



Antonio Cascio

UOC Malattie Infettive e Tropicali
Università di Palermo

19 Ottobre 2019

Moderatori: M. Berta, G. Leigheb, L. Soreca

Ore 8.45 - 10.00

COINFEZIONI

Le zecche vettori di Rickettsiosi

Alessandra Torina (Palermo)

Clinica delle Rickettsiosi in Italia

Antonio Cascio (Palermo)

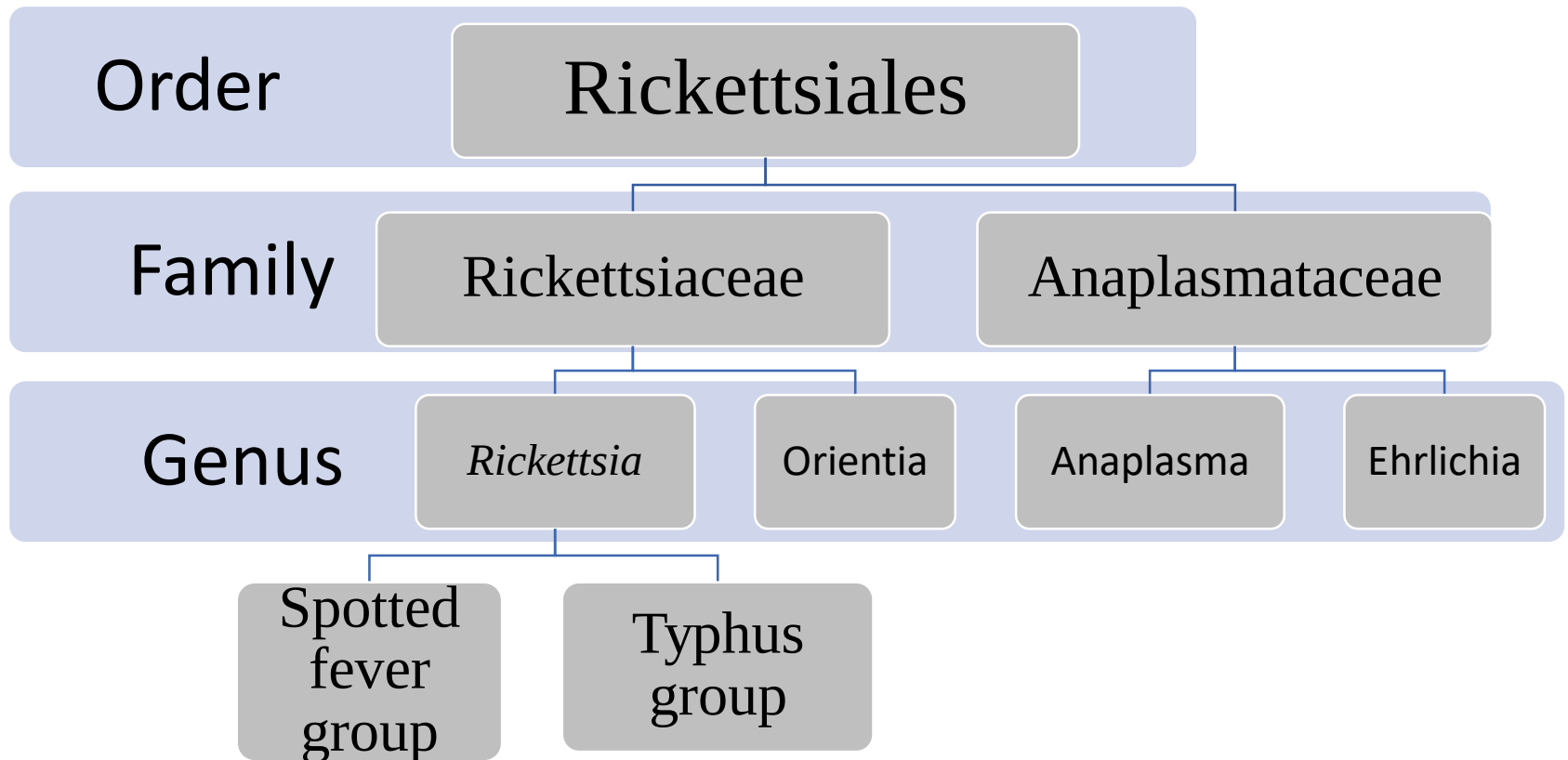
Le Coinfezioni della Malattia di Lyme

Giusto Trevisan (Trieste)

Discussione



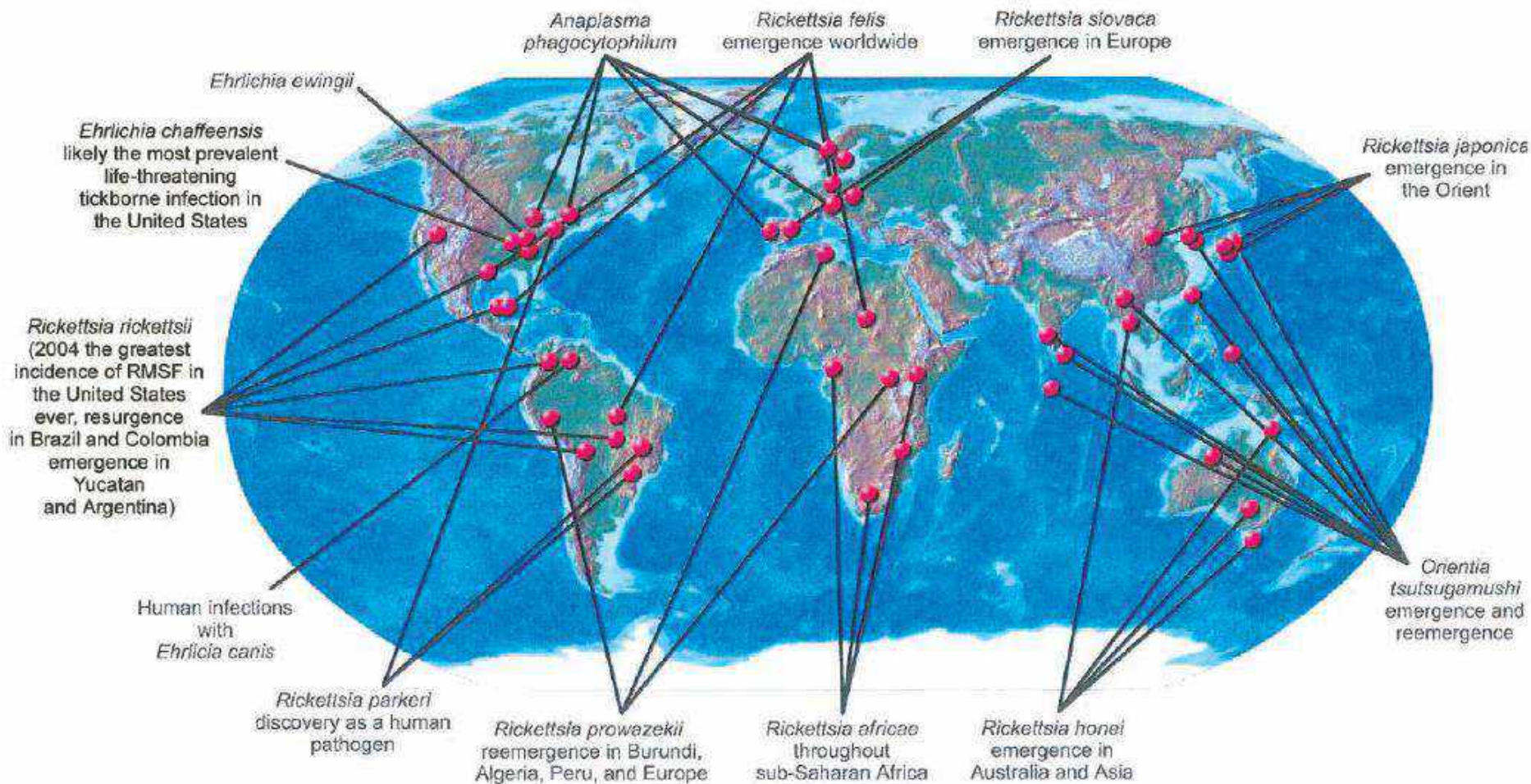
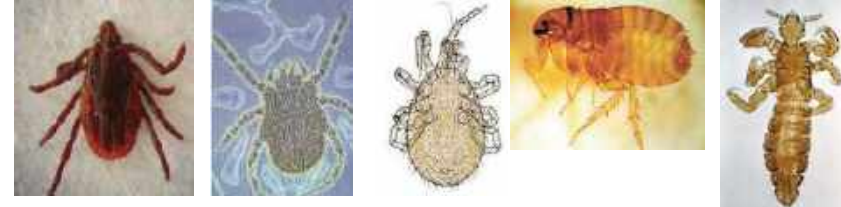
Howard Taylor Ricketts,
first described such microorganisms in connection
with studies on Rocky Mountain spotted fever



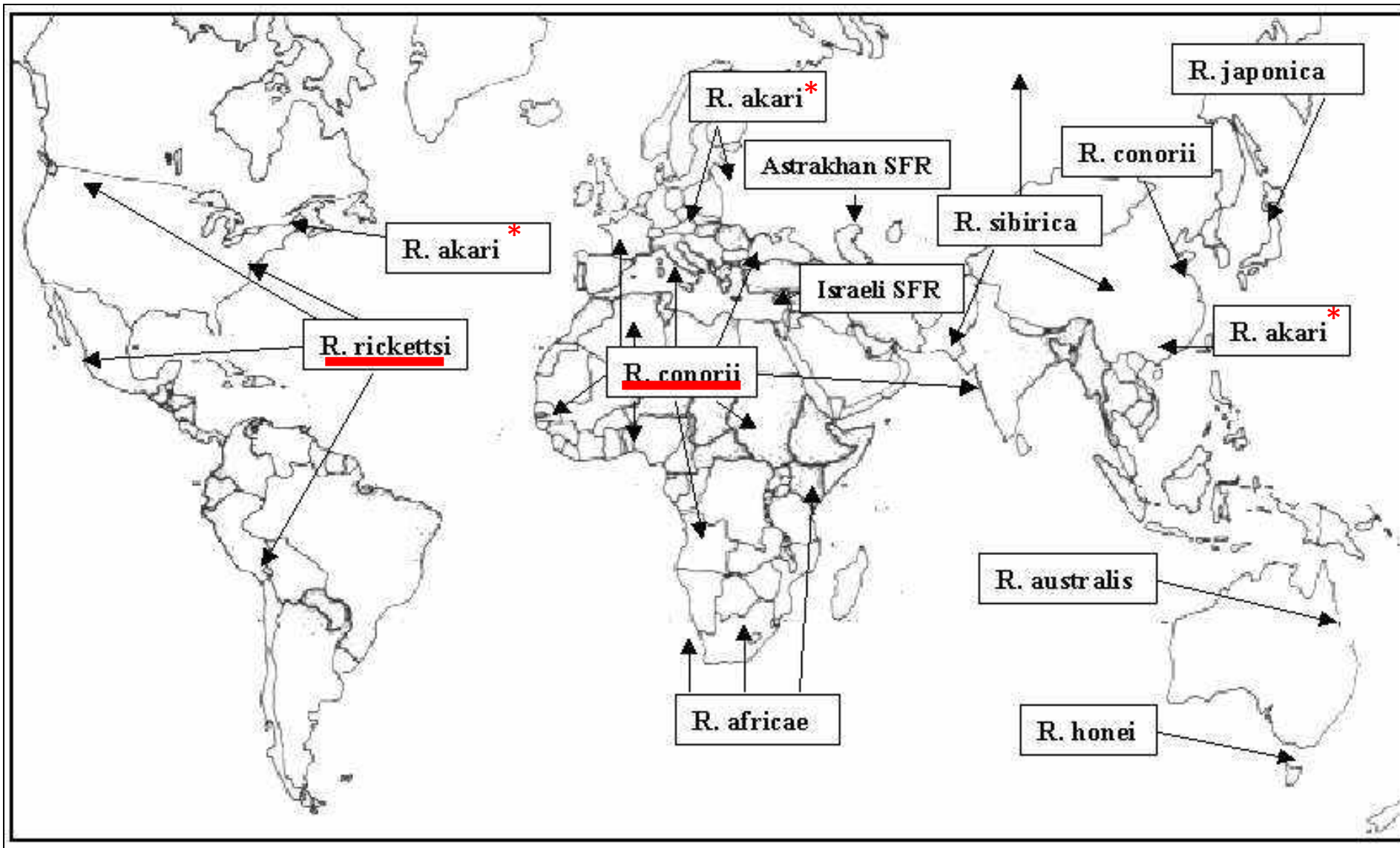
Rickettsiae and Rickettsial Infections: The Current State of Knowledge

David H. Walker

Clinical Infectious Diseases 2007;45:S39-44



Rickettsiosi trasmesse da zecche

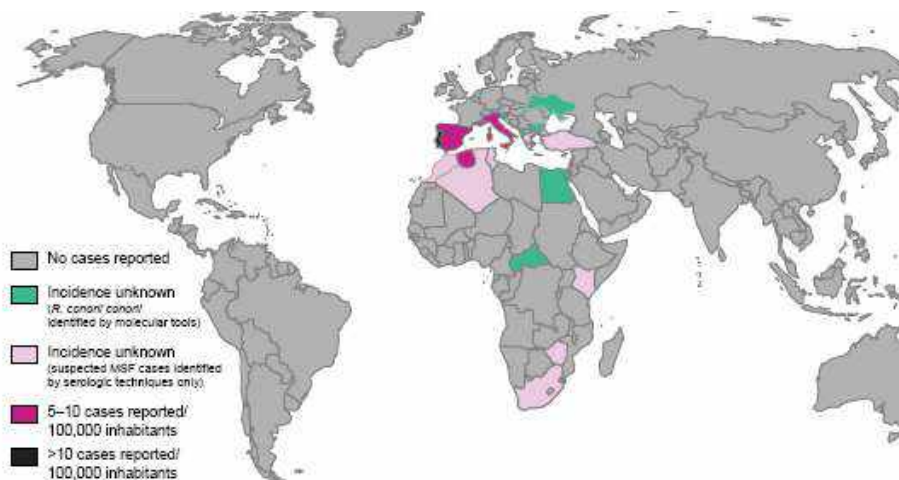


Questions on Mediterranean Spotted Fever a Century after Its Discovery

Clarisse Rovey, Philippe Brouqui, and Didier Raoult

Table 2. Distribution, vector, and main clinical features of the different subspecies of *Rickettsia conorii* complex

Rickettsia	Vector tick	Geographic repartition	Human disease name	Symptoms present, % patients			Fatal forms? (% patients)
				Fever	Inoculation eschar	Rash	
<i>R. conorii conorii</i> , isolates Malish, Moroccan Kenyan	<i>Rhipicephalus</i> sp., <i>Haemaphysalis leachii</i>	Mediterranean area (southern Europe, northern Africa), Croatia, Slovenia, Kenya, Somalia, South Africa, and surrounding the Black Sea (Turkey, Bulgaria, Ukraine, Romania)	Mediterranean spotted fever	91–100	20–87	93–100	Yes (0–18.1)
<i>R. conorii israelensis</i>	<i>Rh. sanguineus</i>	Israel, Portugal, Sicily	Israeli spotted fever	100	0–46	98–100	Yes (0–3.5)
<i>R. conorii caspia</i>	<i>Rh. sanguineus</i> , <i>R. pumilio</i>	Astrakhan region, Chad, Kosovo	Astrakhan spotted fever	100	23	94	No
<i>R. conorii indica</i>	<i>Rh. sanguineus</i> , <i>Boophilus microplus</i> , <i>H. leachii</i>	India, Pakistan	Indian tick typhus	100	Rare	100 (frequently purpuric)	No



Mediterranean Spotted Fever

Agent: *Rickettsia conorii*

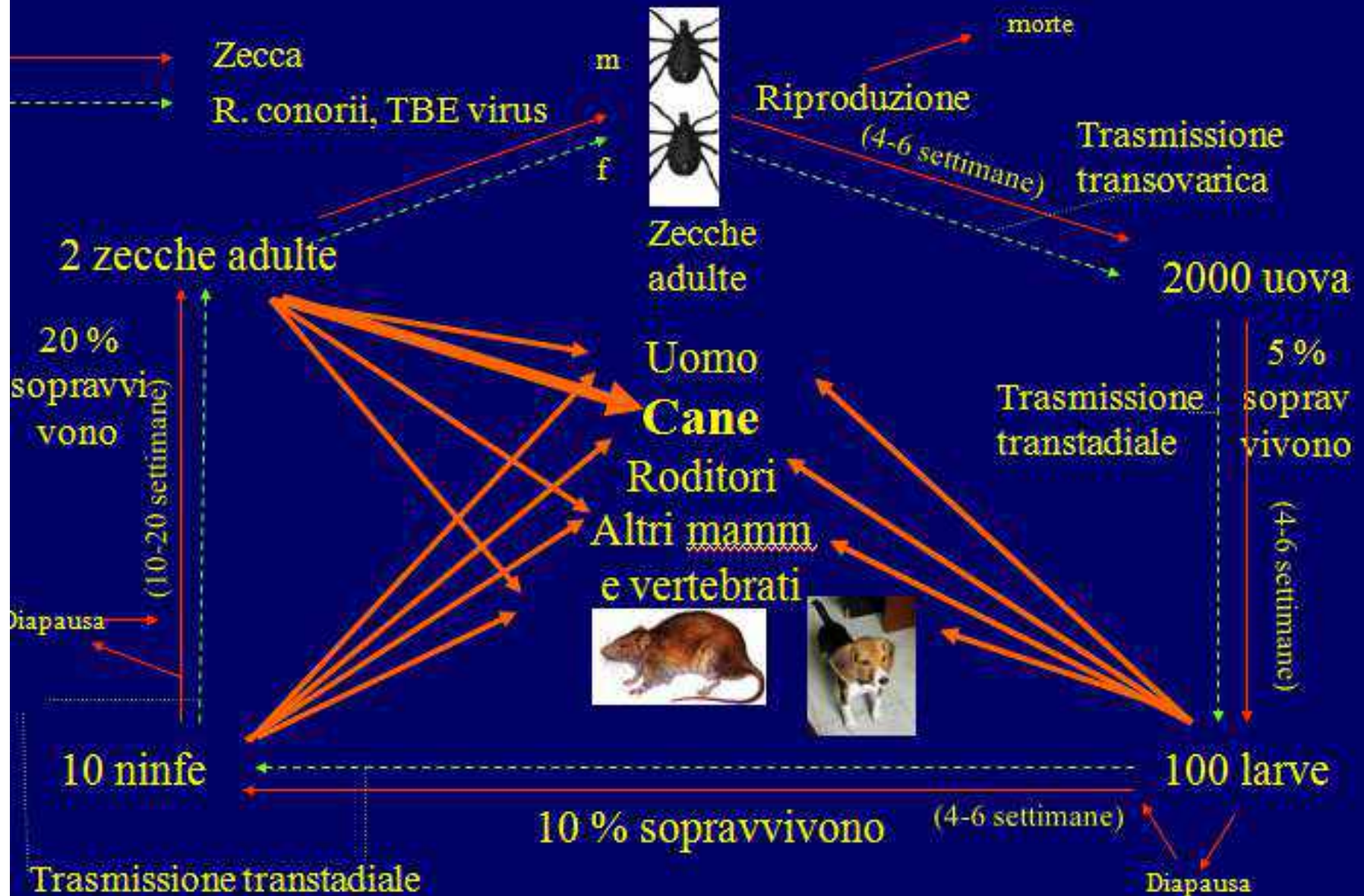
Vector: *Rhipicephalus sanguineus*



Reservoir: **Dogs, little mammals,**
R. sanguineus



Transmission cycle of a tick-borne parasite



Las garrapatas (Acarina: Ixodida) como transmisores y reservorios de microorganismos patógenos en España

Francisco José Márquez-Jiménez^a, Antonio Hidalgo-Pontiveros^a, Francisco Contreras-Chova^b,
José Jesús Rodríguez-Liébana^a y Miguel Ángel Muniain-Ezcurra^c



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Veterinary Parasitology 152 (2008) 173–185

veterinary
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Review

The brown dog tick, *Rhipicephalus sanguineus* (Latreille, 1806)
(Acari: Ixodidae): From taxonomy to control

Filipe Dantas-Torres^{*}

ORIGINAL ARTICLE

Molecular Survey of *Rickettsia* spp. in Sick Dogs in Italy

L. Solano-Gallego, M. Trotta, M. Caldin and T. Furlanello

Laboratorio d'Analisi Veterinarie 'San Marco', Padova, Italy

Impacts

- Mediterranean spotted fever (MSF) is a human disease caused by *Rickettsia conorii* and transmitted by the tick *Rhipicephalus sanguineus*. Dogs have been used as sentinels for the detection of MSF in epidemiological studies, but a few studies have been undertaken to assess the role of dogs as a reservoir of the infection and evaluate the occurrence of the disease in dogs.
- Based on molecular data, there is infrequent rickettsiemia in sick dogs.
- *Rickettsia conorii* infection might be occasionally associated with an acute febrile illness in dogs living in the Mediterranean basin, and pure-bred dogs might be more prone to clinical illness.

