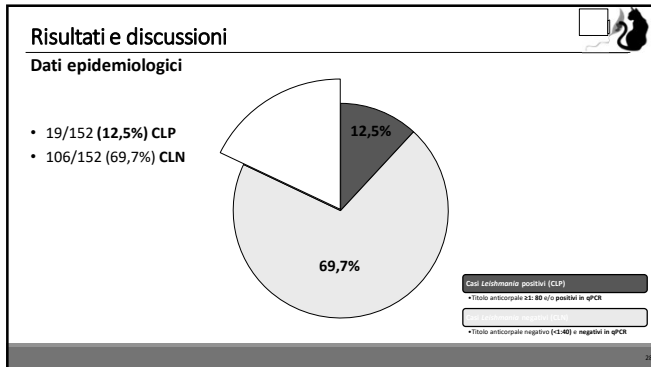
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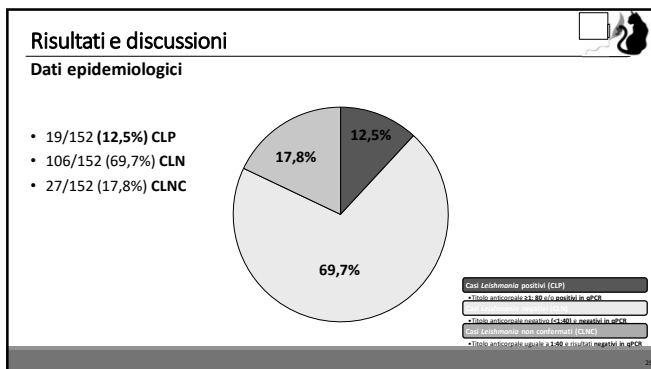
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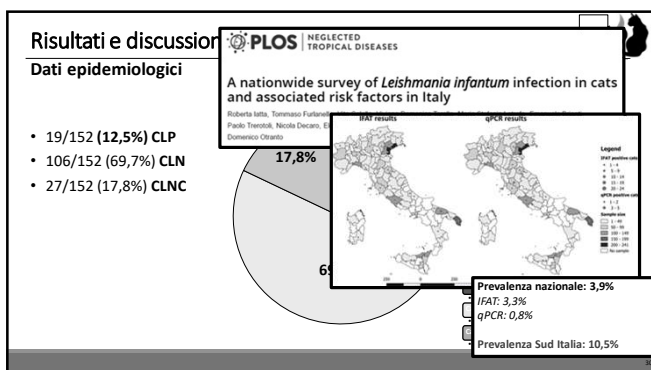
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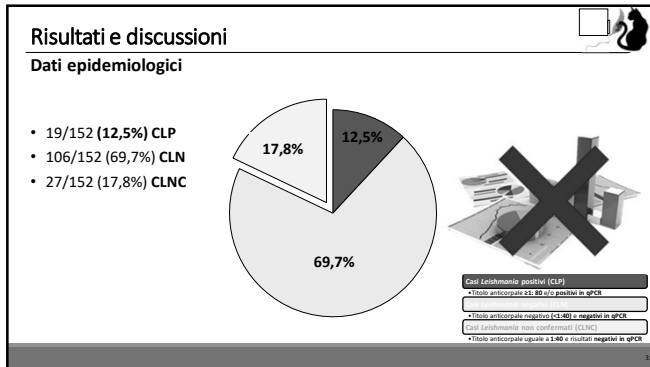
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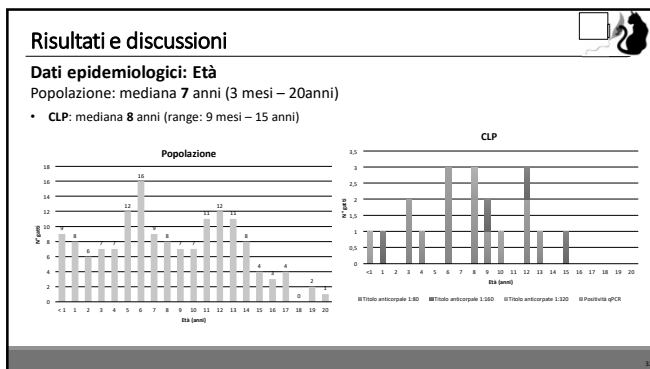