Effects of *Rickettsia conorii* infection on the survival of *Rhipicephalus sanguineus* ticks

M. L. Levin, L. Killmaster, M. E. Eremeeva and G. A. Dasch

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Table 1. Survival of *Rhipicephalus sanguineus* larvae of different origin fed upon dogs inoculated with two strains of *Rickettsia conorii* or uninfected dogs

Ticks fed upon	North American ticks				Mediterranean ticks			
	No. ticks engorged	No. ticks moulted (moulting success, %)	Prevalence of infection in nymphs (%)	Longevity of unfed nymphs (weeks after the moult)	No. ticks engorged	No. ticks moulted (moulting success, %)	Prevalence of infection in nymphs (%)	Longevity of unfed nymphs (weeks after the moult)
Malish-infected dog	1156	209 (18 ± 2)	4/25 (16 ± 15)	<4	1600	257 (16 ± 2)	1/25 (4 ± 8)	<4
ISTT-CDC1-infected dog	1734	1337 (77 ± 2)	18/50 (36 ± 13)	>10	1915	1240 (64 ± 2)	20/50 (40 ± 14)	>10
Uninfected dogs	3599	3416 (94 ± 1)	0/50 (0)	>10	2943	2449 (83 ± 1)	0/50 (0)	>10

- The negative effects of acquisition of the Malish strain, but not the ISTT-CDC1 strain, on the survival of ticks suggest that different strains of *R. conorii* may exploit different routes of transmission for maintenance in nature.
- Vertebrate reservoirs may play a more prominent role in the persistence of some strains of this agent than previously thought.

Febrile Illness Associated with *Rickettsia conorii* Infection in Dogs from Sicily

Laila Solano-Gallego,* Linda Kidd,†
Michela Trotta,* Marco Di Marco,‡ Marco Caldin,*
Tommaso Furlanello,*
and Edward Breitschwerdt†

We report serologic and molecular evidence of acute, febrile illness associated with *Rickettsia conorii* in 3 male Yorkshire terriers from Sicily (Italy).

Table 1. Clinical and laboratory data at the time of initial and follow-up examinations in 3 dogs with serologic and molecular evidence of natural *Rickettsia conorii* infection*

Date of evaluation, 2005	Physical examination abnormalities	Hematologic, biochemical, and serum electrophoresis abnormalities†	<i>Rickettsia</i> (16S and <i>ompA</i> gene) PCR
Dog 1			
May 31‡§	Fever (40.1°C), tachycardia, mildly enlarged right popliteal lymph node, blepharitis, hunched posture, stiff gait	Left shift neutrophilia (segmented 11,700; bands: 468) and thrombocytopenia (112). ↑ ALT (112), hypoproteinemia (5.0) and hypoalbuminemia (40.4). ↑ α_2 - (16.5) and β_1 -globulins (13.9) ¶	Positive
Jun 8	No abnormalities	Mature neutrophilia (16,400); hyperglobulinemia (4.3); ↑ CRP (2.31); ↑ GGT (10.4); ↑ α_2 - (18.5), γ -globulins (23.3); hypoalbuminemia (40.9)	Negative
Aug 8	No abnormalities	No abnormalities	Negative
Dog 2			
Sep 19‡§	Fever (41°C), ptialism, joint pain, lameness in right rear limb	Microcytic-hyperchromic anemia (MCHC 63.7; MCV 56; Hct 25.3); mature neutrophilia (11,680) ¶	Positive
Sep 28	No abnormalities	Hyperglobulinemia (4.3); ↑ CRP (0.64); ↑ α_2 - (17.5), and γ -globulin (24.6); hypoalbuminemia (41.1)	Negative
Oct 25	No abnormalities	No abnormalities	Negative
Dog 3			
Sep 17§#	Fever (41 °C), abdominal pain, dehydration, peripheral lymphadenomegaly (popliteal and prescapular lymph nodes), conjunctivitis	Thrombocytopenia (69); hypoproteinemia (5.3); hypoalbuminemia (28.6); ↑ α_2 - (14.8), β_1 - (13.0), β_2 - (15.6), γ -globulins (23.0) ¶	Positive
Sep 23‡	No abnormalities	Lymphocytosis (5,594); hyperglobulinemia (4.1); ↑ CRP (2.7); ↑ BUN (75); ↑ α_2 -globulin (19.3); hypoalbuminemia (44.9)	Negative
Oct 25	No abnormalities	↑BUN (54)	Negative

Am. J. Trop. Med. Hyg., 77(1), 2007, pp. 133–135

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Rickettsia conorii in Humans and Dogs: A Seroepidemiologic Survey of Two Rural Villages in Israel

Shimon Harrus,* Yael Lior, Moshe Ephros, Galia Grisaru-Soen, Avi Keysary, Carmella Strenger, Frans Jongejan, Trevor Waner, and Gad Baneth

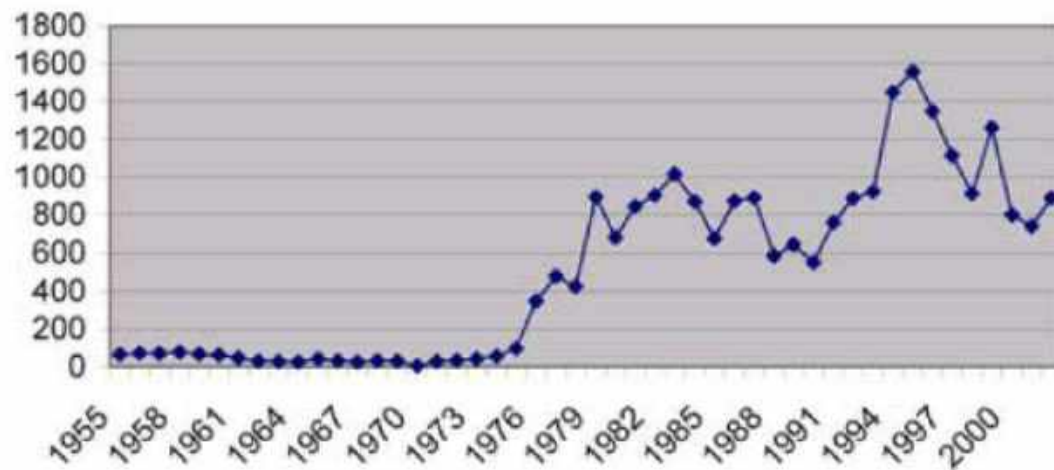


FIGURE 2. Cases of rickettsial diseases in Italy.

Current Knowledge of Rickettsial Diseases in Italy

LORENZO CICERONI, ANTONELLA PINTO, SIMONETTA CIARROCCI,
AND ALESSANDRA CIERVO

*Department of Infectious, Parasitic and Immune-Mediated Diseases, Istituto
Superiore di Sanità, Viale Regina Elena, 299-00161 Rome, Italy*

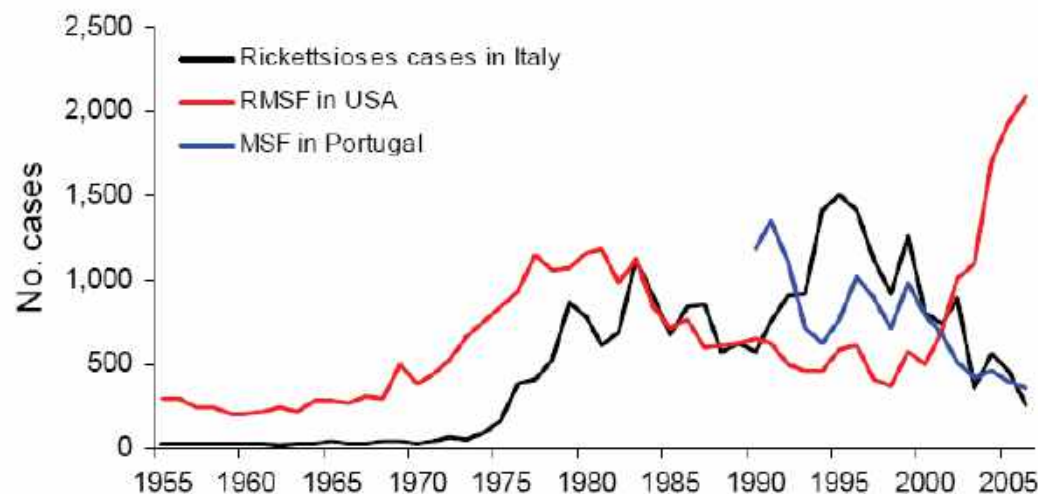


Figure 3. Fluctuation of incidence of Mediterranean spotted fever (MSF) in Italy and Portugal and of Rocky Mountain spotted fever (RMSF) in the United States, by year.

Questions on Mediterranean Spotted Fever a Century after Its Discovery

Clarisse Rovey, Philippe Brouqui, and Didier Raoult



ne geografica dei casi di rickettsiosi notifi-
0. Fonte: Ministero della Salute



* Cases/100 000 population

FIGURE 1. Incidence of rickettsiosis in Italy, 1998–2002.

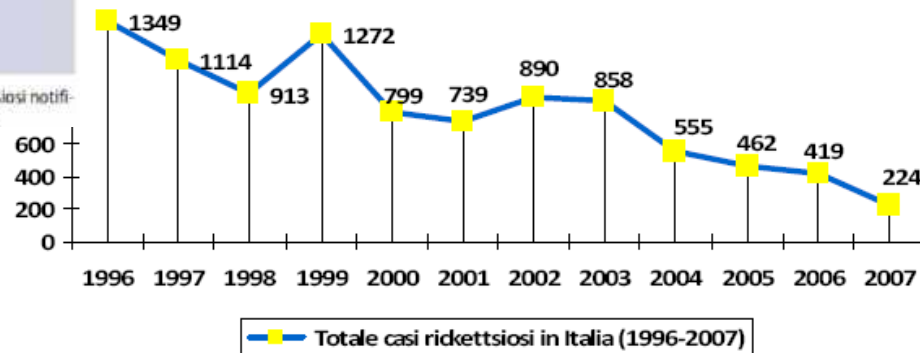
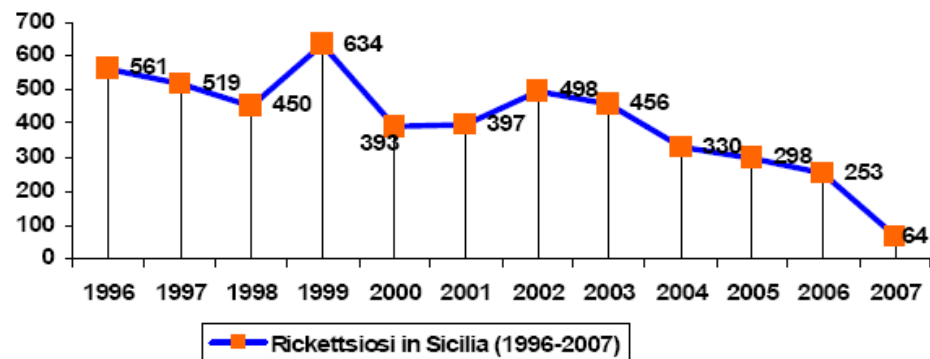


Figura 5. Rickettsiosi in Sicilia



Current Knowledge of Rickettsial Diseases in Italy

LORENZO CICERONI, ANTONELLA PINTO, SIMONETTA CIARROCCHI,
AND ALESSANDRA CIERVO

Department of Infections, Parasitic and Immune-Mediated Diseases, Istituto
Superiore di Sanità, Viale Regina Elena, 299-00161 Rome, Italy



Mediterranean spotted fever rickettsiosis in Italy, 2001–2015: Spatio-temporal distribution based on hospitalization records

Diana Gomez-Barroso^{a,*}, Maria Fenicia Vescio^{b,1}, Antonino Bella^b, Alessandra Ciervo^b, Luca Busani^b, Caterina Rizzo^b, Giovanni Rezza^b, Patrizio Pezzotti^b

^a Consortium for Biomedical Research in Epidemiology and Public Health (CIBERESP), National Center for Epidemiology, Carlos III Institute of Health, Madrid, Spain

^b Department of Infectious Diseases, Istituto Superiore di Sanità, Rome, Italy

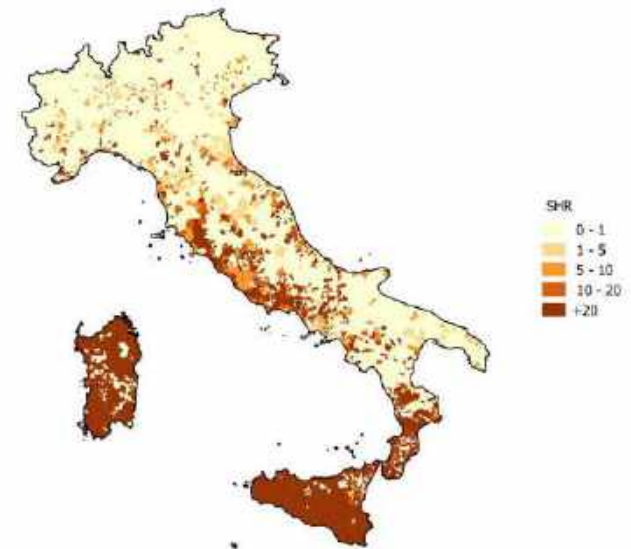


Fig. 4. Standardized Hazard Ratios (n. of hospitalized cases/100,000) for SFG rickettsiosis from 2001 to 2015, Italy.

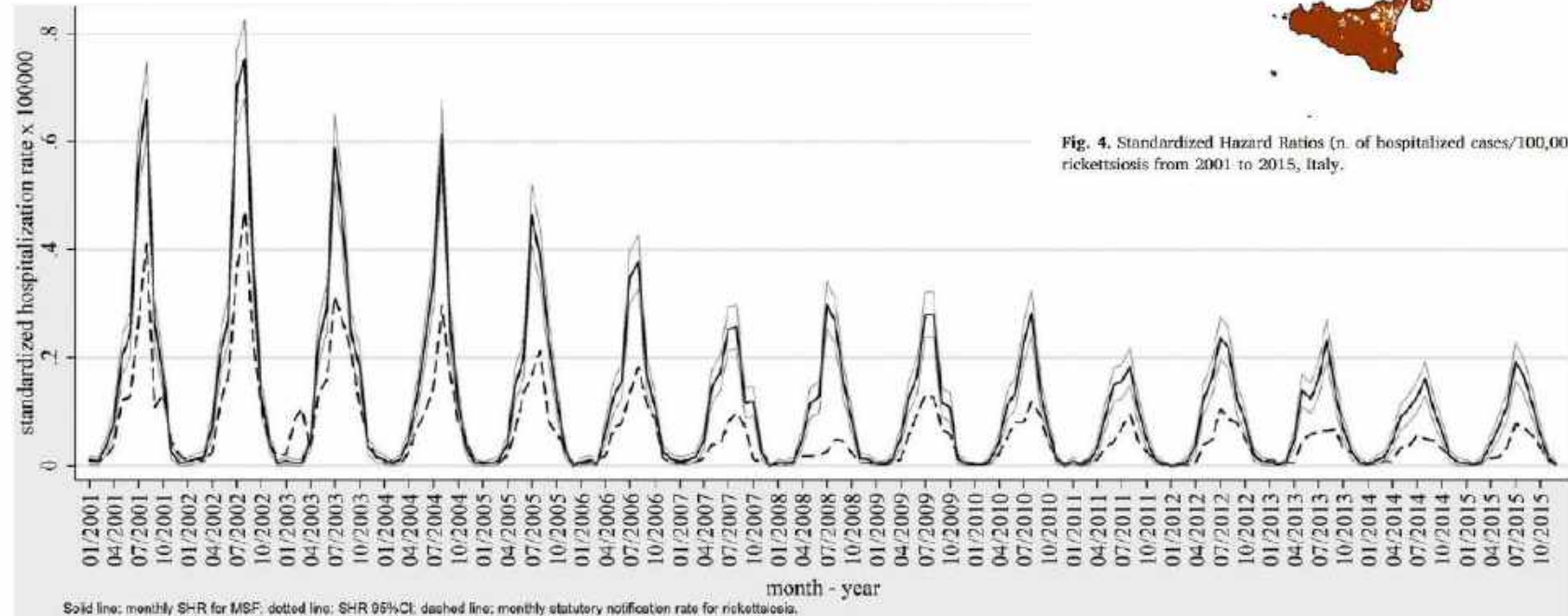
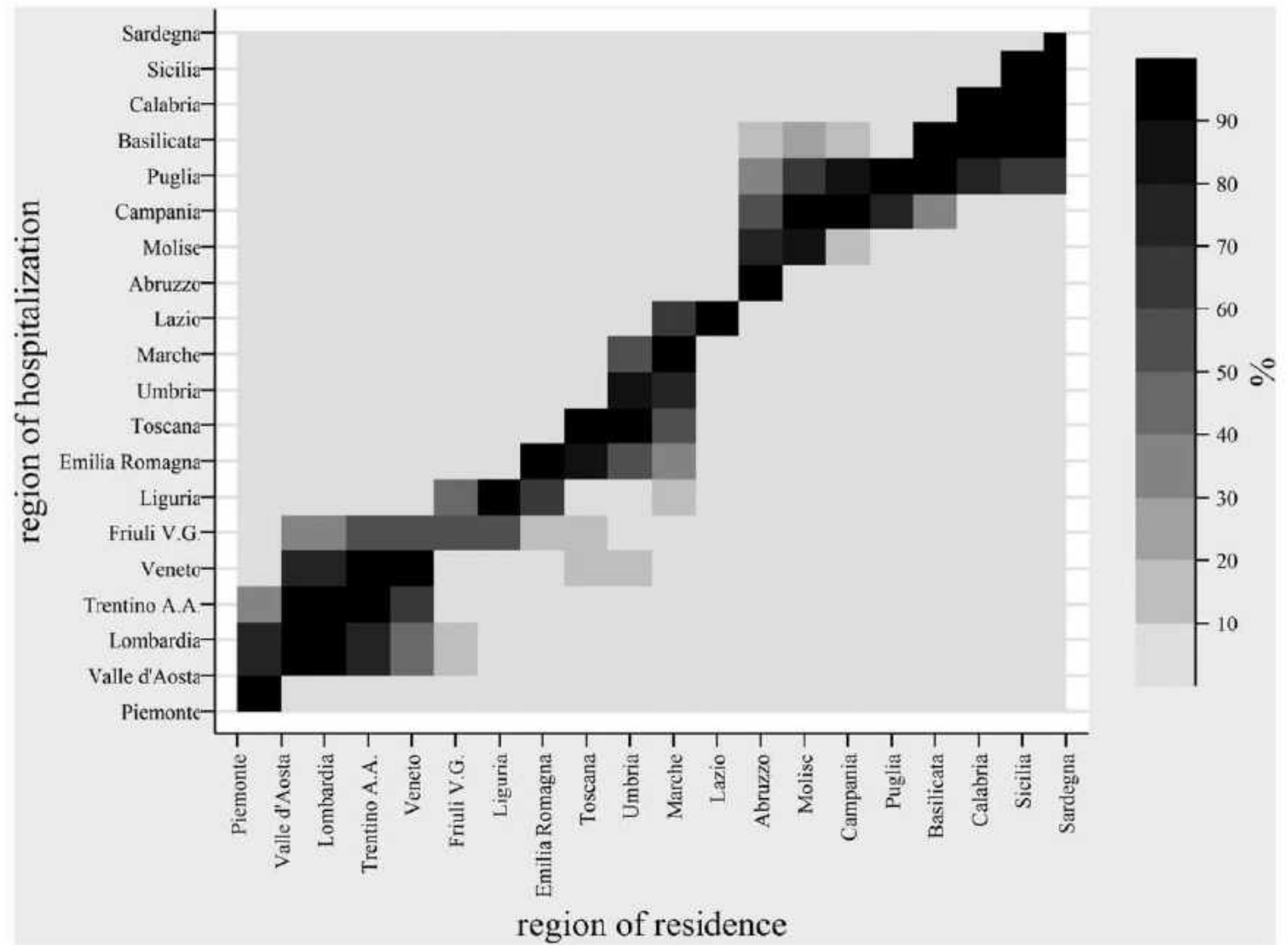


Fig. 2. Age and sex SHR of SFG rickettsiosis by month and year of occurrence in Italy for the period 2001–2015 and respective 95%CI. Statutory notification rate for rickettsiosis by month and year.



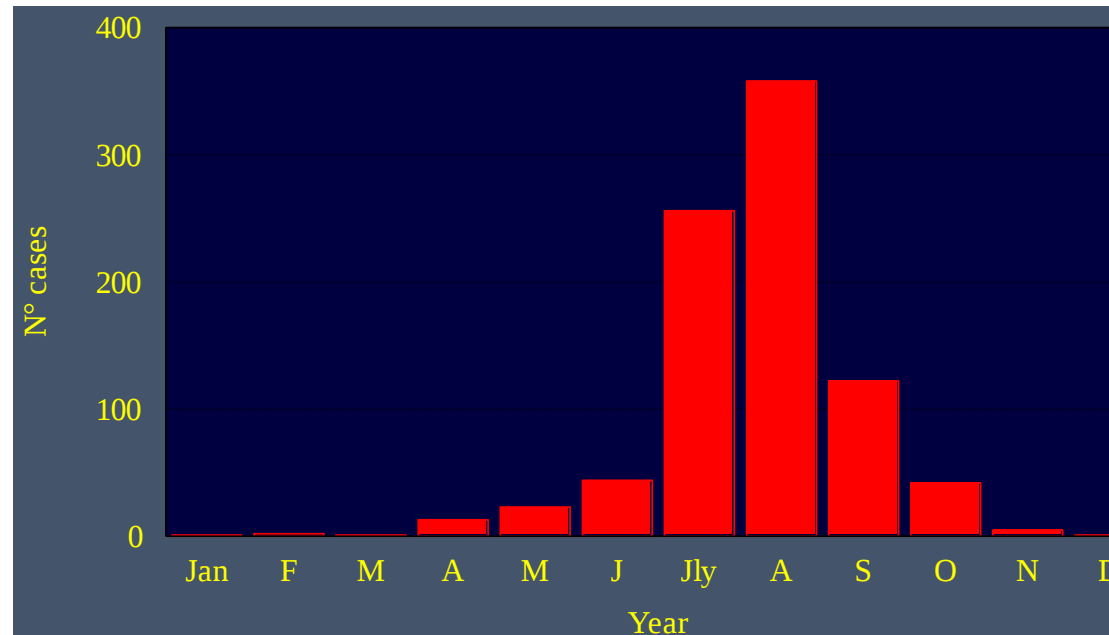
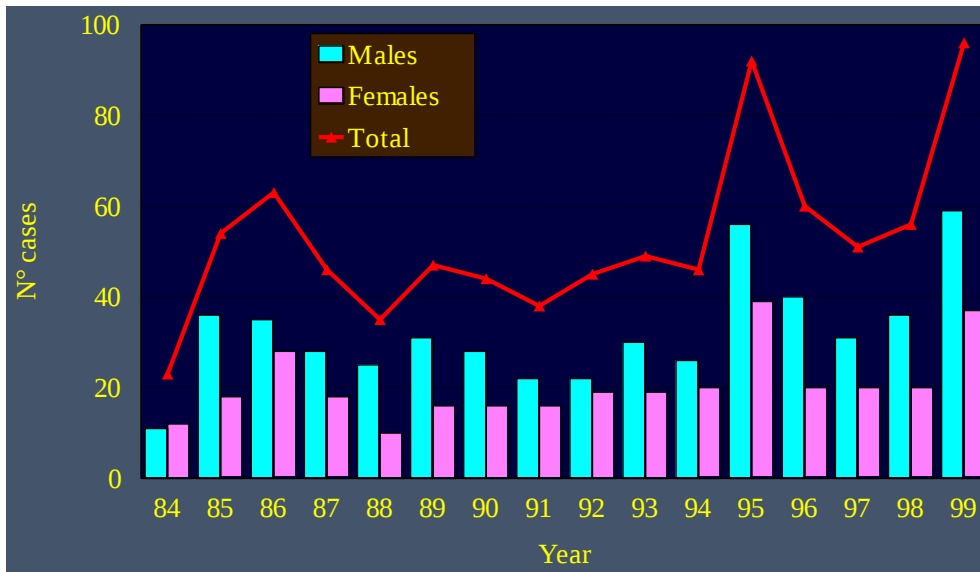
2005



PALERMO	68
TRAPANI	58
SIRACUSA	54
AGRIGENTO	39
CATANIA	30
CALTANISSETTA	24
ENNA	23
RAGUSA	21
MESSINA	13
SICILIA	330



Cases of MSF admitted to the Infectious Diseases Department of "Di Cristina " Children hospital in Palermo



Short Report: Socio-demographic and Climatic Factors as Correlates of Mediterranean Spotted Fever (MSF) in Northern Sardinia

Maria Fenicia Vescio, Maria Adriana Piras, Massimo Ciccozzi, Antonina Carai, Francesca Farchi, Michele Maroli, Maria S. Mura, Giovanni Rezza,* and the MSF Study Group†

Department of Infectious Diseases, Istituto Superiore di Sanità, Roma, Italy; Department of Infectious Diseases, University of Sassari, Sassari, Italy; Infectious Diseases Division, San Francesco Hospital, Nuoro, Italy

Abstract. Mediterranean spotted fever (MSF) is endemic in the Mediterranean area. We carried out a retrospective study to investigate the association between socio-demographic and climatic factors and MSF incidence in northern Sardinia. We found that maximum temperature levels during the previous summer were associated with increases in MSF incidence.

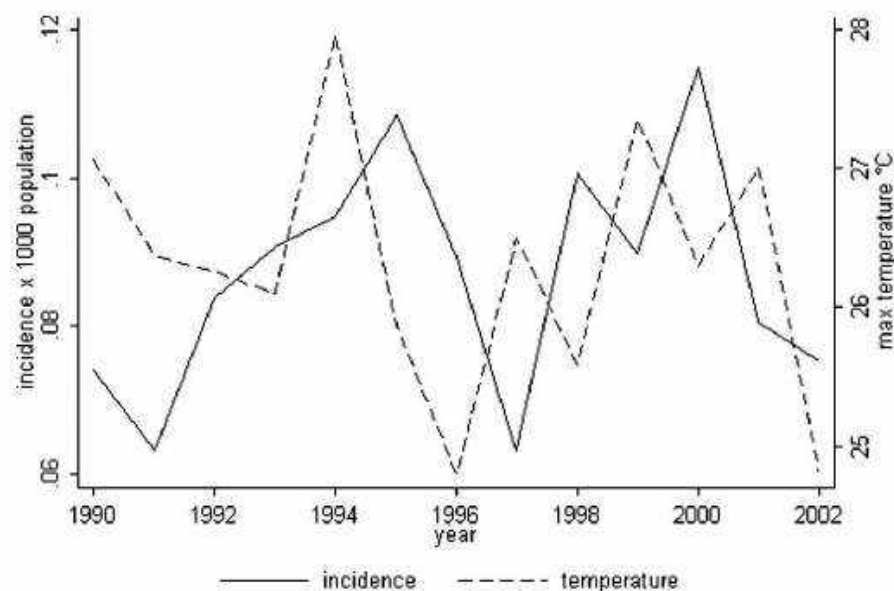
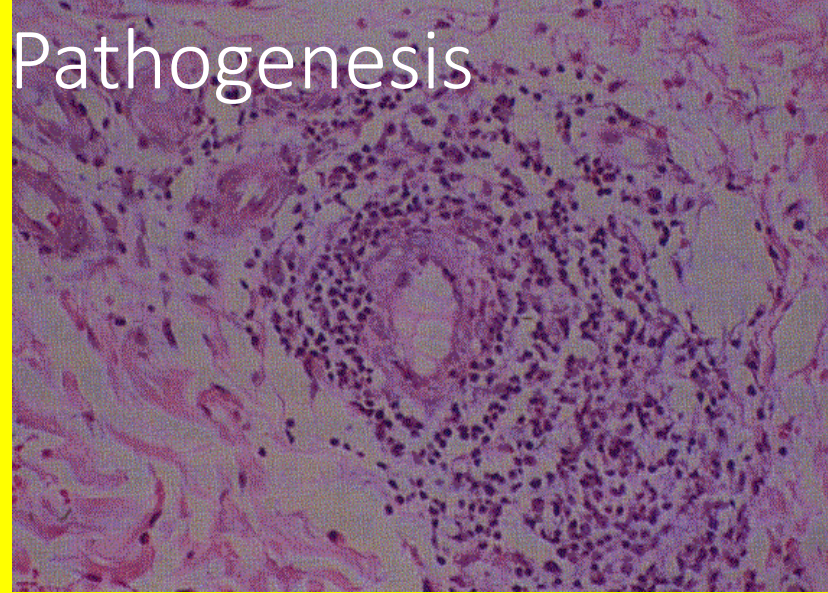


FIGURE 1. Incidence of MSF in North Sardinia (provinces of Sassari and of Nuoro) between 1990 and 2002 and maximum temperature levels between May and August by year of study.

Pathogenesis



Inoculation of rickettsiae



Proliferation in the endothelial cells of the site of tick bite



Necrosis of derma and epidermidis

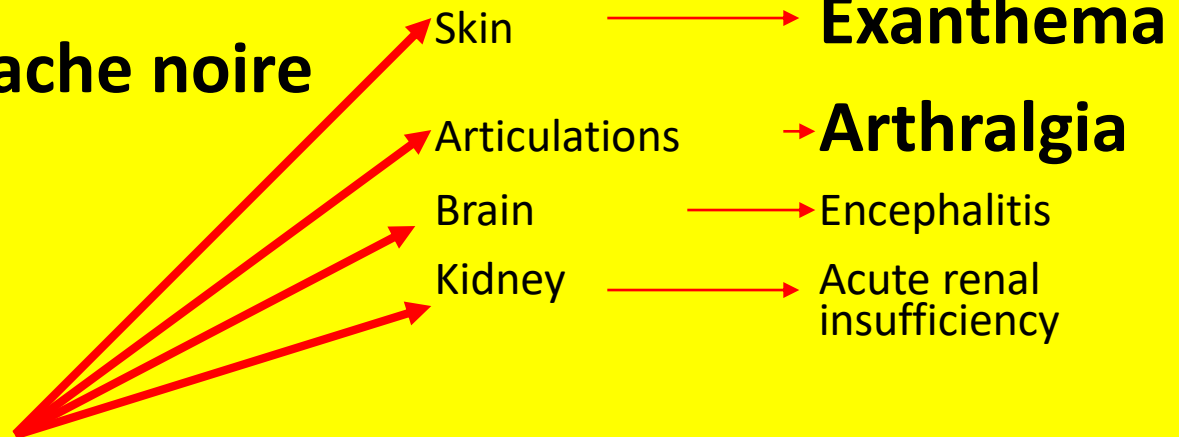


Rickettsiemia



Generalized vasculitis

Tache noire



Skin

Exanthema

Articulations

Arthralgia

Brain

Encephalitis

Kidney

Acute renal insufficiency

Perivascular infiltrate of macrophages, and CD4+ and CD8+ lymphocytes and NK cells

Cytokines (γ -IFN and α -TNF) and chemokines

H_2O_2 , NO

Killing of rickettsiae

Fever





INFECTIOUS DISEASES

A. Cascio · P. Dones · A. Romano · L. Titone

**Clinical and laboratory findings of boutonneuse fever
in Sicilian children**

	N° of cases	(%)	
Fever	627	97.2	
Exanthema	620	96.1	
Tache noire	464	71.9	
	Scalp	163	25.3
	Face and neck	121	18.8
	Truncus	112	17.4
	Upper limbs	11	1.7
	Lower limbs	33	5.1
	Genitals	23	3.5
Lymphadenopathy	307	49	
Hepatomegaly	302	46.8	
Splenomegaly	220	34.1	
Arthralgia	165	25.2	
Polymyalgia	129	20	
Headache	102	15	
Abdominal pain	44	6.8	
Conjunctival hyperemia	42	6	
Vomiting	23	3.5	
Arthritis	12	1.8	
Unilateral orchitis	2	0.3	
Hepatitis	2	0.3	
Lymphocytic meningitis	2	0.3	
Myocarditis	1	0.2	

Rickettsial infection in hospitalised patients in central Tunisia: report of 119 cases

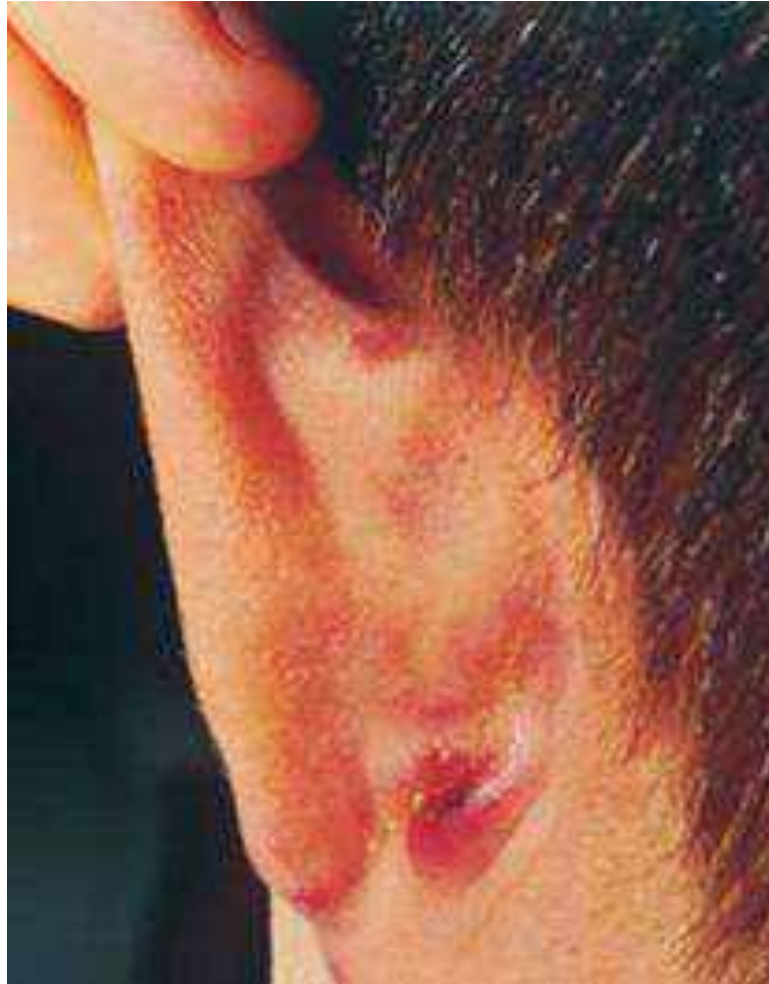
N. Kaabia, F. Bellazreg, W. Hachfi, M. Khalifa, N. Ghanouchi, F. Bahri and A. Letaief

2009 European Society of Clinical Microbiology and Infectious Diseases, *CMI*, 15 (Suppl. 2), 216–217

Table 1. Clinical features in adult hospitalised patients

Clinical data	No. of patients (%)
Fever	119 (100)
Headache	82 (68.9)
Asthenia	63 (52.9)
Arthralgia	48 (40.3)
Myalgia	37 (31.2)
Cough	27 (22.7)
Nausea/vomiting	25 (21)
Abdominal pain	11 (9.2)
Rash	102 (85.7)
Eschar	38 (31.9)













Mediterranean spotted fever in Algeria — new trends

Nadjet Mouffok^a, Philippe Parola^b, Hubert Lepidi^b, Didier Raoult^{b,*}

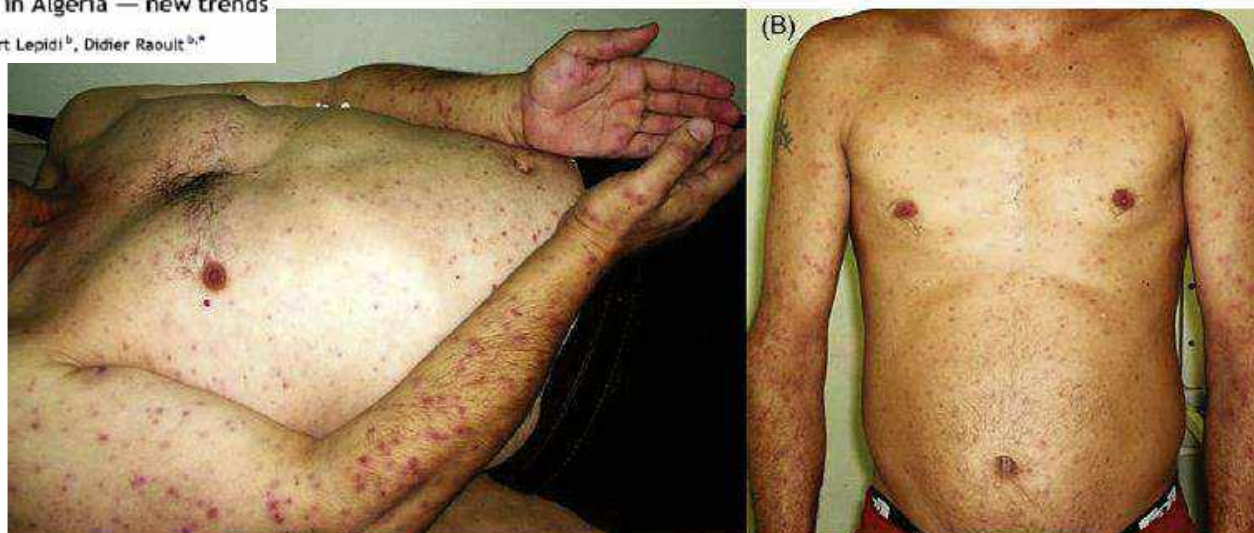


Figure 3 Typical maculopapular rash in two patients with Mediterranean spotted fever (MSF) caused by *Rickettsia conorii* in Oran, Algeria, 2004–2005. Note the fact that the rash may include palms, as shown in patient A.



Figure 4 Purpuric rash with vasculitis in a severe form of Mediterranean spotted fever (MSF) caused by *Rickettsia conorii* in Oran, Algeria.

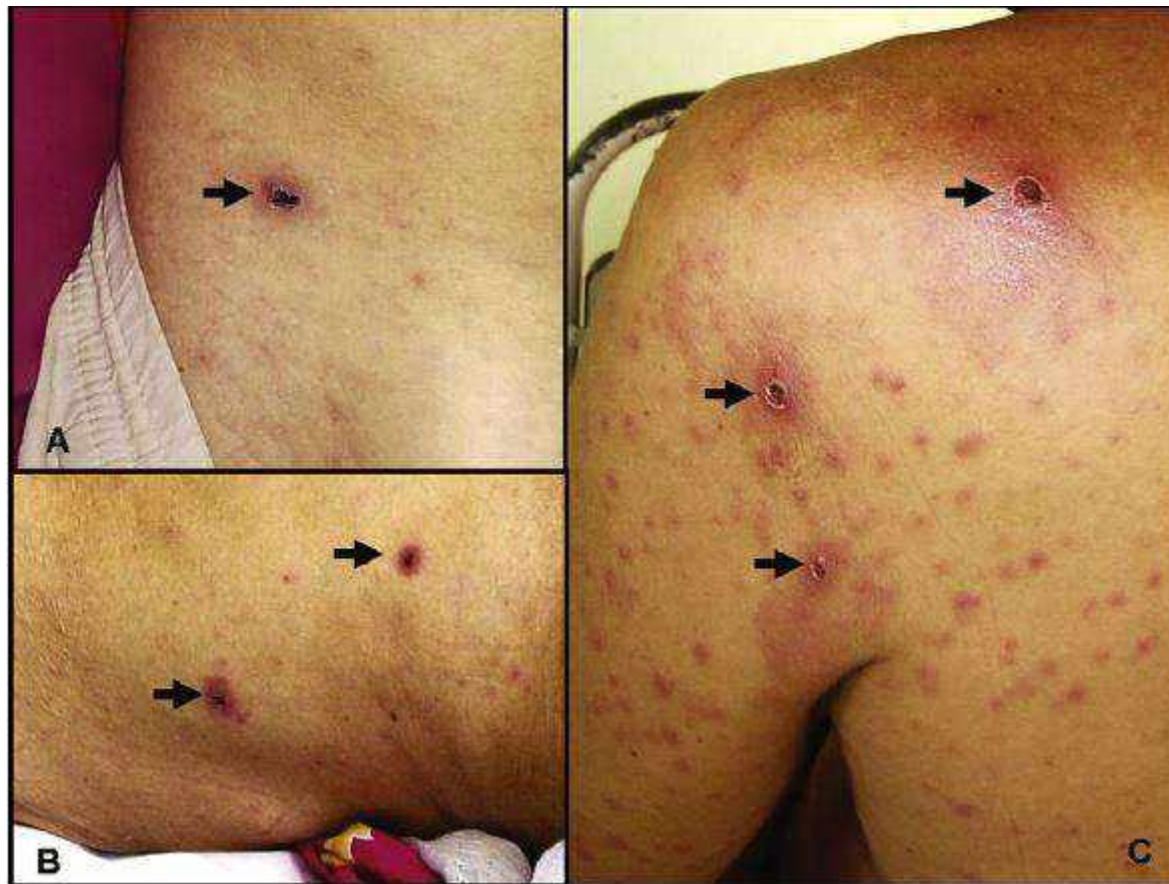


Figure 5 Inoculation eschars (tâche noire) in three patients with Mediterranean spotted fever (MSF) caused by *Rickettsia conorii* in Oran, Algeria, 2004–2005. (A) Single eschar, the most common feature in MSF; (B) two eschars; (C) three eschars, a rare finding in MSF, accompanied with a maculopapular rash.