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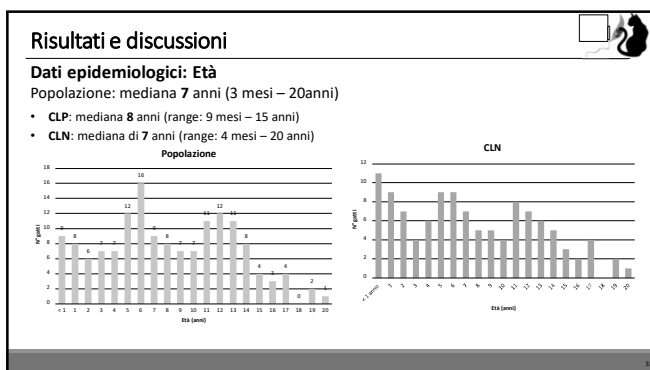
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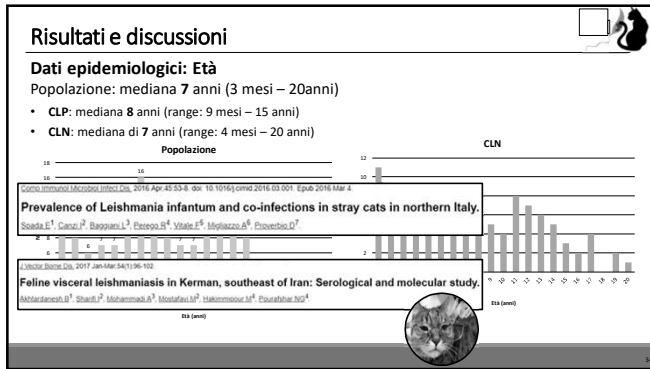
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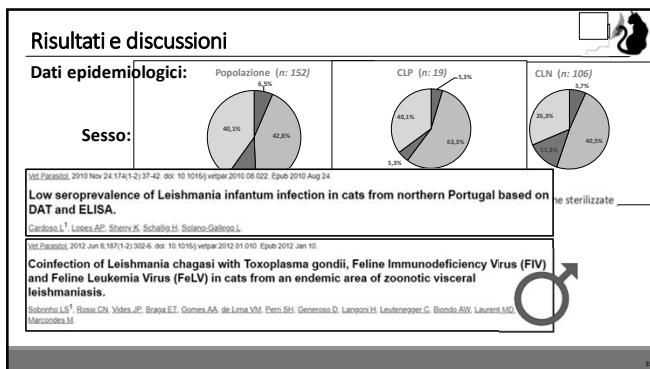
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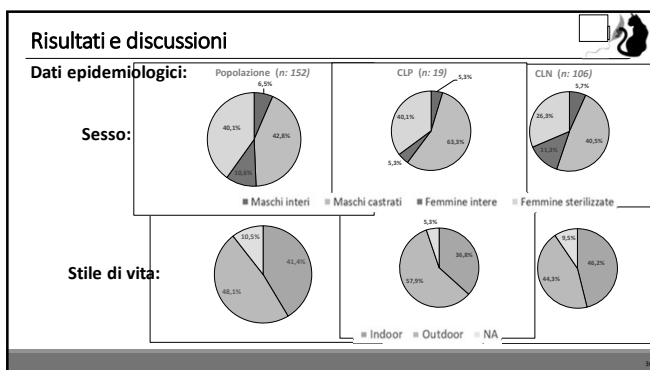
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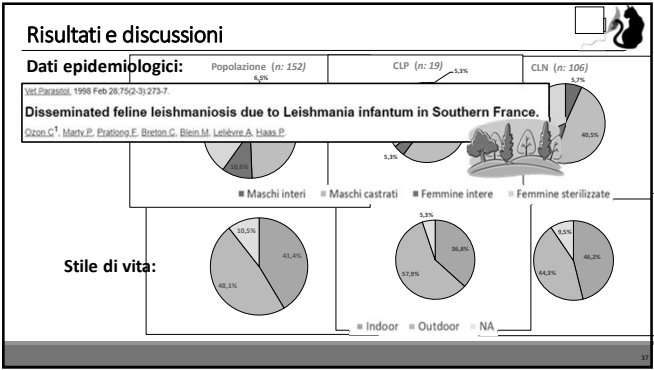