Table 1 Clinical findings in 167 patients with confirmed Mediterranean spotted fever caused by *Rickettsia conorii* in 2004–2005; Oran, Algeria

Clinical findings	<i>n</i>	%
Abrupt onset	142	85.0
Moderate altered state of health	81	48.5
Much altered state of health	22	13.2
Fever	167	100
Loss of weight	119	71.3
Asthenia	154	92.2
Headache	159	95.2
Arthromyalgia	148	88.6
Cutaneous signs		
Maculopapular rash	164	98.2
Purpuric rash (legs)	25	15.0
Extensive purpuric skin	3	1.8
Discrete eruption	72	43.1
Tâche noire (inoculation eschar)	123	73.7
Single	103	
Double	14	
Triple	6	

Neurologic signs		
Meningitis	8	4.8
Altered state of consciousness	18	10.8
Coma	6	3.6
Delirium	6	3.6
Seizure	8	4.8
Agitation	8	4.8
Hemiparesis	3	1.8
Hemiplegia	1	0.6
Tetraparesis	2	1.2
Cerebellar ataxia	4	2.4
Pyramidal syndrome	2	1.2
Peripheral neuropathy	7	4.2
Bilateral hypoacusis	3	1.8
Unilateral hypoacusis	5	3.0
Digestive signs		
Vomiting	120	71.9
Diarrhea	14	8.4
Constipation	32	19.2
Abdominal pain	29	17.4
Gastric and duodenal ulceration	5	3.0
Ictus	3	1.8
Hepatomegaly	13	7.8
Splenomegaly	7	4.2

Mediterranean spotted fever in Algeria — new trends

Nadjat Mouffok^a, Philippe Parola^b, Hubert Lepidi^b, Didier Raoult^{b,*}

			Clinical findings	<i>n</i>	%
			Nephrological signs		
			Oliguria—anuria	7	4.2
Cardiovascular signs			Edema		
Shock (systolic blood pressure	12	7.2	On leg	45	26.9
<90 mmHg and tachycardia)			On legs and arms	4	2.4
Deep venous thrombosis (leg)	2	1.2			
			Respiratory signs		
			Cough	58	34.7
			Respiratory insufficiency	5	3.0
			Thoracic pain	6	3.6
			Epistaxis	7	4.2
			Adenopathy	9	5.4
			Ocular signs		
			Conjunctivitis	78	46.7
			Bilateral	74	
			Unilateral	4	
			Chorioretinitis	1	0.6
			Uveitis	1	0.6
			Hemorrhagic conjunctivitis	3	1.8
			Papillary edema	4	2.4
			Hemorrhagic retinitis	2	1.2
			Death	6	3.6

L'uomo è arrivato venerdì sera in ospedale con la febbre molto alta. I medici non hanno potuto far nulla, il decesso tra sabato e domenica. Il secondo caso dell'estate in città: pure un imprenditore perse la vita

Zecche, nuovo allarme a Licata Muore pensionato novantenne

LICATA. (aau) Ancora zecche killer a Licata. Questa volta la vittima della rickettsiosi, infezione che ha terrorizzato la Sicilia in questa stagione estiva, è un anziano licatese di novanta anni. L'uomo, dopo essere stato morso da una zecca, è deceduto nel corso della notte tra sabato e domenica scorsi, ma la notizia è stata resa nota soltanto ieri. I medici non hanno alcun dubbio sul fatto che a provocare la morte dell'anziano pensionato sia stato il morso di una zecca. Salgono così a due, nel giro di poche settimane, i morti per rickettsiosi a Licata.

nulla, anche in quel caso, erano valse le cure dei medici degli ospedali di Licata, Gela ed Enna. Adesso le zecche killer hanno colpito ancora.

Sono stati i parenti del novantenne di Licata, del quale non sono state rese note le generalità, ad accompagnare l'anziano, lo scorso venerdì sera, al San Giacomo d'Altopasso. Al pronto soccorso l'uomo è arrivato con la febbre a 41 ed ai medici i familiari del no-

uomo e ne hanno disposto il ricovero nella divisione di medicina. Qui il novantenne è stato sottoposto ad una serie di esami che non hanno lasciato dubbi sul fatto che avesse contratto la rickettsiosi. I medici hanno subito dato vita ad una terapia di antibiotici, pur rendendo-

È stata aperta un'inchiesta. I carabinieri vogliono individuare il luogo in cui il parassita ha colpito

si conto che la gravità delle condizioni e l'età avanzata

ospedale l'anziano stesse male, accusando la febbre. In casi come questo è però difficilissimo riconoscere i sintomi dell'infezione, riscontrabili solo tramite attenti esami. All'alba di domenica il pensionato, malgrado gli sforzi dei medici che hanno tentato fino all'ultimo di salvargli la vita, è deceduto.

I carabinieri della compagnia di Licata hanno avviato un'indagine sulla morte del novantenne, mirata soprattutto ad accertare il luogo in cui il pensionato è stato morso dalla zecca. L'uo-

no arrivate numerose proteste da parte dei residenti che segnalavano la presenza di zecche e di altri parassiti. La prima indagine dei carabinieri era scattata già all'indomani della morte del quarantenne di Licata che si trovava in città per le ferie. I militari intendono verificare le condizioni igienico-sanitarie di Licata e la morte dell'anziano pensionato non fa che aumentare l'allarme che ormai da settimane si registra in città. Tra l'altro, proprio qualche giorno dopo la morte del quarantenne, al pronto soccorso del San Giacomo d'Altopas-

PUNTURA DI ZECCA MUORE A 25 ANNI

L'ultima vittima della rickettsiosi è il conduttore in una radio privata di Favara. Al ritorno da una vacanza a Malta la febbre a 42° e il ricovero in ospedale: non c'è stato nulla da fare. Quest'estate decine di

FATTI & NOTIZIE
GIORNALE DI SICILIA

DOMENICA 5 SETTEMBRE 1999

Una puntura dell'insetto sarebbe stata fatale per Salvatore Mendolia, 25 anni. Lavorava in una radio privata. I primi malesseri li aveva avvertiti al ritorno da un viaggio a Malta

La zecca killer torna a colpire Favara, morto un giovane dj

FAVARA. (ur) Né meningite, né encefalite, ma una puntura di zecca la causa del decesso del giovane disc-jockey di Favara, Salvatore Mendolia, 25 anni, stroncato domenica scorsa da una febbre che ha toccato i 42 gradi.

Dapprima era stato ricoverato ad Agrigento, poi è stato trasferito a Caltanissetta. Vani i tentativi dei medici di salvarlo

scato domenica scorsa. Si è svegliato fiacco, privo di forze, con qualche linea di febbre. Agli amici che lo invitano ad

nato alle sue quotidiane attività: la radio e il lavoro, sopprimendo. Nulla lasciava presagire una morte così veloce.

Il male lo ha nuovamente at-

torno, di voler rimanere a casa. Col passare delle ore le sue condizioni si sono aggravate a tal punto che gli anziani genitori hanno chiesto aiuto a dei parenti.

Il ragazzo, caricato su una vettura, è accompagnato al «San Giovanni di Dio» di Agrigento dove riceve le

prime cure. Le applicazioni di ghiaccio non attenuano la febbre finché non si decide il trasferimento al reparto malattie

nissetta.

Così inutile perché il giovane, dopo alcune ore di agonia, muore. Una morte apparsa in un primo momento misteriosa tanto che qualcuno sospettò una meningite fulminante. Ulteriori accertamenti hanno, invece, fatto propendere per un caso di rickettsiosi, uno dei tanti che si sono registrati nelle ultime settimane in Sicilia e che hanno ucciso cinque vittime, non risparmiando anziani, né tantomeno giovani.

I funerali del ragazzo si sono svolti venerdì pomeriggio a di-

PARTINICO. Ricoverato per «demenza» Anziano in Psichiatria, ma aveva la rickettsiosi

PARTINICO. (gdg) È ancora emergenza zecche nel Palermitano. Il caso del giovane di Agrigento, morto per complicanze da morso da zecca, si sarebbe potuto ripetere a Partinico con un anziano. L'uomo, un pensionato partinicese ultrassessantenne, arrivato al pronto soccorso del nosocomio cittadino, è stato ricoverato in urgenza nella divisione di psichiatria, perché presentava tutti i sintomi della «demenza». Ma, dopo una movimentata notte di analisi e scrupolosi controlli da parte dei medici, si è scoperto che «era affetto da una infezione da rickettsia». «Praticamente - dice il responsabile della divisione di medicina dell'ospedale di Partinico, Enzo Provenzano - il paziente era stato colpito da una encefalite da zecche, un'infezione molto grave ed anche altrettanto rara in Italia. Se

non diagnosticata in tempo può essere anche mortale».

L'odissea per l'anziano è cominciata, circa una settimana fa, «quando giunto in ospedale accompagnato dai familiari», - racconta lo stesso primario - presentava una sintomatologia caratterizzata da allucinazioni, confusione mentale, e fobie varie. Pertanto è stato ricoverato nel reparto di Psichiatria. Qui, dopo un'attenta visita, i medici, non convinti che si trattasse di una vera patologia psichiatrica, hanno richiesto la consulenza dell'internista dello stesso nosocomio, Vito Aiello, il quale per escludere ogni sospetto di patologia tumorale o vascolare, ha inviato il paziente ad effettuare una tac a Palermo. Accertamento risultato negativo. E, l'anziano, dopo alcune ore, è ritornato così a Partinico, ma questa volta, nella



Enzo Provenzano

divisione di Medicina. È stato lo stesso internista, dopo un'ennesima ed accurata visita «a scoprire» spiega il dottore Provenzano - sotto l'ascella del paziente, la presenza di una macchia nerastra tipica di una rickettsiosi. Dopo soli quattro giorni di terapia per endovena, il paziente è stato dimesso in buone condizioni di salute. Intanto, a Partinico su circa 20 casi di pazienti colpiti da questa infezione, circa la metà ha contratto l'encefalite da rickettsiosi ed epatite. Tutti casi risolti con esito positivo.

GRAZIELLA DI GIORGIO

Calogera Farrauto, un'infermiera in pensione, è stata trasportata in elicottero al Buccheri La Ferla di Palermo. È ricoverata in terapia intensiva. Da otto giorni accusava febbre alta e forti dolori

Zecche killer, un altro caso Grave una donna di San Cataldo

PALERMO. (lus) Non si placa l'allarme zecche. Ieri mattina, al Buccheri La Ferla di Palermo, una donna di San Cataldo è stata ricoverata al reparto di terapia intensiva e le sue condizioni sono gravissime.

Calogera Farrauto, infermiera in pensione, è stata elicottrata, dal servizio 118 di Caltanissetta. Un viaggio in elicottero dal Sant'Elia al-

lisi di rito, hanno diagnosticato alla Farrauto la rickettsiosi. Subito è stato disposto il trasferimento nell'ospedale del capoluogo.

La donna, una volta giunta a Palermo in elicottero, è stata sottoposta a una terapia di sostegno. I medici sono intervenuti per regolare l'attività respiratoria, renale e sanguigna. I familiari della donna, arrivati a Palermo da Caltanissetta,

non sono riusciti a spiegare ai medici dove la donna avesse potuto contrarre l'infezione.

Come per i casi registrati in questi giorni, la difficile identificazione del morso di zec-

ca ha ritardato la diagnosi, impedendo l'avvio delle dovute cure. Non si conoscono le condizioni igienico sanitarie della zona in cui abita la donna, ma essendo aperta campagna, non sorprende la presenza dei parassiti.

alla donna, parlano di condizioni gravi e si sono riservati di esprimere la prognosi, considerato che l'infezione dovuta alla puntura delle zecche ha un'evoluzione imprevedibile.

L'unica prevenzione possibile, suggeriscono i medici, è un controllo accurato del corpo quando si è di ri-

torno da luoghi potenzialmente infestati dai parassiti, come l'aperta campagna. Bisogna osservare che non ci siano segni, seppur di difficile identificazione, di punture. Determinante è la tempestiva segnalazione al proprio medico curante nel caso in cui persiste febbre alta, che si protra per diversi giorni.

Luigi Sarullo

I medici avvertono: i parassiti vivono soprattutto in aperta campagna. Nei giorni scorsi, tre morti tra Licata e Modica

l'ospedale Civico di Palermo, e da qui, in ambulanza, al nosocomio di via Messina Marine, dove immediatamente è iniziata, per lei, la terapia intensiva.

La donna già da otto giorni presentava febbre alta e dolori in tutto il

Patti, una comitiva di vacanzieri trasforma il pranzo in maxi-rissa

MESSINA. È finita in rissa, nel peggiore dei modi, una cena tra due comitive di vacanzieri, emiliani e lombardi, che in un locale caratteristico avevano deciso di festeggiare la fine delle vacanze trascorse in Sicilia sul litorale tirrenico, tra Patti e Capo d'Orlando. Quindici dei venti commensali coinvolti nella rissa sono dovuti ricorrere alle cure dei medici del pronto soccorso del «Barone Romeo» di Patti. Nessuno è rimasto ferito in modo serio: le prognosi variano da quattro a 15 giorni, salvo complicazioni.

A nulla è servito il ricovero all'ospedale «Maggiore». Le vittime erano di Avola e Santa Croce Camerina. A un terzo paziente i medici hanno iniettato il siero: è stato dichiarato fuori pericolo

A Modica zecche «assassine» In due muoiono per le punture

MODICA. (Im) Una morte fulminante. È infezione da rickettsiosi. La diagnosi è arrivata in ritardo per due persone che, nel giro di ventiquattr'ore, sono decedute all'ospedale Maggiore di Modica. Giovanni Giudice di Santa Croce Camerina ed un'altra persona di Avola, sono stati morsi da due zecche. Non si erano accorti del morso mortale. Sono arrivati al pronto soccorso del Maggiore nella giornata di mercoledì con sintomi che facevano pensare ad una polmonite. Tosse, febbre alta, dolori in tutto il corpo.

I sanitari hanno iniziato la terapia necessaria e, nel contempo, i due pazienti sono stati sottoposti alle analisi cliniche. Dagli esami di laboratorio è venuto fuori il tragico responso: rickettsiosi. I globuli rossi, in pratica, sono impazziti; si sono autodistrutti nel giro di poche ore. Troppo tardi per iniettare il siero necessario a stroncare l'infezione. Il morso della zecca ha provocato una sorta di anemia istantanea.

Nessun intervento medico ha potuto salvare le due persone. C'è speranza, invece, per un altro paziente modicano che è stato ricoverato nella mattinata di giovedì. I sintomi erano simili a quelli riscontrati nei due pazienti deceduti. I medici hanno effettuato una corsa con-

vocata dal morso della zecca di propagarsi ulteriormente. Per il paziente modicano è stata attuata una procedura d'urgenza: il siero è stato iniettato immediatamente. L'uomo è tenuto costantemente sotto controllo. La prognosi sulla vita è stata sciolta nella tarda mattinata di ieri. I sanitari ipotizzano il fatto che il paziente abbia degli anticorpi abbastanza forti da contrastare, momentaneamente, l'infezione.

Gli esami di laboratorio hanno accertato che si tratta di rickettsiosi: i globuli rossi «impazziscono». L'abbondanza di cani randagi alle radici dell'epidemia

Una vera e propria epidemia che ha fatto registrare due morti fulminanti. È allarme rickettsiosi nel nosocomio modicano. "È difficile individuare immediatamente la causa dei malori provocati dal morso della zecca - spiega il direttore sanitario facente funzioni, Piero Bonomo - anche perché, in questi ultimi anni, le patologie che si presentano si sono modificate per motivi a noi sconosciuti. A parte il fatto che, da tre anni a questa parte, il fenomeno è

frutto, probabilmente, di una scarsa politica di salvaguardia dell'ambiente; c'è da dire che i pazienti che sono stati curati all'ospedale Maggiore, si sono presentati anche con sintomi diversi da quelli che non lasciano più il morso, tra

AGENZIA 6 SETTEMBRE 1999

I tre casi di infezione sanitaria immediata di Ruta, perché torio urbano fu morsa da una zecca in pieno corso che le zecche pagne. La cattura parassiti, mo luogo, alla scarsa igiene dell'infezione facile da individuare abbandonati mentre l'immediato va in putrefazione affirmando la paragonano, poi al randagismo co a livello re-

Ad agosto in Sicilia escalation di casi di rickettsiosi. I primi due nell'ospedale di Modica. Dopo pochi giorni tocca ad un emigrato agrigentino tornato nell'Isola per trascorrere un periodo di vacanze

Un'estate segnata dalla paura Cinque vittime in un mese

PALESTRA. I primi due morti di rickettsiosi sono stati registrati a Modica, l'ultimo di cui gliamela a Ferra. L'uomo che «dalla» le zecche di un cane in Sicilia ha avuto il morso. Il rickettsiosi, che si trasmette, è una malattia che, in questi ultimi anni, ha provocato la morte di cinque persone. I primi due sono stati registrati all'ospedale di Modica. Dopo pochi giorni tocca ad un emigrato agrigentino tornato nell'Isola per trascorrere un periodo di vacanze.

Deceduto anche un litigese di 90 anni. Declin i ricoveri. Gli esperti tranquillizzano: «Non c'è motivo di allarme»

Avola. Non si erano ancora del tutto calmate le allarmi scatenate dal rickettsiosi, che si è verificato un nuovo caso di morte. Il rickettsiosi, che si trasmette, è una malattia che, in questi ultimi anni, ha provocato la morte di cinque persone. I primi due sono stati registrati all'ospedale di Modica. Dopo pochi giorni tocca ad un emigrato agrigentino tornato nell'Isola per trascorrere un periodo di vacanze.

che si trasmette di rickettsiosi. Troppo tardi per iniettare il siero necessario a stroncare l'infezione. Il morso della zecca ha provocato una sorta di anemia istantanea. Nessun intervento medico ha potuto salvare le due persone. C'è speranza, invece, per un altro paziente modicano che è stato ricoverato nella mattinata di giovedì. I sintomi erano simili a quelli riscontrati nei due pazienti deceduti. I medici hanno effettuato una corsa con-

Carlo Federico aveva cominciato a sentirsi male ai primi di agosto. Tra i sintomi febbre e mal di schiena. Poi il ricovero ad Agrigento e la corsa al Civico di Palermo

Punto da una zecca muore dopo il coma Vittima un agrigentino di ventitré anni

AGRIGENTO. (get) Aveva compiuto 23 anni a giugno. Ieri mattina è morto al Civico di Palermo, dopo dieci giorni di coma, per un banale caso di rickettiosi non diagnosticata in tempo. Un morso di zecca che i medici palermitani hanno scoperto sotto l'alluce del piede destro.

Carlo Federico, di Agrigento, perito tecnico in cerca di prima attività, aveva cominciato a sentirsi male ai primi di agosto. Raucedine, mal di schiena e qualche linea di febbre. Nulla di grave insomma o comunque di particolarmente allarmante per i medici che lo hanno curato nei primi giorni. Una banale e fastidiosa febbre estiva, come tante diagnosticate in quel periodo di caldo afoso. Ma il male che lo ha strappato all'affetto dei familiari ha fatto il suo corso. Quel malessere non finiva mai. Dopo Ferragosto le visite più approfondite hanno fatto emergere dei

no entrò in stato di coma. Carlo Federico aveva avuto il tempo soltanto di andare a salutare la sua giovane fidanzata Fabiola e la sorella Loredana in partenza per Roma per la giornata mondiale della Gioventù. Un saluto alla stazione di Agrigento al quale Federico non aveva voluto mancare nonostante la febbre ed il senso di forte malessere. Dalla clinica Sant'Anna il giovane venne prima portato all'ospedale San Giovanni di Dio e poi con l'elisoccorso al Civico di Palermo. Ma non c'è stato nulla da fare. Dieci giorni di cure intensive, continuamente seguito dai medici specialistici non sono serviti a strapparli alla prematura morte.

Federico, si è spento ieri mattina nel nosocomio palermitano gettando nella disperazione i genitori e le due sorelle, Loredana e la piccola Cristina di undici anni. Con loro anche la fidanzata Fabiola

era recato numerose volte, prima della malattia che lo ha ucciso, con il suocero per portare gli aiuti alimentari che l'associazione di volontari raccoglie periodicamente in città. Latte per i bambini ed ogni genere di alimenti necessari alle numerose famiglie di nomadi che da anni vivono in quella zona. Una contrada lontana dal centro abitato,

Il giovane forse è stato morso nel campo nomadi di Gasena dove svolgeva attività come volontario. Ma per i medici questa è solo un'ipotesi

malcurata, senza servizi igienici e circondata da sterpaglie. L'ambiente, insomma, dove le zecche trovano terreno fertile per riprodursi specie nel periodo estivo. Con ogni probabilità, ma è

no che questa è solo una tesi da dimostrare. Resta comunque il fatto che un morso di zecca, non diagnosticato in tempo necessario, ne ha stroncato la giovane esistenza. Ieri notte nel quartiere di Fontanelle, dove il ragazzo abitava con la famiglia, gli amici hanno organizzato una lunga veglia di preghiera.

«Era un ragazzo buono che pensava al prossimo con grande slancio - dice don Carmelo Petrone, prete che lo conosceva bene. Il suo impegno nel volontariato era costante. Quando si presentava l'occasione di prestare la sua opera non si tirava mai indietro». I funerali di Carlo Federico si svolgeranno oggi pomeriggio alle 16 nella chiesa di San Nicola ad Agrigento. Saranno presenti centinaia di giovani. Tutti gli amici che con quel ragazzo, dal fisico prestante ma dal cuore tenero, avevano condiviso mille battaglie per i poveri della città. Quegli stessi ragazzi ch

L'assessorato: «Zecche? Non tutte infette» Ma la Germania frena il turismo in Sicilia

PALERMO. (cn) Fonogramma del ministero della Sanità tedesco a quello italiano. Oggetto: richiesta di chiarimenti sulla situazione rickettsiosi in Sicilia. E intanto la Germania pensa al blocco del turismo verso l'isola. Un possibile danno economico non indifferente. L'assessorato regionale alla Sanità ha già pronta una dettagliata relazione che entro oggi sarà inviata a Roma.

«Sì - dice il dottore Saverio Ciriminna, responsabile igiene pubblica dell'assessorato regionale alla Sanità - il fenomeno zecche esiste, come esiste in altri paesi della fascia mediterranea nei mesi caldi, ma non è lecito drammatizza-

Da anni si sa che la Sicilia è una terra endemica per la rickettsiosi. Basta verificare i dati degli ultimi anni: 653 casi nel '95, 561 nel '96, 519 nel '97, 453 nel '98. Quest'anno si pensa ad un lieve incremento, ma è solo una supposizione, considerato che il complessivo numero di casi segnalati nel '99 si saprà solo nei primi mesi del Duemila. Intanto, quest'estate si contano già quattro morti (lo scorso anno furono due), tutti adulti. E all'ospedale dei Bambini, il «Di Cristina» di Palermo, da maggio sono stati ricoverati 78

no guariti.

«Ogni anno abbiamo a che fare con questa malattia legata, nel periodo estivo, all'attività di diffusione delle zecche, i vettori dell'infezione. Come in tutte le malattie infettive, i

La Regione in campo: niente allarmismi, è un fenomeno che si presenta ogni anno

casi possono essere quantitativamente variabili da un anno all'altro», spiega la professoressa Lucina Titone, direttore dell'Istituto di malattie infettive e primario della divisione di infettivologia dell'ospedale dei Bambini, presente ad un

rio regionale Sanità, per fare il punto sul fenomeno rickettsiosi nell'isola.

L'assessorato regionale alla Sanità monitorizza da una decina d'anni questa malattia infettiva. «I dati ricevuti fino ad oggi non dimostrano che quest'anno l'infezione abbia assunto un andamento particolare rispetto agli anni passati. I casi di decesso registrati nel tempo sono tutti da imputare ad un ritardo nella diagnosi e nell'inizio della terapia. Tra l'altro, almeno tre dei morti di quest'anno erano persone con altre patologie, cosa che ha aggravato il quadro clinico», sostiene il dottore Ciriminna.

Ed ecco le misure di preven-

pagna dotarsi di calze e scarpe e controllare sempre se hanno zecche addosso, anche nelle zone dotate di peli (ascelle, capelli, pube) o sugli animali vanno controllati accuratamente. La zecca non va presa con le mani, ma con pinzetta, cercando di farla saltare e metterla poi in alcool. Se si ha il sospetto che la zecca si sia attaccata al corpo, bisogna fare attenzione se, dopo circa cinque giorni, irraggiono febbre elevata, mal di testa, dolori articolari.

«Non tutte le zecche sono infette - spiega Ciriminna - diventano se pungono animali che hanno nel loro sangue l'agente patogeno, la rickettsia conorii».

Solarino La vittima era stata ricoverata in ospedale qualche settimana fa **Donna uccisa dal morso di una zecca?**

Milena Sanzaro
SOLARINO

Una morte ancora tutta da chiarire, quanto alle circostanze nelle quali è maturata, una morte che ha suscitato commozione e sgomento nella comunità solarinese.

La scomparsa, improvvisa, di una donna di 43 anni, sposata, madre di due figli, ha finito anche con il turbare il clima gioioso di festa che si sta vivendo in questi giorni a Solarino per i festeggiamenti in onore del Santo patrono.

Il sospetto è che la morte della donna possa in qualche misura essere collegata con un morso di un insetto, probabilmente di una zecca, a causa del quale era stata già ricove-



L'ospedale di Siracusa

rata alcune settimane fa all'ospedale.

La situazione fisica che sembrava fosse in qualche misura sotto controllo, una decina di giorni fa fece registrare un mutamento con il manifestarsi di una serie di problemi gastrointestinali. Dopo essere stata visitata, secondo quella che è la prima ed ancora frammentaria ricostruzione della vicenda, la donna fece ritorno a casa per festeggiare insieme al marito e ai figli la ricorrenza del santo patrono San Paolo apostolo, di cui era devota. Il destino ha però voluto che non riuscisse a vivere appieno il giorno di festa. Colpita da improvviso malore durante la notte tra sabato e domenica e subito portata alla guardia

medica è stata successivamente ricoverata in ospedale ma il suo cuore alla fine non avrebbe retto fermandosi. Ora si sta verificando se la morte sia in qualche modo connessa con quello che verosimilmente sembra sia stato il morso di una zecca rimediato forse durante una passeggiata in campagna.

Già alcune settimane fa un altro solarinese era stato morso da una zecca, ma il pronto intervento dei medici e l'immediato ricovero ospedaliero hanno evitato il peggio.

I funerali della sfortunata donna si svolgeranno molto probabilmente già nel pomeriggio di oggi nella chiesa madre dedicata a San Paolo Apostolo. ◀

Forme gravi in chi?

- Anziani
- Diabetici
- Alcolisti
- Deficit G6PD
- Immunodepressi
- Insufficienza renale
- Insufficienza cardiaca



Le Infezioni in Medicina, n. 3, 158-162, 2001

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Complicanze della febbre bottonosa

Complications of mediterranean spotted fever

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Mediterranean Spotted Fever in Portugal

Risk Factors for Fatal Outcome in 105 Hospitalized Patients

RITA DE SOUSA,^a SÓNIA DÓRIA NÓBREGA,^b
FÁTIMA BACELLAR,^a AND JORGE TORGAL^c

Mediterranean spotted fever: clinical, laboratory and epidemiological features of 199 cases.

Raoult D, Weiller PJ, Chagnon A, Chaudet H, Gallais H, Casanova P.

Most previous studies of Mediterranean spotted fever (MSF) have included cases that either were not laboratory-confirmed or were confirmed by the Weil-Felix test. The authors report the detailed clinical, laboratory and epidemiological features of 199 serologically-confirmed cases of MSF (by microimmunofluorescence). This work demonstrates that the disease is difficult to diagnose, especially at the beginning; that it can be fatal (2.5% of cases); and that a rapid and specific diagnosis is necessary to identify atypical cases. Epidemiological features such as season (summer essentially), presence of a dog, and travel in an endemic area (the Mediterranean Basin) are important in the diagnosis. In such cases fever associated with rash have to be considered and treated as MSF.

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The retrospective study presented here identified diabetes, vomiting, dehydra-
tion and uremia as risk factors for death among MSF hospitalized patients. These fi-
ndings are largely consistent with risk factors identified individually or in combination
with other epidemiologic and clinical characteristics in studies of MSF.^{6–9,21–23} T

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presence of a dog, and travel in an endemic area (the Mediterranean Basin) are important in the diagnosis. In such cases
fever associated with rash have to be considered and treated as MSF.

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Seven of 142 cases (5%) of Mediterranean spotted fever admitted to hospital in Marseilles in 1983 and 1984 were
severe. All of them were confirmed by specific laboratory tests. The disease resembles Rocky Mountain spotted fever
with purpuric exanthem, confusion, renal insufficiency, hypoxaemia, thrombocytopenia, hyponatraemia and hypocalcaemia.
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patients with mediterranean spotted fever in Sa



CASE REPORT

Mediterranean spotted fever and encephalitis: a case report and review of the literature

Vitor Duque · Conceição Ventura · Diana Seixas ·
Arnaldo Barai · Nuno Mendonça · Joana Martins ·
Saraiva da Cunha · António Melo-Silvestre



European Journal of Internal Medicine 16 (2005) 525 – 527

EUROPEAN JOURNAL OF
INTERNAL
MEDICINE

www.elsevier.com/locate/ejim

Brief report

Cerebral infarction: An unusual complication of Mediterranean
spotted fever

E. Botelho-Nevers, C. Foucault, H. Lepidi, P. Brouqui*

J Med Microbiol **58** (2009), 521–525; DOI: 10.1099/jmm.0.004465-0

© 2009 Society for General Microbiology

ISSN 0022-2615

Case Report

Mediterranean spotted fever with encephalitis

Luis Aliaga¹, Patricia Sánchez-Blázquez¹,
Javier Rodríguez-Granger², Antonio Sampedro²,
Miguel Orozco¹ and Jorge Pastor³

54

Arch Dis Child 2001;85:54–55

SHORT REPORT

Facial nerve palsy associated with *Rickettsia conorii*
infection

M Bitsori, E Galanakis, C E Papadakis, S Sbyrakis

Case Report

Myocarditis in Mediterranean spotted fever: a case report and a review of the literature

Claudia Colomba, Lucia Siracusa, Marcello Trizzino, Claudia Gioè, Anna Giammanco and Antonio Cascio

Case Report

Atrial fibrillation in Mediterranean spotted fever

Claudia Colomba,¹ Laura Saporito,¹ Pietro Colletti,² Giovanni Mazzola,² Raffaella Rubino,¹ Diego Pampinella¹ and Lucina Titone¹

INSUFFISANCE RÉNALE AIGÜE AU COURS DE LA FIÈVRE BOUTONNEUSE MÉDITERRANÉENNE : DESCRIPTION DE TROIS OBSERVATIONS

H. SKHIRI, D. ZELLAMA, S. ALOUI, S. BOURAOUI, MA. FRIH, A. ACHOUR,
N. BEN DHIA, M. ELMAY

Med Trop 2004; **64** : 58-60

Posterior Segment Manifestations of *Rickettsia conorii* Infection

Conclusion: Posterior segment involvement, frequently asymptomatic, is common in patients with acute MSF. Because the diagnosis can be easily overlooked, a careful dilated fundusoscopic examination, complemented by fluorescein angiography in selected cases, is recommended. Mild vitritis, retinal vasculitis, optic disc staining, white retinal lesions, retinal hemorrhages, and multiple hypofluorescent choroidal dots are the most common manifestations of MSF. Posterior segment changes in a patient with fever and/or skin rash living in or returning from a specific endemic area, especially during the spring or summer, strongly suggest *R. conorii* infection. *Ophthalmology* 2004;111:529–534 © 2004 by the American Academy of Ophthalmology.

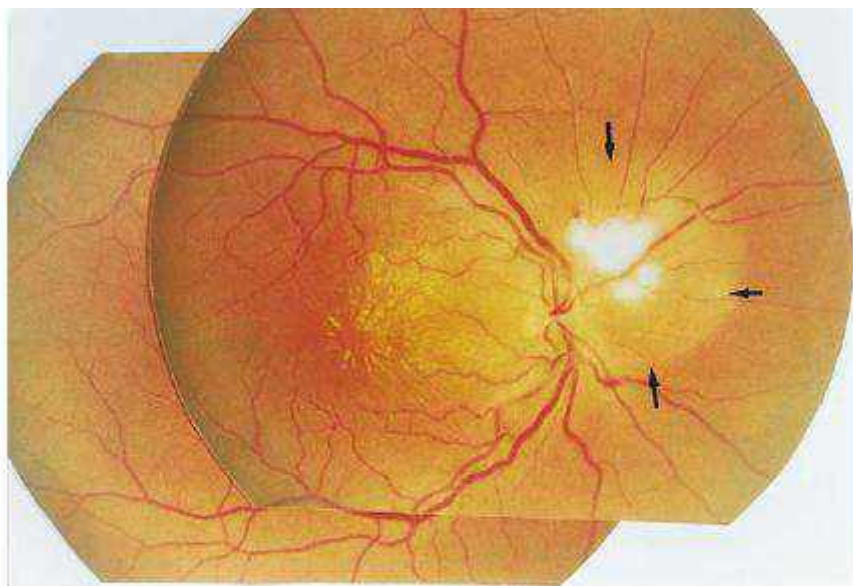


Figure 3. An 18-year-old woman with a 5-day history of fever without skin rash complained of blurred vision in the right eye of 3 days' duration. Visual acuity was 20/25 (both eyes). This color fundus photograph of the right eye shows a nasal juxtavascular white retinal lesion with associated serous retinal detachment (arrows) and a macular star.

Table 2. Fundusoscopic and Fluorescein Angiographic Findings at Presentation

Findings	Eyes (n = 60)	%
White retinal lesions	18	30.0
Vascular involvement		
Sheathing	5	8.3
Arterial plaques	1	1.7
Leakage	27	45.0
Branch retinal artery occlusion	1	1.7
Delayed filling in BRV	1	1.7
Hemorrhages		
Intraretinal	14	23.3
White centered	2	3.3
Subretinal	2	3.3
Optic disc		
Edema	1	1.7
Staining	30	50.0
Others		
Hypofluorescent choroidal dots	10	16.7
Serous retinal detachment	3	5.0
Macular star	2	3.3
Cystoid macular edema	1	1.7

BRV = branch retinal vein.

Diagnostic value of ocular examination in Mediterranean spotted fever

M. Khairallah¹, S. Ben Yahia¹, B. Jelliti¹, F. Ben Romdhane², C. Loussaief², S. Attia¹, A. Toumi², R. Messaoud¹ and M. Chakroun²

¹Department of Ophthalmology, and ²Department of Infectious Diseases, Fattouma Bourguiba University Hospital, Monastir, Tunisia

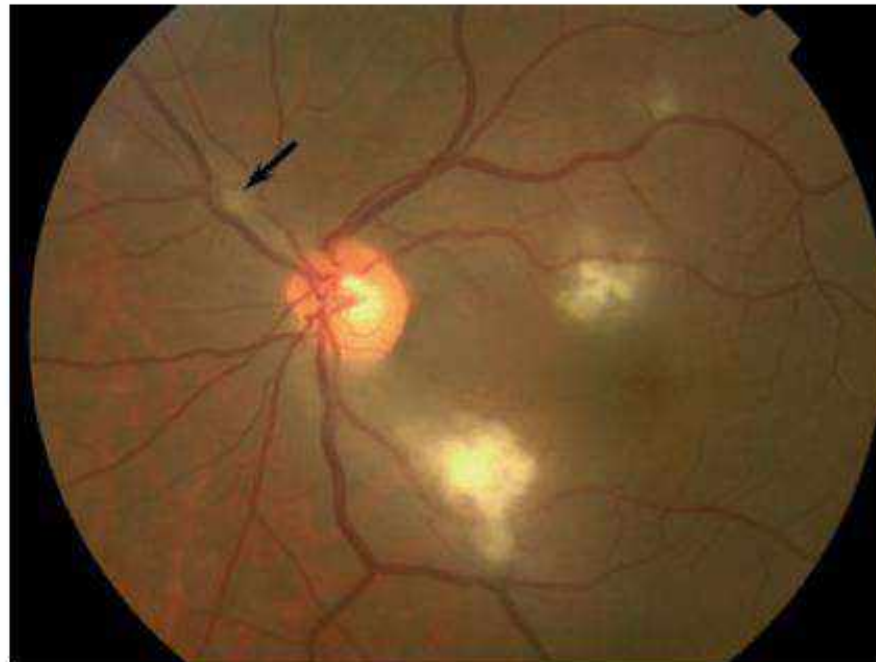


Fig. 1. Colour fundus photograph of the left eye of a 32-year-old man with Mediterranean spotted fever shows multiple foci of retinitis of different sizes and juxtavascular in location. Note the associated retinal vascular sheathing (arrow).

Splenic Rupture and Malignant Mediterranean Spotted Fever

Laura Schmulewitz,*
Kaoutar Moumille,*
Natacha Patey-Mariaud de
Serre,* Sylvain Poirée,*
Edith Gouin,† Frédéric Mechaï,*
Véronique Cocard,*
Marie-France Mamzer-Bruneel,*
Eric Abachin,* Patrick Berche,*
Olivier Lortholary,*†
and Marc Lecuit*†

*Université Paris Descartes, Hôpital Neck-
er-Enfants Malades, Paris, France; and
†Institut Pasteur, Paris

A 55-year-old man was referred Hospital, for fever, myalgia, and hypotensive shock. The patient had been in Southern France (Montpellier) 6 days before symptom onset and had been bitten by a tick on the left hand. Four days later, he reported fatigue, fever (39°C), and myalgia. His medical history showed polycystic kidney disease, which had necessitated hemodialysis and a kidney transplant. He was receiving ongoing treatment with an immunosuppressive regimen of cyclosporine, prednisolone, and tacrolimus



Coronal view of unenhanced abdominal computed tomography demonstrating splenic enlargement with endocapsular hematoma and intraperitoneal hemorrhage (arrows).

Fatal Spotted Fever Rickettsiosis, Kenya

Jeremiah S. Rutherford,* Kevin R. Macaluso,†
Nathaniel Smith,‡ Sherif R. Zaki,§
Christopher D. Paddock,§ Jon Davis,*
Norman Peterson,* Abdu F. Azad,†
and Ronald Rosenberg*

We report a fatal case of rickettsiosis in a woman from the United States living in Kenya, who had a history of tick exposure. Immunohistochemical staining of skin, kidney, and liver demonstrated spotted fever group rickettsiae. The clinical findings, severity, and fatal outcome are most consistent with *Rickettsia conorii* infection.

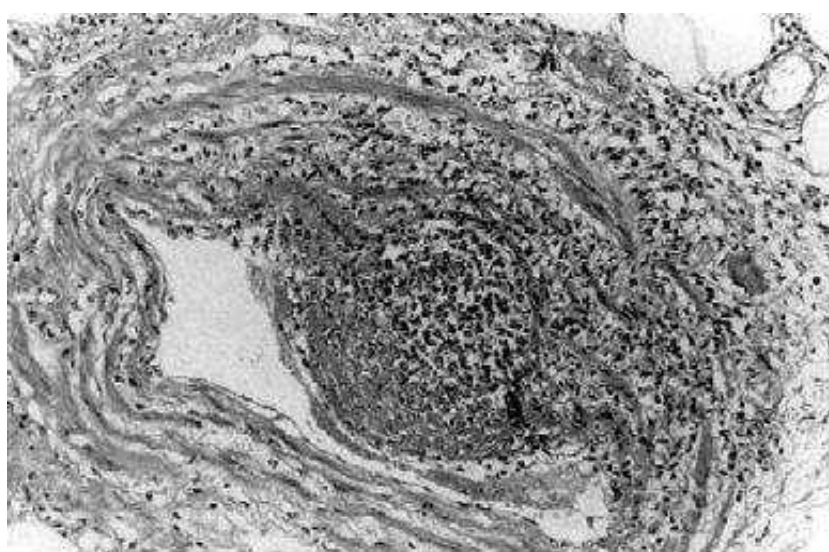
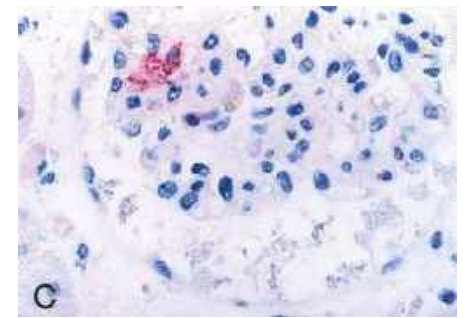
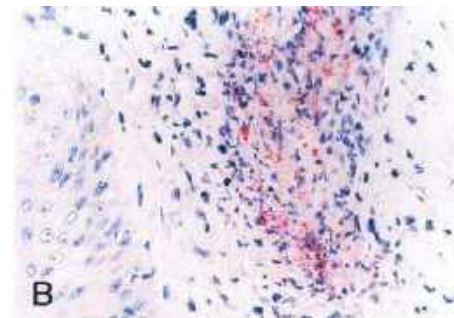
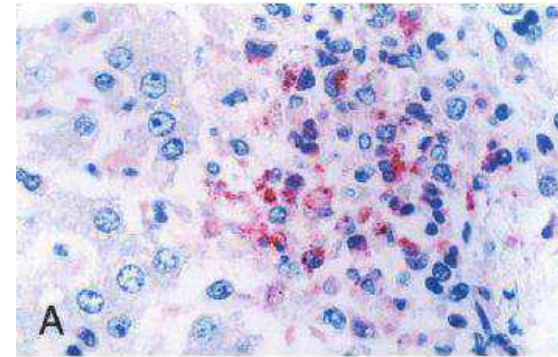


Figure 1. Vasculitis and edema involving medium-sized artery in the subcutaneous fat at the site of the eschar (hematoxylin and eosin stain; original magnification x100).



Immunohistochemical localization of spotted fever group rickettsial antigens in various tissues of a patient with fatal spotted fever rickettsiosis, by immunoalkaline phosphatase stain with naphthol phosphate–fast red substrate and hemotoxylin counterstain.