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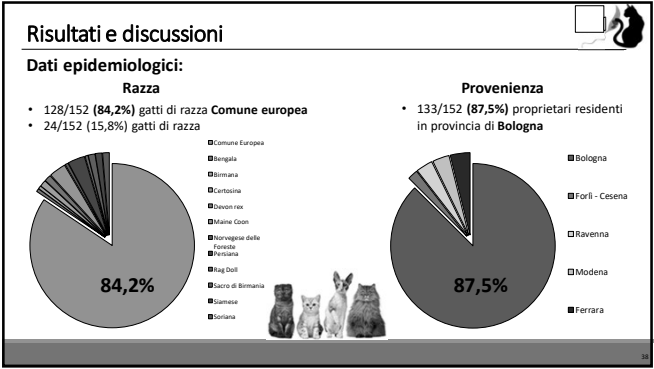
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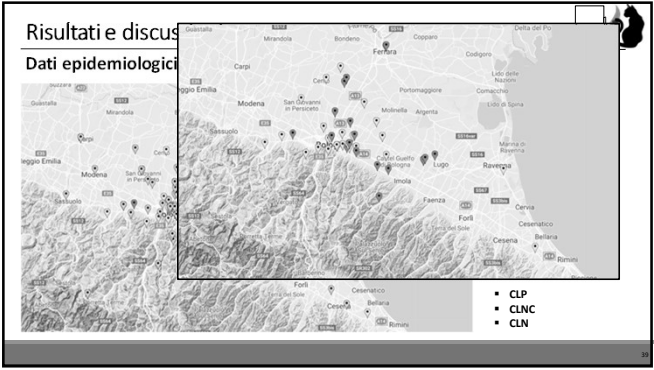
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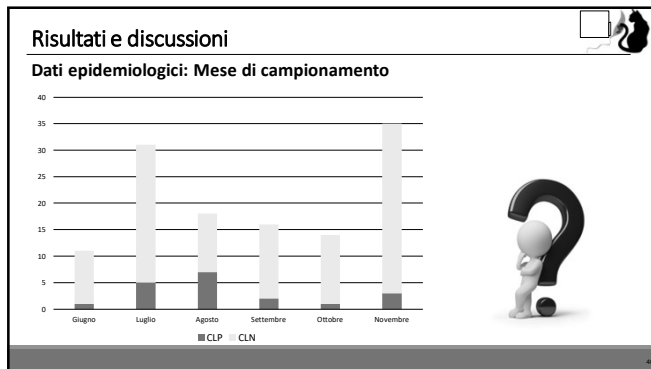
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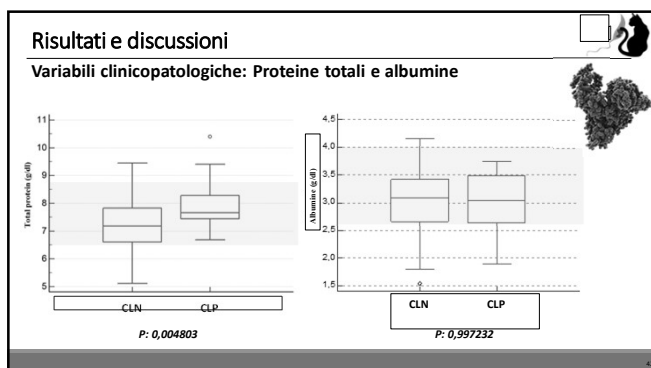
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Alterazioni clinicopatologiche riportate in letteratura