Rickettsiae and rickettsial antigens (red) in Kupffer cells in liver (A), perivascular infiltrates in skin (B), and glomerular endothelium in kidney (C)

Case Report

Haemophagocytic syndrome and rickettsial diseases

Antonio Cascio,^{1,2} Salvatore Giordano,³ Piera Dones,³ Silvia Venezia,⁴ Chiara Iaria^{2,5} and Ottavio Ziino⁴

Infección grave por *Rickettsia conorii* asociada a síndrome hemofagocítico

Transactions of the Royal Society of Tropical Medicine and Hygiene (2009) 103, 561–563



available at www.sciencedirect.com



journal homepage: <http://www.elsevier.com/locate/trstmh>



CASE REPORT

Unusual pancytopenia secondary to haemophagocytosis syndrome in rickettsioses

R. Premaratna^{a,*}, H.S.A. Williams^b, T.G.A.N. Chandrasena^c, R.P.V.J. Rajapakse^d, S.A.M. Kularatna^e, H.J. de Silva^a

The diagnosis of HLH can be established if one of either 1 or 2 below is fulfilled:

1. A molecular diagnosis consistent with HLH

2. Diagnostic criteria for HLH are fulfilled (five out of the eight criteria below):

- **Fever**
- **Splenomegaly**
- **Cytopenias (affecting ≥2 or 3 lineages in the peripheral blood)*:**
Hemoglobin < 90 g/l (in infants < 4 weeks: hemoglobin < 100 g/l)
Platelets < 100,000/ml
Neutrophils < 1000/ml
- **Hypertriglyceridemia and/or hypofibrinogenemia:**
Fasting triglycerides ≥ 265 mg/dl
Fibrinogen ≤ 1.5 g/l
- **Hemophagocytosis in bone marrow or spleen or lymphnodes**
- **Low or absent NK-cell activity**
- **Ferritin ≥ 500 µg/l**
- **Soluble CD25 ≥ 2400 U/l**

Journal of Clinical Microbiology, June 2001, p. 2341–2342
0095-1137/01/3924-00+0 DOI: 10.1128/JCM.39.6.2341-2342.2001
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Vol. 39, No. 6

Fulminant Japanese Spotted Fever Associated with Hypercytokinemia

HIROMICHI IWASAKI,^{1,*} FUMIHIRO MAHARA,² KOBUNIRO TAKADA,³ HIROMI FUJITA,⁴ AND TAKANORI UEDA⁵

¹Division of Transfusion Medicine, ²Department of Immunology and Medical Zoology, ³and First Department of Internal Medicine, ⁴Fukuoka Medical University, Fukuoka, ⁵Mahara Hospital, Takashima, ⁶and Osaka Research Laboratory, Chama General Hospital, Fukuoka, Japan

Received 25 January 2001/Returned for modification 6 March 2001/Accepted 27 March 2001

We report a patient with Japanese spotted fever caused by *Rickettsia japonica* who developed shock associated with hypercytokinemia. Elevated levels of cytokines (macrophage colony-stimulating factor, interleukin-1 beta, interleukin-6, and gamma interferon) decreased rapidly after a combination treatment using an antibiotic (minocycline hydrochloride [MINO]) and methylprednisolone; however, tumor necrosis factor-alpha levels were increased. The patient's fever relapsed and was resolved only after the addition of clonidine to hydrocortisone. The administration of new guidelines alone may be another useful form of treatment to eradicate *R. japonica* even if the symptoms of hypercytokinemia appear to improve with the administration of MINO and methylprednisolone.

CASE REPORT

Open Access



Widespread subcutaneous necrosis in spotted fever group Rickettsioses from the coastal belt of Sri Lanka- a case report

Nathasha Luke^{1,2}, Hasini Munasinghe², Lakshmi Balasooriya² and Ranjan Premaratna^{2,3*} 



Israeli Spotted Fever in Sicily. Description of two cases and minireview.

Colomba C¹, Trizzino M², Giammanco A³, Bonura C⁴, Di Bona D⁵, Tolomeo M⁶, Cascio A⁷.



EMERGING INFECTIOUS DISEASES



Vol. 9, No. 7
July 2003

**Israeli Spotted
Fever *Rickettsia*
in Sicilian
Rhipicephalus
sanguineus Ticks**

- Giovanni M. Giammanco,*
Serafino Mansueto,* Pietro
Ammatuna,* and Giustina
Vitale*

*Università di Palermo, Palermo,
Italy

Fatal *Rickettsia conorii* subsp. *israelensis* Infection, Israel

Miriam Weinberger,*† Avi Keysary,‡
Judith Sandbank,* Ronit Zaidenstein,*
Avi Itzhaki,* Carmela Strenger,‡ Moshe Leitner,‡
Christopher D. Paddock,§
and Marina E. Ereemeeva§

- A small vessel in the kidney (A) and a capillary in the cerebral cortex (B) positive with immunohistochemical stain specific for spotted fever group rickettsiae. Original magnification ×158.

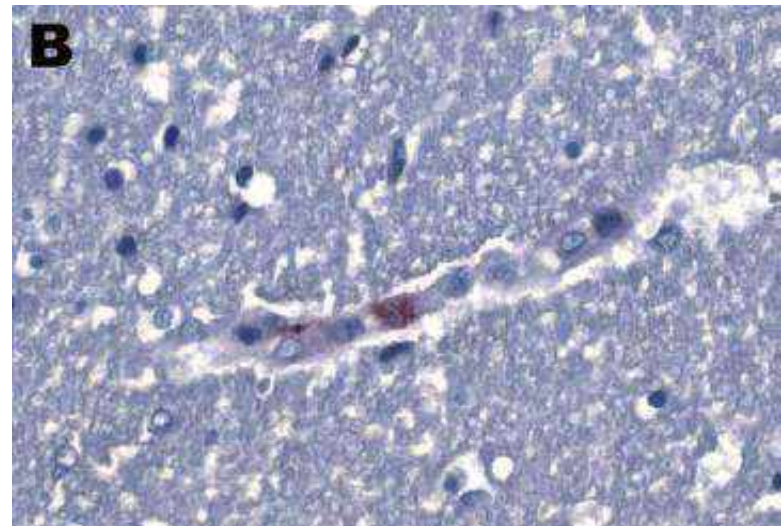
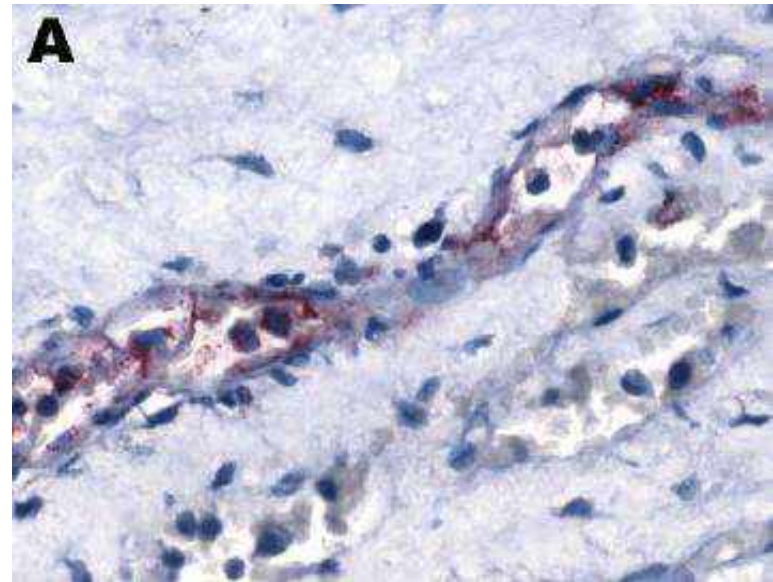


Table. Diagnostic tests performed to identify spotted fever in the patient*

Day after disease onset	Assay	Specimen(s) tested	Result	Laboratory
7	IFA	Serum	IgM<100, IgG<100	IIBR†
	PCR	Serum	Negative	IIBR
11 (autopsy)	IFA	Serum	IgM = 64, IgG<32	CDC‡
	PCR	Serum sediment	<i>Rickettsia conorii</i> subsp. <i>israelensis</i>	CDC
		Liver, muscle, skin, lung, kidney	Spotted fever group rickettsiae	IIBR§
		Liver, muscle, skin	<i>R. conorii</i> subsp. <i>israelensis</i>	CDC¶
	IHC stain#	Brain, kidney	Positive	CDC
	Cell culture**	Liver, lung	Negative	IIBR

*IFA, immunofluorescent assay; Ig, immunoglobulin; IIBR, Institute for Biological Research; CDC, Centers for Disease Control and Prevention; IHC, immunohistochemical.

†IFA performed (6). Cutoff values for IgM and IgG are 100.

‡IFA performed (7). Cutoff values for IgM and IgG are 64.

§Nested PCR for 17-kDa protein gene (8).

¶Nested and semi-nested PCR for 17 kDa protein gene and recombinant outer membrane protein A gene fragment, respectively, followed by sequencing (9).

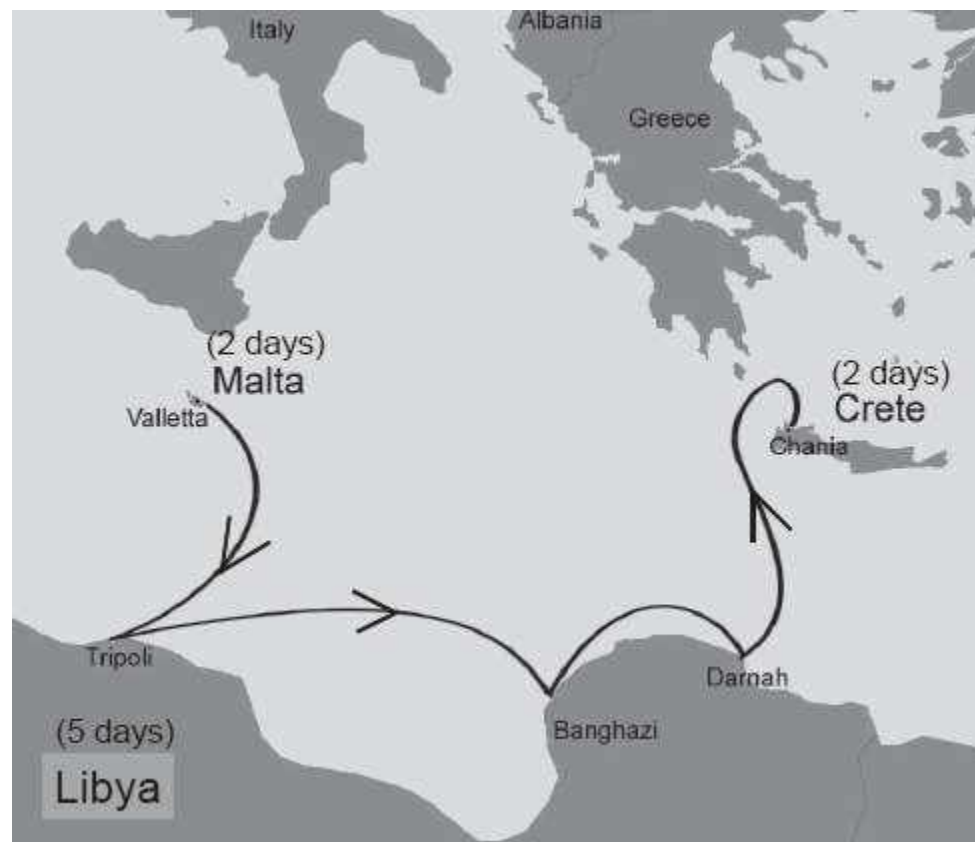
#Three-micron sections cut from formalin-fixed, paraffin-embedded brain and kidney tissue samples were stained by using an immunoalkaline phosphatase technique with a hyperimmune rabbit anti-*Rickettsia rickettsii* antibody at a dilution of <500 (3).

**Homogenized samples from lung and liver were applied by centrifugation onto monolayer of Vero cells culture in 24-well plates and incubated for 2 weeks at 35°C in 5% CO₂ atmosphere incubator.

Fatal Case of Israeli Spotted Fever after Mediterranean Cruise

We describe a 63-year-old man who had fatal ISF despite adequate therapy. The patient, who lived in Switzerland, took a cruise on the Mediterranean Sea, sailing for a week along the coasts of Crete, Libya, and Malta (Figure). With his wife, he visited several archeological sites in Libya (Cyrene, Apollonia, Ptolemais, Leptis Magna, Sabratha). Three days after returning to Switzerland, the patient reported loss of appetite, epigastric pain, and loose stools. Four days later, a fever (40°C) and generalized rash developed. The patient was hospitalized 6 days after symptom onset. At that time, he had fever (38.3°C), hypotension (85/55 mm Hg), tachycardia (100/min); a maculopapular rash involving the trunk, limbs, palms, and soles; and petechial lesions on the right arm. The patient was confused and exhibited bilateral dysdiadochokinesis. Laboratory

Autopsy showed severe pulmonary edema and liver ischemia. The brain had petechial hemorrhages in the left cerebellum and right frontal lobe, as well as a small recent ischemic infarction in the right caudate nucleus.

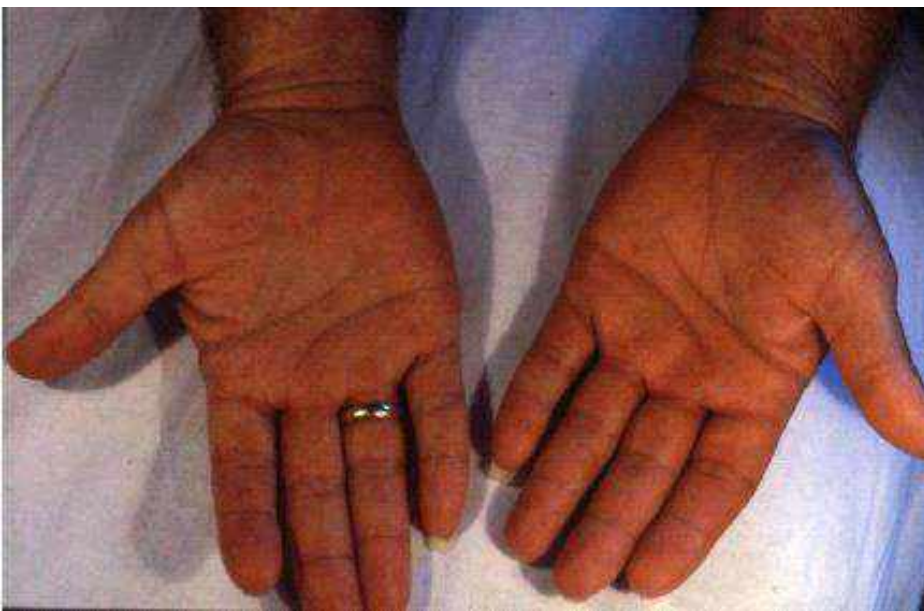


Rickettsia massiliae **Human Isolation**

EMERGING INFECTIOUS DISEASES

Giustina Vitale,*
Serafino Mansueto,*
Jean-Marc Rolain,†
and Didier Raoult†

*Azienda Ospedaliera Universitaria
Policlinico "P. Giaccone," Palermo, Italy;
and †Université de la Méditerranée,
Marseille, France



EMERGING INFECTIOUS DISEASES®

Volume 18, Number 6—June 2012

Letter

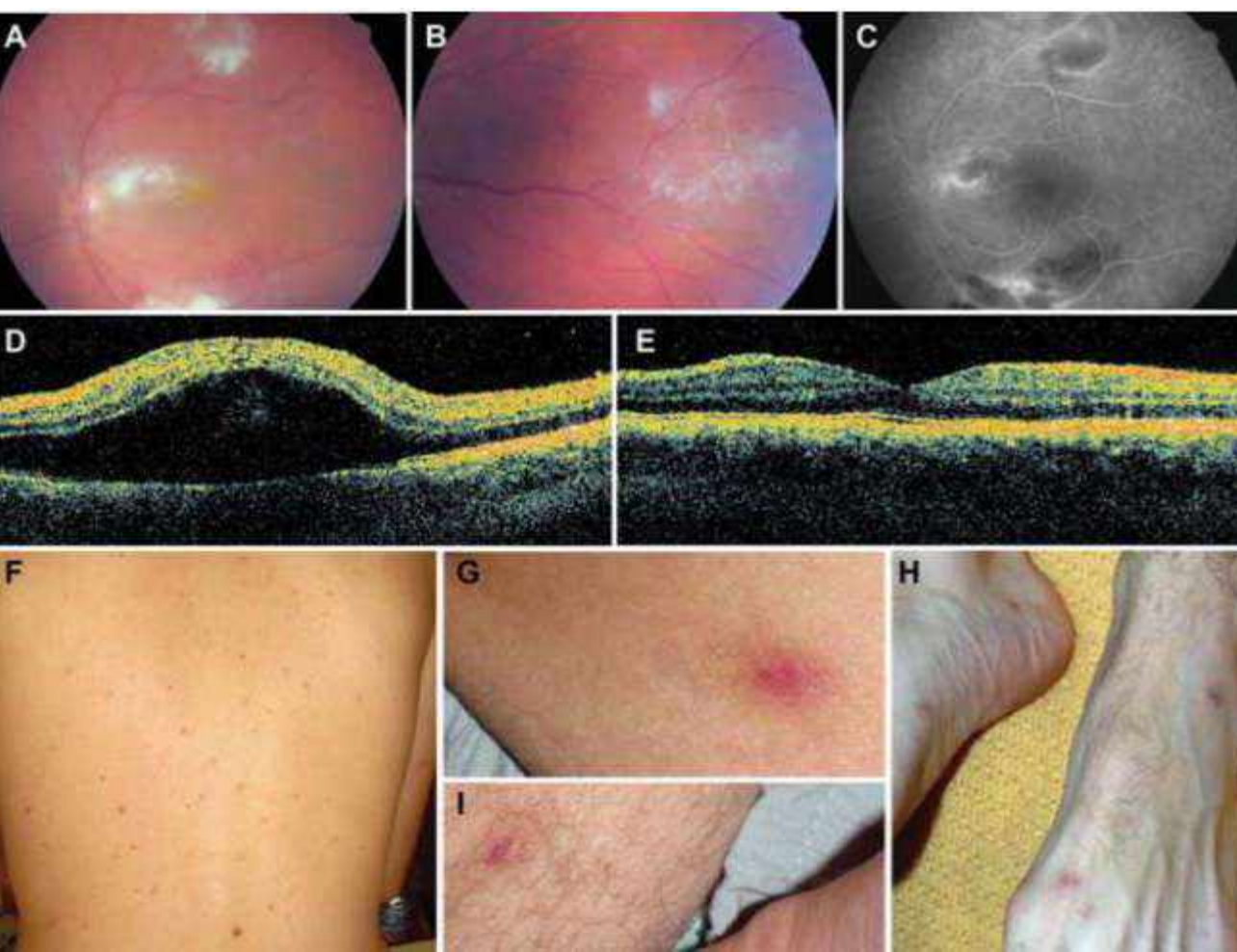
Rickettsia conorii Indian Tick Typhus Strain and *R. slovaca* in Humans, Sicily

Alessandra Torina,
Isabel G. Fernández de Mera,
Angelina Alongi,
Atilio J. Mangold,
Valeria Blanda,
Francesco Scarlata,
Vincenzo Di Marco,
and José de la Fuente

Warmer Weather Linked to Tick Attack and Emergence of Severe Rickettsioses

Philippe Parola¹, Cristina Socolovschi¹, Luc Jeanjean², Idir Bitam¹, Pierre-Edouard Fournier¹, Albert Sotto³, Pierre Labauge², Didier Raoult^{1*}

¹ Unité de Recherche en Maladies Infectieuses et Tropicales Emergentes, CNRS-IRD UMR 6236, WHO Collaborative Centre for Rickettsial and Other Arthropod Borne Bacterial Diseases, Faculté de Médecine, Marseille, France, ² Consultation de Neuro-Ophthalmologie, CHU Nîmes, France, ³ Service des Maladies Infectieuses, CHU Nîmes, France



Chorioretinitis with macular involvement in patient with *Rickettsia massiliae* infection

[Travel Med Infect Dis.](#) 2018 Nov - Dec;26:66-68. doi:
10.1016/j.tmaid.2018.08.002. Epub 2018 Aug 13.

**Rickettsia massiliae infection after a tick bite on the
eyelid.**

[Eldin C](#)¹, [Virgili G](#)², [Attard L](#)², [Edouard S](#)³, [Viale P](#)², [Raoult
D](#)³, [Parola P](#)⁴.

Rickettsia monacensis and human disease, Spain.

[Jado J](#)¹, [Oteo JA](#), [Aldámiz M](#), [Gil H](#), [Escudero R](#), [Ibarra V](#), [Portu J](#), [Portillo A](#), [Lezaun MJ](#), [García-Amlí C](#), [Rodríguez-Moreno I](#), [Anda P](#).

Author information

Abstract

We identified *Rickettsia monacensis* as a cause of acute tickborne rickettsiosis in 2 humans. Its pathogenic role was assessed by culture and detection of the organism in patients' blood samples. This finding increases the number of recognized human rickettsial pathogens and expands the known geographic distribution of Mediterranean spotted fever-like cases.

[Emerg Infect Dis.](#) 2012 Apr;18(4):702-4. doi: 10.3201/eid1804.111583.

Rickettsia monacensis as cause of Mediterranean spotted fever-like illness, Italy.

[Madeddu G](#), [Mancini F](#), [Caddeo A](#), [Ciervo A](#), [Babudieri S](#), [Maida I](#), [Fiori ML](#), [Rezza G](#), [Mura MS](#).

Mediterranean spotted fever-like illness in Sardinia, Italy: a clinical and microbiological study

Giordano Madeddu¹ · Vito Fiore¹ · Fabiola Mancini² · Antonello Caddeo¹ ·
Alessandra Ciervo² · Sergio Babudieri¹ · Giovanna Masala³ · Paola Bagella¹ ·
Giuseppe Nunnari⁴ · Giovanni Rezza² · Maria Stella Mura¹

- Overall, 87 patients admitted with MSF-like illness to our Infectious Diseases Unit were consecutively enrolled from 2010 to 2012.
- The most frequent diagnosis at discharge was MSF in 76 cases (87.3 %), followed by Q Fever in 7 (8.0 %), anaplasmosis in 2 (2.3 %), ehrlichiosis and bartonellosis in 1 (1.1 %) and a double infection caused by Rickettsia and Ehrlichia was found in 1 (1.1 %) case.

Mediterranean spotted fever-like illness in Sardinia, Italy: a clinical and microbiological study

Giordano Madeddu¹ · Vito Fiore¹ · Fabiola Mancini² · Antonello Caddeo¹ ·
Alessandra Ciervo² · Sergio Babudieri¹ · Giovanna Masala³ · Paola Bagella¹ ·
Giuseppe Nunnari⁴ · Giovanni Rezza² · Maria Stella Mura¹

Table 2 Demographic and clinical characteristics of 87 patients hospitalized for MSF-like syndrome

Variable	
Male gender	65 (74.7)
Age (years)	53.0 ± 14.3
Clinical sign/symptom	
Fever	85 (97.7)
Maculopapular rash	74 (85.0)
Palm and sole rash	65 (74.7)
Arthromyalgia	65 (74.7)
Headache	57 (65.5)
Tache noire	47 (54.0)
Nausea	18 (20.7)
Vomiting	15 (17.2)
Conjunctivitis	9 (10.3)
Confusion	8 (9.2)
Laboratory abnormalities	
Hepatic transaminase increase	49 (56.3)
Thrombocytopenia	31 (35.6)
Clinical complications	
Renal damage	38 (43.4)
Respiratory failure	3 (3.4)

Data expressed as mean ± standard deviation or number (percentage)

- Eighty-seven patients with a mean age of 53 ± 14 years, of whom 65 (75 %) males, were included in the study. The most common diagnosis was MSF (79 %), followed by Q fever (8 %), and anaplasmosis (2 %).
- A tache noire was found in 58 % of rickettioses and 28 % of **Coxiella burnetii** infections.
- MSF was confirmed in 47 % of the cases by IFI and 43 % by ELISA antibody tests.
- The isolation of rickettsial DNA from the eschar was positive in 10/13 (77 %) of the cases due to *Rickettsia conorii*.
- Using this method, we identified the first case of **R. monacensis** infection in Italy

Tache Noire in a Patient with Acute Q Fever

Vito Fiore^a Fabiola Mancini^c Alessandra Ciervo^c Paola Bagella^a
Francesca Peruzzo^a Giuseppe Nunnari^d Giovanni Andrea Deiana^b
Giovanni Rezza^b Sergio Babudieri^a Giordano Madeddu^a

Units of ^aInfectious Diseases and ^bNeurology, Department of Clinical and Experimental Medicine, University of Sassari, Sassari; ^cDepartment of Infectious, Parasitic and Immunomediated Diseases, Istituto Superiore di Sanità, Rome; and ^dDivision of Infectious Diseases, Department of Clinical and Experimental Medicine, University of Messina, Messina, Italy



Q fever

- Q fever cases have been reported almost everywhere they have been sought, except in New Zealand.
- The **main reservoirs** of *C. burnetii* are **cattle, sheep, and goats**. However, in recent years, an increasing number of animals have been reported to shed the bacterium, including **domestic mammals, marine mammals, reptiles, ticks, and birds**.
- **Birth products** contain the highest concentration of bacteria, but *C. burnetii* is also found in **urine, feces, and milk of infected animals**.
- Transmission to humans is most frequently due to **inhalation of aerosolized bacteria**

Occurrence of *Coxiella burnetii* in bulk tank milk from northwestern Italy

June 29, 2013 | **Veterinary Record**

N. Vicari, S. Faccini, M. Ricchi, C. Garbarino,
L. Decastelli, M. Boldini, C. Rosignoli,
A. Dalmaso, V. Bronzo, M. Fabbi

- A total of 780 BTM samples (one sample for each herd) were collected between 2007 and 2011 within different sanitary programmes from different provinces of Emilia-Romagna, Piedmont and Lombardy regions. Four to 10 months after the first analysis, a second round of BTM samples were collected from 287 randomly selected farms in three provinces of Lombardy region independently from their first test results (Table 2). All specimens were transported to the laboratories at 4°C, and stored at $-24 \pm 6^\circ\text{C}$ until analysis

TABLE 1: Data referred to the first sampling of the study

Region	Province	Number of farms investigated	Number Of positive samples	% Of positive samples (95% CI)
Lombardy	Pavia	135	32	24 (17 to 32)
	Cremona	152	83	55 (46 to 63)
	Mantova	113	46	41 (31 to 50)
	Lodi	101	56	55 (45 to 65)
Emilia Romagna	Piacenza	126	44	35 (27 to 44)
Piedmont	Cuneo	28	18	64 (44 to 81)
	Novara	13	2	15 (02 to 45)
	Torino	112	56	50 (40 to 59)
	Total	780	337	43 (40 to 47)

Detection of *Rickettsia hoogstraalii*, *Rickettsia helvetica*, *Rickettsia massiliae*, *Rickettsia slovaca* and *Rickettsia aeschlimannii* in ticks from Sardinia, Italy.

Chisu V¹, Leulmi H², Masala G¹, Piredda M¹, Foxi C¹, Parola P³

- The presence of *Rickettsia* spp. was evaluated by standard PCR and sequencing in 123 ticks collected from several mammals and vegetation in Sardinia, Italy.
- This study provides the first evidence of the presence of ***Rickettsia hoogstraalii*** in *Haemaphysalis punctata* and *Haemaphysalis sulcata* ticks from mouflon and ***Rickettsia helvetica*** in *Ixodes festai* ticks from hedgehog.
- In addition, ***Rickettsia massiliae***, ***Rickettsia slovaca*** and ***Rickettsia aeschlimannii*** were detected in *Rhipicephalus sanguineus*, *Dermacentor marginatus* and *Hyalomma marginatum marginatum* ticks from foxes, swine, wild boars, and mouflon



Figure 1. Map of Sardinia, Italy, indicating the tick collection sites identified by progressive number. * Municipalities where positive ticks have been detected, site code: (2) *Ri. massiliae*; (6) *Ri. slovaca*; (9) *Rickettsia* spp. and *Ri. hoogstraalii*; (11) *Ri. helvetica*; (12) *Ri. hoogstraalii*; (13) *Ri. aeschlimanni*; (14) *Ri. slovaca*; (17) *Ri. hoogstraalii*.

Tick species	Collection Site	Host (n°)	N°, stage, sex
<i>H. punctata</i>	(1); (2); (7); (9); (10); (12); (13); (14); (16); (17)	Mouflons(6) Sheep(6) Cattle (1)	5 Nymphs, 23 ♀, 21 ♂
<i>Rh. sanguineus</i>	(2); (3); (18)	Dogs (3) Fox (1) Vegetation (1)	18 Nymphs, 3 ♀, 7 ♂
<i>D. marginatus</i>	(4); (6); (9); (12); (14); (15)	Mouflons (2) Deer (1) Wild boar (3) Swine (1)	4 Nymphs, 4 ♀, 7 ♂
<i>H. sulcata</i>	(9); (12)	Mouflons (2)	6 Nymph, 4 ♀, 4 ♂
<i>Rh. turanicus</i>	(14)	Mouflon (1)	6 ♀
<i>Hy. m. marginatum</i>	(8); (13)	Mouflon (1) Deer (1)	3 ♀, 2 ♂
<i>I. festai</i>	(2); (11)	Hedgehog (1) Man (1)	1 Nymph, 3 ♀, 1 ♂
<i>Ixodes</i> spp.	(5)	Man (1)	1 ♀



Tick species positive for rickettsial DNA	Host, sex and collection sites of ticks	Rickettsial gltA gene: number of positive ticks/total	Gene sequence	GenBank accession number
<i>H. punctata</i>	Sheep, ♀, (9) Mouflon, ♂, (17)	2/49	<i>Rickettsia</i> spp. <i>Ri. hoogstralii</i> (100%)	JQ691712
<i>Rh. sanguineus</i>	Fox, ♂, ♂, (2)	2/28	<i>Ri. massiliae</i> (100%)	CP003319
<i>D. marginatus</i>	Swine, ♂, (6) Wildboar, ♀, ♀, (14)	3/15	<i>Ri. slovaca</i> (100%)	CP003375
<i>H. sulcata</i>	Mouflon, ♀, ♂, (9); ♂, (12)	3/14	<i>Ri. hoogstralii</i> (100%) <i>Ri. hoogstralii</i> (100%)	JQ691712
<i>Hy. m. marginatum</i>	Mouflon, ♂, (13)	1/5	<i>Ri. aeschlimannii</i> (100%)	DQ235776
<i>I. festai</i>	Hedgehog, ♂, nymph (11)	2/5	<i>Ri. helvetica</i> (100%)	U59723

***Rickettsia aeschlimannii* Infection, Algeria**

An 80-year-old man who reported contact with dogs parasitized by ticks had a 7-day history of high fever, headache, myalgia, and vomiting. On physical examination, a generalized maculopapular rash, 2 eschars (right shoulder and knee), and bilateral hemorrhagic signs on the retina were noticed. Elevated levels of liver enzymes (aspartate aminotransferase 187 U/L, alanine aminotransferase 108 U/L), hyponatremia (sodium 120 mmol/L), and hypokalemia (potassium 2.9 mmol/L) were found. IF assay showed raised levels of IgG/IgM against *R. aeschlimannii* (512/64) and *R. conorii* (128/0).



Nora Mokrani, Philippe Parola,
Soraya Tebbal,
Mokhtar Dalichaouche,
Ahmed Aouati, and Didier Raoult

The second patient, a 36-year-old man, reported a 15-day history of fever with headache and failure of amoxicillin and cotrimoxazole treatments. Oral aphthous, a maculopapular rash, and purpuric lesions on the arms were noticed. IF assay showed raised levels of IgG/IgM at the same titer (2,048/32) against *R. conorii*, *R. aeschlimannii*, and *R. massiliae*. WB assays and cross-adsorption studies confirmed that antibodies were directed against *R. aeschlimannii* (Figure). Both patients recovered after doxycycline treatment (1).

The probability of being bitten by several infected *H. marginatum* ticks is high and can lead to several eschars in patients, a characteristic of few tickborne rickettsioses.

***Hyalomma marginatum* is not only vectors but also reservoirs of *R. aeschlimannii*. *H. marginatum* ticks readily bite humans, and persons may receive multiple simultaneous tick bites.**

Human *Rickettsia aeschlimannii* infection: first case with acute hepatitis and review of the literature

A. TOSONI¹, A. MIRIJELO², A. CIERVO³, F. MANCINI³, G. REZZA³, F. DAMIANO⁴, R. CAUDA⁴, A. GASBARRINI¹, G. ADDOLORATO¹, ON BEHALF OF THE INTERNAL MEDICINE SEPSIS STUDY GROUP*



- We describe the unique case of a patient presented with significant high aminotransferase levels due to the first human ***R. aeschlimannii*** infection ever detected in Italy.
- The hypothesis of rickettsiosis was made on the basis of a comprehensive medical history and was confirmed by serological tests.
- **Molecular analyses** made on a sample of hepatic tissue revealed the presence of a rickettsial species never found before in human liver



Figure. Papule on the anterior surface of the left arm of a 70-year-old man, Crete, Greece. The papule was surrounded by an infiltrated area without tenderness or pruritus. A tick was found in the center of the papule and carefully removed in its entirety.

***Rickettsia
aeschlmannii***
**Infection in a Man,
Greece**



RESEARCH

Open Access

Ticks infesting humans in Italy and associated pathogens

Domenico Otranto^{1*}, Filipe Dantas-Torres^{1,2}, Alessio Giannelli¹, Maria Stefania Latrofa¹, Antonio Cascio³, Stefania Cazzin⁴, Silvia Ravagnan⁴, Fabrizio Montarsi⁴, Sergio Aurelio Zanzani⁵, Maria Teresa Manfredi⁵ and Gioia Capelli⁴

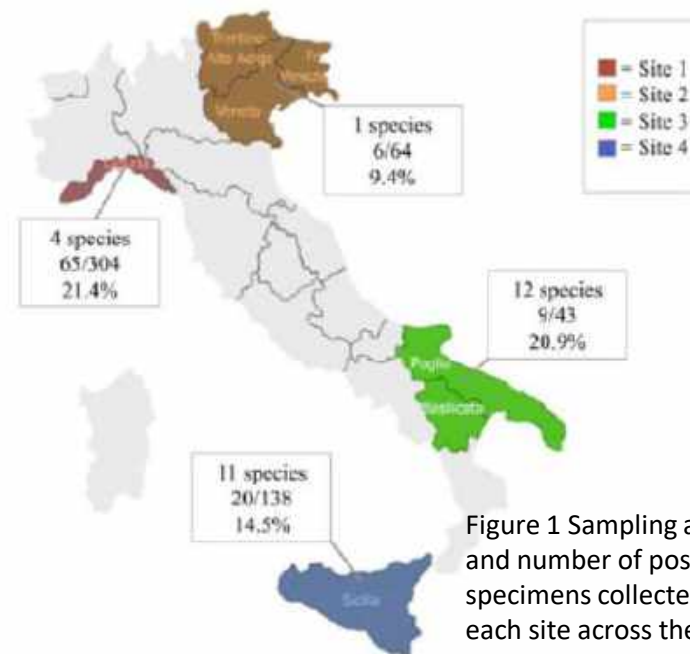


Figure 1 Sampling areas and number of positive specimens collected from each site across the Italian peninsula.

Methods: Samples (n = 561) were collected from humans in four main geographical areas of Italy (i.e., northwestern, northeastern, southern Italy, and Sicily), which represent a variety of environments. After being morphologically identified, ticks were molecularly tested with selected protocols for the presence of pathogens of the genera *Rickettsia*, *Babesia*, *Theileria*, *Candidatus Neoehrlichia mikurensis*, *Borrelia* and *Anaplasma*.

Results: Ticks belonged to 16 species of the genera *Argas*, *Dermacentor*, *Haemaphysalis*, *Hyalomma*, *Ixodes* and *Rhipicephalus*, with *Ixodes ricinus* (59.5%) being the species most frequently retrieved, followed by *Rhipicephalus sanguineus sensu lato* (21.4%). Nymphs were the life stage most frequently retrieved (41%), followed by adult females (34.6%).

The overall positivity to any pathogen detected was 18%. Detected microorganisms were *Rickettsia* spp. (17.0%), *Anaplasma phagocytophilum* (0.8%), *Borrelia afzelii* (0.5%), *Borrelia valaisiana* (0.3%), *C. N. mikurensis* (0.5%) and *Babesia venatorum* (0.6%).

Region	Species (n)	N (%)*	Tick-borne microorganisms (n)
Northwestern Italy (Savona, Liguria)	<i>D. marginatus</i> (3)	1	<i>R. monacensis</i> (1)
	<i>I. ricinus</i> (263)	63 (23.9)	<i>R. monacensis</i> (54), <i>A. phagocytophilum</i> (3), <i>B. venatorum</i> (3), <i>R. helvetica</i> (3), <i>B. valaisiana</i> (1), <i>Rickettsia</i> spp. (1), <i>B. afzelii</i> (1)
	<i>Ixodes</i> spp. (7)	0	
	<i>Rh. sanguineus</i> s.l. (31)	1 (3.2)	<i>R. slovaca</i> (1)
Northeastern Italy (Veneto, Friuli Venezia Giulia and Trentino Alto Adige)	<i>I. ricinus</i> (64)	6 (9.4)	<i>R. helvetica</i> (4), <i>C. N. mikurensis</i> (2), <i>B. afzelii</i> (1)
Southern Italy (Puglia and Basilicata)	<i>A. reflexus</i> (2)	0	
	<i>D. marginatus</i> (12)	7 (58.3)	<i>R. slovaca</i> (5), <i>R. raoulti</i> (1), <i>R. peacockii</i> (1), <i>Rickettsia</i> spp.
	<i>H. inermis</i> (1)	1	
	<i>H. parva</i> (2)	0	
	<i>H. punctata</i> (1)	0	
	<i>Hyalomma</i> spp. (4)	0	
	<i>I. acuminatus</i> (2)	0	
	<i>I. ricinus</i> (1)	0	
	<i>I. ventralis</i> (1)	1	<i>R. helvetica</i> (1)
	<i>Rh. sanguineus</i> s.l. (15)	0	
	<i>Rh. turanicus</i> (1)	0	
	<i>Rhipicephalus</i> spp. (1)	0	
	<i>D. marginatus</i> (10)	4	<i>R. slovaca</i> (4)
	<i>H. punctata</i> (1)	0	
	<i>H. d. detritum</i> (2)	0	
	<i>H. lusitanicum</i> (27)	1 (3.7)	<i>R. aeschlimannii</i> (1)
	<i>H. marginatum</i> (2)	0	
	<i>Hyalomma</i> spp. (4)	0	
	<i>I. ricinus</i> (7)	1	<i>R. monacensis</i> (1)
	<i>Rh. bursa</i> (4)	0	
	<i>Rh. pusillus</i> (1)	0	
	<i>Rh. sanguineus</i> s.l. (74)	12 (16.7)	<i>R. massiliae</i> (11), <i>Rickettsia</i> spp. (1)
	<i>Rh. turanicus</i> (6)	2	<i>R. massiliae</i> (1), <i>R. massiliae/rhipicephali</i> (1)

Sicily

11 species
20/138
14.5%



Mediterranean spotted fever with involvement of the gastrointestinal tract

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DESCRIPTION

A previously healthy 62-year-old man, resident in a rural environment, was admitted to the intensive care unit of gastroenterology with a 5-day history of fever (39°C), upper abdominal pain, nausea, emesis and cutaneous rash, complicated in the preceding day by haematemesis. Physical examination revealed a maculopapular rash in the trunk and palmoplantar regions. Laboratory data demonstrated ferropenic anaemia (haemoglobin 8 g/dL), thrombocytopenia (34 000/ μ L), leukocytosis ($12.8 \times 10^3/\mu$ L), elevated C reactive protein (21 mg/dL) and acute renal failure. The upper endoscopy showed fresh blood in the gastric lumen, multiple serpiginous erosions and several small shallow ulcers covered with haematin in the antrum and duodenum, one of them with active bleeding. Endoscopic haemostasis was made with epinephrine and the placement of four haemoclips. The

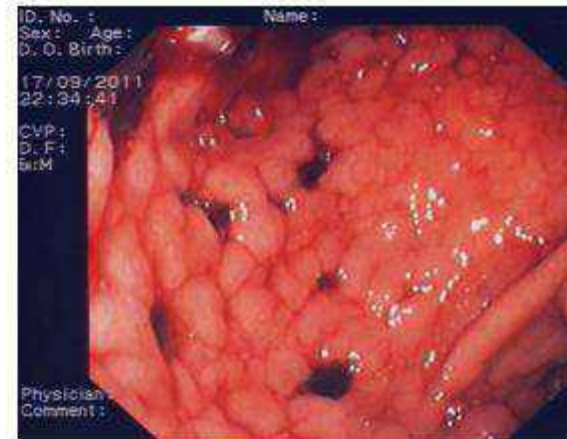


Figure 2 Upper endoscopy image: gastric antrum with multiple serpiginous erosions and several small shallow ulcers covered with haematin.

J Med Microbiol. 2013 Sep;62(Pt 9):1363-4. doi: 10.1099/jmm.0.053546-0. Epub 2013 Jun 20.

A case of spotted fever rickettsiosis in a human immunodeficiency virus-positive patient.

Colomba C, Siracusa L, Madonia S, Saporito L, Bonura C, De Grazia S, Giammanco GM.