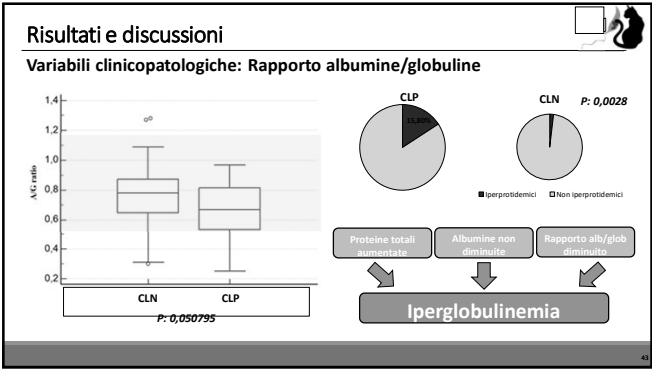
- Anemia normocromica, normocitica, non rigenerativa
- Pancitopenia → Aplasia midollare
- Iperprotidemia
- Ipergammaglobulinemia
- Ipoalbuminemia
- Trombocitopenia
- Linfocitosi
- Linfopenia
- ↑ ALT/AST
- Aumento creatinina sierica
- Proteinuria

(Pamini e Persichetti, 2018)

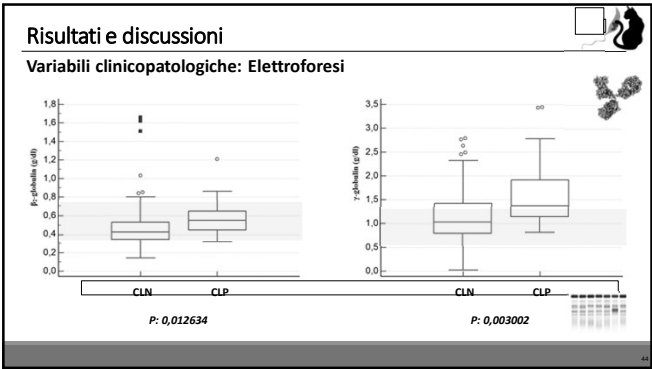
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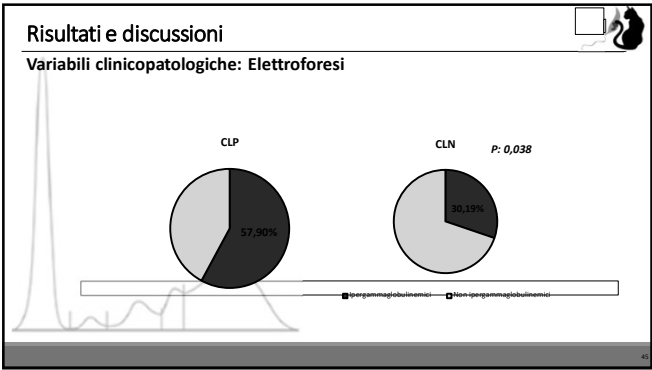
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Risultati e discussioni

Veterinary Parasitology: Regional Studies and Reports
Volumes 1-2, December 2015, Pages 65-69

Case Report
Feline leishmaniosis in Portugal: 3 cases (year 2014)
Rui Pimenta ^{1,2,3,4}, Sora Kava Pimenta ¹, João Barata ¹, Pedro Barata ¹, Ana Rodrigues ¹, Maria João Pinheiro ¹, Luis Mota ¹, Andreia Gomes ¹, José Manuel Cruzado ¹, Lúcia Camparim ¹, Carla Maia ¹, Luís Gonçalves ¹

Abstract
Ocular signs, diagnosis and long-term treatment with allopurinol in a cat with leishmaniosis

Keywords
Schistosomiasis, leishmaniosis, feline

Published online May 27, 2014

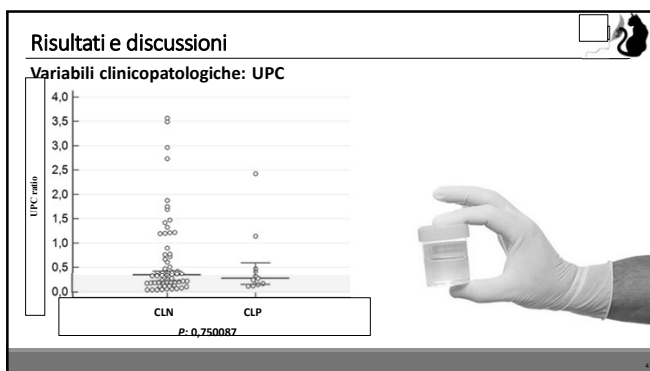
Vis. Res. Commun., 2004 Aug 28 Suppl 1:363-6
Case report of leishmaniasis in four cats.
Pentosi MG¹, Venza M, Reale S, Vitale E, Lo Giudice S

Diagram:

```

    Ipergammalobulinemia
      ↓
    Infiammazione cronica
      ↓
    Eccessiva risposta umorale?
  
```

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Limiti dello studio

- Gatti **condotti a visita** presso struttura ospedaliera
- Dati non rappresentativi dell'**intera regione**
- Assenza di un **secondo controllo**

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Conclusioni

- Prevalenza del 12,5%
- Prima positività alla qPCR su pelo nel gatto
- Gatti CLP presentano un aumento delle proteine totali e delle β_2 e γ -globuline
- Gatti CLP sono più iperprotidemici e ipergammaglobulinemici dei CLN

CONCLUSION



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Prospettive future

- Determinare il ruolo del gatto nella diffusione dell'infezione da *L. infantum*
- Indagare l'effettivo ruolo patogeno del parassita nel gatto



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Original Article



Serological, molecular and clinicopathological findings associated with *Leishmania infantum* infection in cats in Northern Italy


Lorenza Urbani*, Alessandro Tirolo*, Daniela Salvatore, Michele Tumbarello, Sofia Segatore, Mara Battilani, Andrea Balboni and Francesco Dondi

Journal of Feline Medicine and Surgery
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SAGE

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Michele Tumbarello
Mara Battilani
Andrea Balboni
Francesco Dondi



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