Urban family cluster of spotted fever rickettsiosis linked to *Rhipicephalus sanguineus* infected with *Rickettsia conorii* subsp. *caspia* and *Rickettsia massiliae*

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Cristina Socolovschi^a, Philippe Parola^a, Didier Raoult^{a,*}

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Gangrene in cases of spotted fever: a report of three cases

Harshal Satish Joshi,¹ Mathew Thomas,¹ Anup Warriar,² Suresh Kumar³

BMJ Case Reports Published
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doi:10.1136/bcr-2012-
007295



Gangrene is an uncommon complication in cases of rickettsial spotted fever. We report three cases of spotted fever from south India, presumably caused by *Rickettsia conorii* subspecies *indica*. Along with gangrene, these cases had severe manifestations of sepsis and multiorgan dysfunction syndrome (MODS) like acute kidney injury, liver dysfunction, delirium and seizure. One patient died while the other two recovered well. This case series is being reported to highlight the occurrence of gangrene in spotted fever rickettsiosis and the importance of appropriate management at the earliest.

ono già tre, dall'inizio dell'estate, i decessi provocati dalle punture di questo

Un killer chiamato zec

Ma la colpa è di chi non sa riconoscere i sint

li italiani hanno riscoperto con stupore che si può morire anche per il morso di un insetto. È infatti quello che è accaduto a Tesco Asaro, diciottenne di Mazara del Vallo, spirato la notte di Ferragosto che i medici dell'ospedale della siciliana lo avevano inutilmente o come se soffrisse di un'epatite, re invece era stato infettato da una. E stessa sorte era capitata in giugno all'inizio di agosto a due abitanti di Sant'Elena, in Sardegna. In i, a dispetto della loro diffusione trascurabile, sia il pubblico sia una parte della classe medica dedicano genere poca attenzione alle malattie trasmesse dagli insetti: zanzare, cimici, pidocchi e, come si è visto, zecche. La zecca, nota al pubblico più

Ancora incerta la patologia, trasmessa dall'acaro, che a Ferragosto uccise un ragazzo a Mazara del Vallo. L'università di Palermo già nell'88 avvertì che la Sicilia andava considerata zona a rischio per la «febbre bottonosa»

di Maurizio Imperiali



Gambe coperte

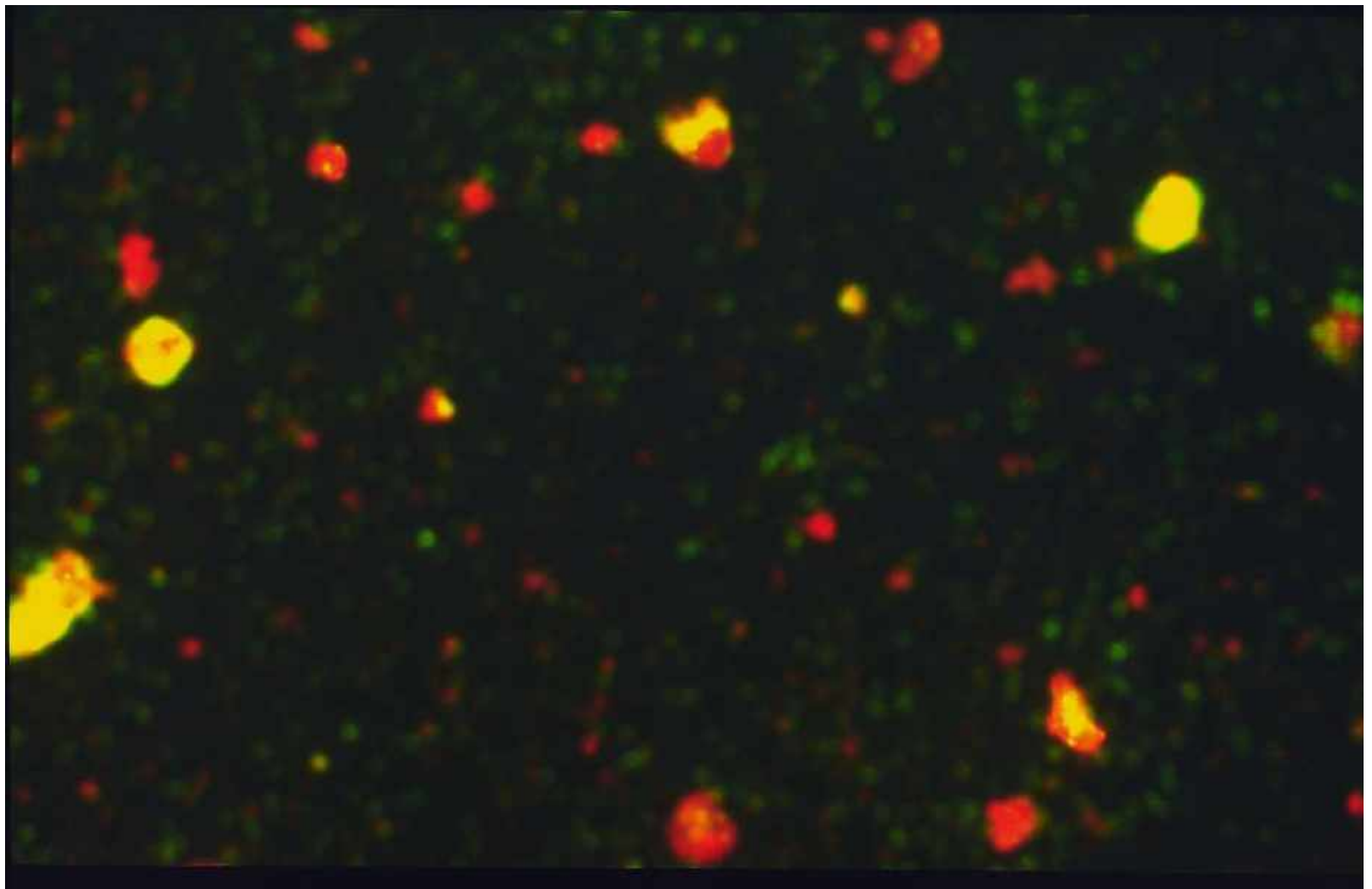
IL PICCOLO
NEMICO ABITA
NEI BOSCHI

Poiché non esistono

morbo di Lyme le aree settentrionali boschive del centro della Cecoslovacchia da rickettsiosi mediterranea. È dato che, già nel 1988, il professor Giuseppe Nardone, direttore dell'Istituto di malattie infettive di Palermo, aveva avvertito che la Sicilia presentava un rischio per la malattia, che non esclude che si verificasse anche altrove: «È stato già segnalato che la sola provincia di Palermo ha avuto anche in passato segnalazioni di casi di febbre bottonosa». I medici di Mazara del Vallo, senza la zecca, «Tutti

Diagnosis

- shell vial system
 - PCR 
 - immunomagnetic procedure for isolation of circulating endothelial cells in blood
 - serological tests
 - IFAT
 - ~~• Weil-Felix~~
 - ~~• Complement fixation~~
 - ELISA
-



POLYMERASE CHAIN REACTION-BASED DIAGNOSIS OF MEDITERRANEAN SPOTTED FEVER IN SERUM AND TISSUE SAMPLES

MOSHE LEITNER, SHMUEL YITZHAKI, SABINE RZOTKIEWICZ, AND AVI KEYSARY

Department of Biochemistry and Israeli National Reference Center for Rickettsioses Department of Infectious Diseases, Israel Institute for Biological Research, Ness-Ziona, Israel

Abstract. A nested polymerase chain reaction (PCR) assay has been developed and used in the diagnosis of fatal and benign cases of Mediterranean spotted fever (MSF). The test was based on specific primers derived from a *Rickettsia conorii* 17-kD protein gene. A positive signal was obtained from spotted fever group (SFG) and typhus group (TG) rickettsiae. Discrimination between SFG and TG rickettsiae was based on a restriction fragment length polymorphism test. Other gram-negative bacterial species tested did not generate a signal, attesting for the specificity of the assay. The SFG-specific DNA fragment was detected in four of 29 acute-phase sera from serologically confirmed patients with MSF, while acute-phase sera from 25 patients without MSF were PCR negative. Acute-phase sera samples (five of five) and tissue autopsies (six of seven) from fatal suspected cases of MSF were PCR positive. The results demonstrate that sera and tissue samples are suitable specimens for the nested PCR tests, especially in fatal cases.

Efficacy and Safety of Clarithromycin as Treatment for Mediterranean Spotted Fever in Children: A Randomized Controlled Trial

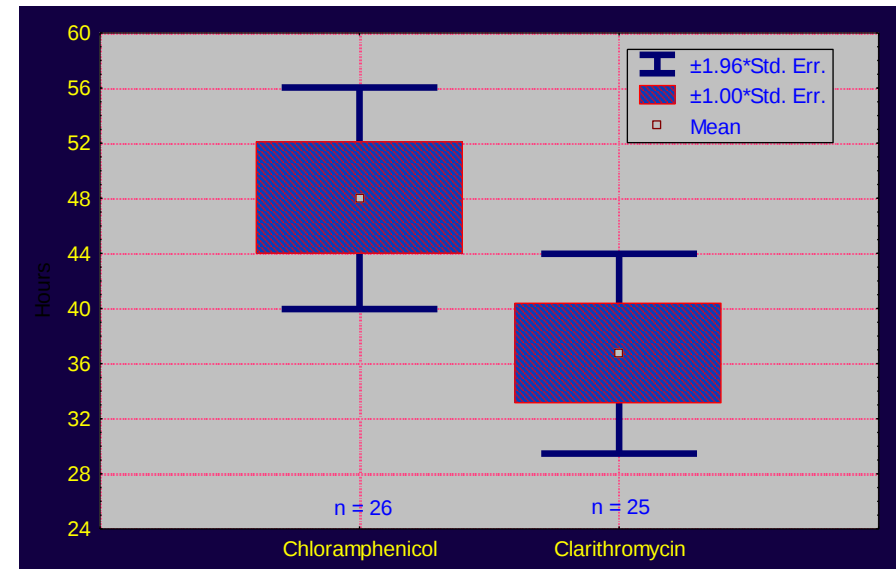
Clinical Infectious Diseases 2001;33:409–11

Antonio Cascio,¹ Claudia Colomba,¹ Domenico Di Rosa,¹ Ludovico Salsa,¹ Lucio di Martino,² and Lucina Titone¹

Fifty-one children with Mediterranean spotted fever (MSF) were randomized to receive either clarithromycin, 15 mg/kg/day orally in 2 divided doses, or chloramphenicol, 50 mg/kg/day orally in 4 divided doses, for 7 days. Mean time to defervescence was 36.7 h in the clarithromycin group and 47.1 h in the chloramphenicol group ($P = .047$). Clarithromycin could be an acceptable therapeutic alternative to chloramphenicol and to tetracyclines for children aged <8 years with MSF.

Table 1. Baseline characteristics of the 51 patients with Mediterranean spotted fever, according to drug treatment group.

Characteristic	Drug treatment group		<i>P</i>
	Chloramphenicol (<i>n</i> = 26)	Clarithromycin (<i>n</i> = 25)	
Male sex	14	16	NS
Age, years ^a	5.2 ± 2.6	7.1 ± 3.6	.035
Fever	26	25	NS
Duration of fever before treatment, mean days	3 ± 1.3	3.3 ± 1.7	NS
Exanthema	26	25	NS
Tache noire	26	25	NS
ESR, mm/h	22.5 ± 9.2	27.9 ± 11.7	NS
AST level, IU/L	57.3 ± 25	40.2 ± 18.8	NS
WBC count, cells × 10 ³ /mL	6077 ± 2464	6954 ± 2745	NS
Platelet count, cells × 10 ³ /mL	214 ± 57.4	185 ± 56.7	NS

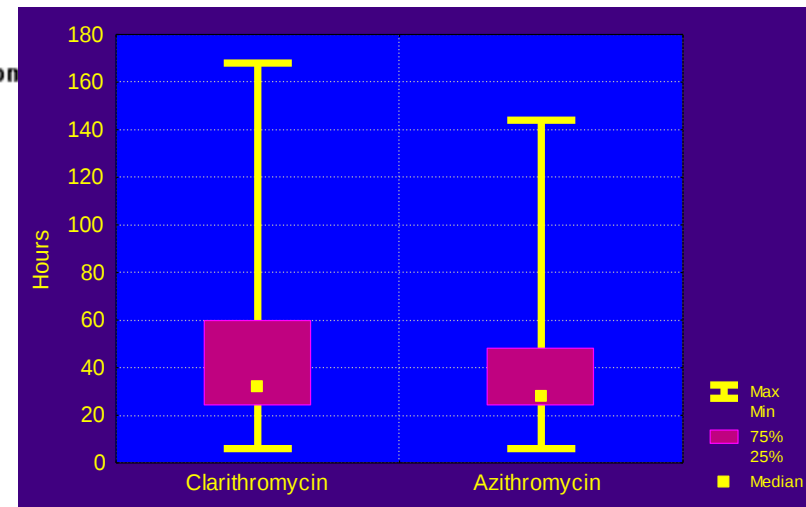


Time to defervescence

Clarithromycin Versus Azithromycin in the Treatment of Mediterranean Spotted Fever in Children: A Randomized Controlled Trial

Clinical Infectious Diseases 2002;34:154–8

Antonio Cascio,^{1,4} Claudia Colomba,¹ Spinello Antinori,¹ David L. Paterson,² and Lucina Titon



We conducted an open-label randomized controlled trial to compare the efficacy and safety of clarithromycin (15/mg/kg/day in 2 divided doses for 7 days) with those of azithromycin (10 mg/kg/day in 1 dose for 3 days) in the treatment of children with Mediterranean spotted fever. Until now, there has not been a gold-standard therapy for this rickettsial disease in children. Eighty-seven children were randomized to receive 1 of the 2 drugs. The mean time to defervescence ($\pm$ standard deviation) was 46.2 ± 36.4 h in the clarithromycin group and 39.3 ± 31.3 h in the azithromycin group. These differences were not statistically significant and both drugs were equally well-tolerated. Clarithromycin and azithromycin could be acceptable therapeutic alternatives to chloramphenicol and tetracyclines for children aged ≤ 8 years with Mediterranean spotted fever. Azithromycin, because it has a long half-life, offers the advantages of administration in a single daily dose and a shorter duration of therapy, which could increase compliance in children.

Drugs and regimens studied	No. of patients	Findings
Clarithromycin, 7 days (7.5 mg/kg b.i.d.) vs. chloramphenicol, 7 days (12.5 mg/kg q.i.d.)	46	More-rapid disappearance of fever in the group treated with clarithromycin
Erythromycin stearate, 10 days (12.5 mg/kg q.i.d) vs. tetracycline hydrochloride, 10 days (10 mg/kg q.i.d.)	81	More-rapid disappearance of fever and symptoms in the group treated with tetracycline
Azithromycin, 3 days (10 mg/kg once a day) vs. doxycycline, 5 days (5 mg/kg once a day)	30	No statistically significant differences in time to defervescence
Doxycycline, 1 day (2.5 mg/kg b.i.d.) vs. josamycin, 5 days (25 mg/kg b.i.d.)	32	No statistically significant differences in time to defervescence
Azithromycin, 3 days (10 mg/kg once a day) vs. clarithromycin, 7 days (7.5 mg/kg b.i.d.)	87	No statistically significant differences in time to defervescence

Mediterranean spotted fever: a report of 200 cases in Tunisia

F. B. Romdhane¹, C. Loussaief¹, A. Toumi¹, S. B. Yahia², M. Khaiyrallah², N. Bouzouaia¹ and M. Chakroun¹

Clinical Microbiology and Infection, Volume 15, Supplement 2, December 2009

Treatment group

Tetracycline
(*n* = 98)

Azithromycin
(*n* = 24)

Doxycycline
(*n* = 36)

Ciprofloxacin
(*n* = 35)

7 days or more
(250 mg × 4/day)

1 day
(500 mg × 2)

1 day
(200 mg × 2)

3 days
(500 mg × 3/day)

Symptoms

Fever	3.4 ± 1.1	2.6 ± 1	2.9 ± 1.1	3 ± 1.4
Arthromyalgias	4.6 ± 1.6	3.6 ± 2	3.7 ± 1.4	4.2 ± 1.9
Rash	4.1 ± 1.3	3.1 ± 1.6	3.4 ± 1.3	4 ± 1.7

Table 1. Median duration of symptoms in days after the beginning of therapy

Analysis of risk factors for malignant Mediterranean spotted fever indicates that fluoroquinolone treatment has a deleterious effect

Elisabeth Botelho-Nevers^{1,2}, Clarisse Rovey¹, Hervé Richet¹ and Didier Raoult^{1*}

Conclusions: In this retrospective study fluoroquinolone treatment was associated with increased MSF disease severity. Fluoroquinolones have been previously associated with treatment failure in typhus and scrub typhus cases. Thus, we do not recommend the use of fluoroquinolones to treat rickettsial diseases.

Aneruptive Fever Associated with Antibodies to *Rickettsia helvetica* in Europe and Thailand†

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Philippe Brouqui,¹ and Didier Raoult^{1*}

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Received 12 August 2003/Returned for modification 12 October 2003/Accepted 27 October 2003

We report that eight patients from France, Italy, and Thailand had serological evidence of *Rickettsia helvetica* infection. The infection presented as a mild disease in the warm season and was associated with fever, headache, and myalgia but not with a cutaneous rash. *R. helvetica* should be suspected in patients with unexplained fever, especially following a bite from an *Ixodes* sp. tick.

Septicaemia with *Rickettsia helvetica* in a patient with acute febrile illness, rash and myasthenia

K. Nilsson ^{a,b,c,d,e,*}

J Infect (2008), doi:10.1016/j.jinf.2008.06.005

***Ixodes ricinus* ticks are reservoir hosts for *Rickettsia helvetica* and potentially carry flea-borne *Rickettsia* species**

Hein Sprong¹, Peter R Wielinga¹, Manoj Fonville¹, Chantal Reusken¹, Afke H Brandenburg², Fred Borgsteede³, Cor Gaasenbeek³ and Joke WB van der Giessen^{*1}

Results: The DNA of the human pathogen *R. conorii* as well as *R. helvetica*, *R. sp. IRS* and *R. bellii*-like were found. Unexpectedly, the DNA of the highly pathogenic *R. typhi* and *R. prowazekii* and 4 other uncharacterized *Rickettsia spp.* related to the typhus group were also detected in *I. ricinus*. The presence of *R. helvetica* in fleas isolated from small rodents supported our hypothesis that cross-infection can occur under natural conditions, since *R. typhi/prowazekii* and *R. helvetica* as well as their vectors share rodents as reservoir hosts. In one biotope, the infection rate with *R. helvetica* was ~66% for 9 years, and was comparable between larvae, nymphs, and adults. Larvae caught by flagging generally have not yet taken a blood meal from a vertebrate host. The simplest explanation for the comparable prevalence of *R. helvetica* between the defined tick stages is, that *R. helvetica* is vertically transmitted through the next generation with high efficiency. The DNA of *R. helvetica* was also present in whole blood from mice, deer and wild boar.

Conclusion: Besides *R. helvetica*, unexpected rickettsiae are found in *I. ricinus* ticks. We propose that *I. ricinus* is a major reservoir host for *R. helvetica*, and that vertebrate hosts play important roles in the further geographical dispersion of rickettsiae.

A new tick-transmitted disease due to *Rickettsia slovaca*

D Raoult, Ph Berbis, V Roux, W Xu, M Maurin

Tick-borne lymphadenopathy—a new rickettsial disease?

Andras Lakos

TIBOLA (Tick-borne lymphadenopathy)
Rickettsia slovaca



Mesi invernali



Dermacentor marginatus





Scalp Eschar and Neck Lymphadenopathy Caused by *Bartonella henselae* after Tick Bite

**Emmanouil Angelakis,¹ Céline Pulcini,² Julie Waton,³ Patrick Imbert,⁴
Cristina Socolovschi,¹ Sophie Edouard,¹ Pierre Dellamonica,²
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and ⁴Service des Maladies Infectieuses et Tropicales, Hôpital Instruction Armée
Bégin, Paris, France

Rickettsia slovaca and *Rickettsia raoultii* have been associated
with a syndrome characterized by scalp eschar and neck
lymphadenopathy following tick bites. However, in many
cases, the causative agent remains undetermined. We report
3 cases of this syndrome caused by *Bartonella henselae*, and
we propose the term “SENLAT” to collectively describe this
clinical entity.

Scalp Eschar and Neck Lymphadenopathy Caused by *Bartonella henselae* after Tick Bite

Emmanouil Angelakis,¹ Céline Pulcini,² Julie Waton,³ Patrick Imbert,⁴ Cristina Socolovschi,¹ Sophie Edouard,¹ Pierre Dellamonica,² and Didier Raoult¹

Table 1. Three Cases of SENLAT (Scalp Eschar and Neck Lymphadenopathy after Tick Bite) Caused by *Bartonella henselae*

Patient	Tick species	Tick bite	Animal exposure	Clinical manifestations	Serological test result	Western blot result	PCR result
Patient 1	<i>Dermacentor</i> species	Yes	No	Asthenia, scalp eschar, and bilateral cervical lymphadenopathy	Negative	Positive for <i>B. henselae</i>	Tick was positive for <i>B. henselae</i>
Patient 2	Unknown	Yes	Cats and horses	Asthenia, scalp eschar, and bilateral cervical lymphadenopathy	Positive for <i>Bartonella</i> species	Positive for <i>B. henselae</i>	Eschar was positive for <i>B. henselae</i>
Patient 3	Unknown	Yes	Cat, horses, and cows	Asthenia, scalp eschar, and left occipital lymphadenopathy	Positive for <i>Bartonella</i> species	Positive for <i>B. henselae</i>	Eschar was positive for <i>B. henselae</i>

Emerg Infect Dis. 2013 May;19(5):836-7. doi: 10.3201/eid1905.121169.

Scalp eschar and neck lymphadenopathy caused by *Rickettsia massiliae*.

Cascio A, Torina A, Valenzise M, Blanda V, Camarda N, Bombaci S, Iaria C, De Luca F, Wasniewska M.

KEYWORDS: Rickettsia, Rickettsia massiliae, bacteria, eschar, fever, lymphadenopathy, scalp eschar and neck lymphadenopathy, tick

PMID: 23697545 [PubMed - indexed for MEDLINE] PMCID: PMC3647502

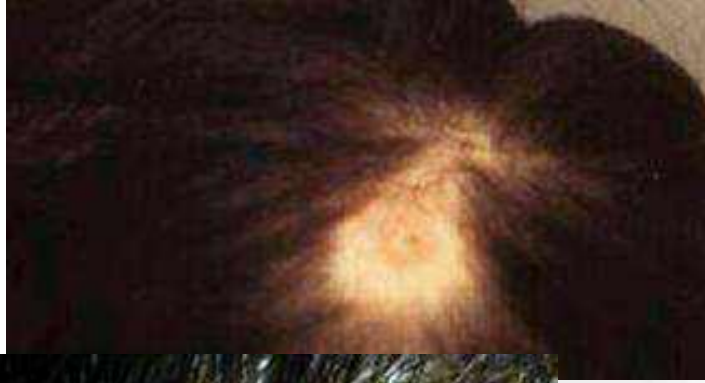
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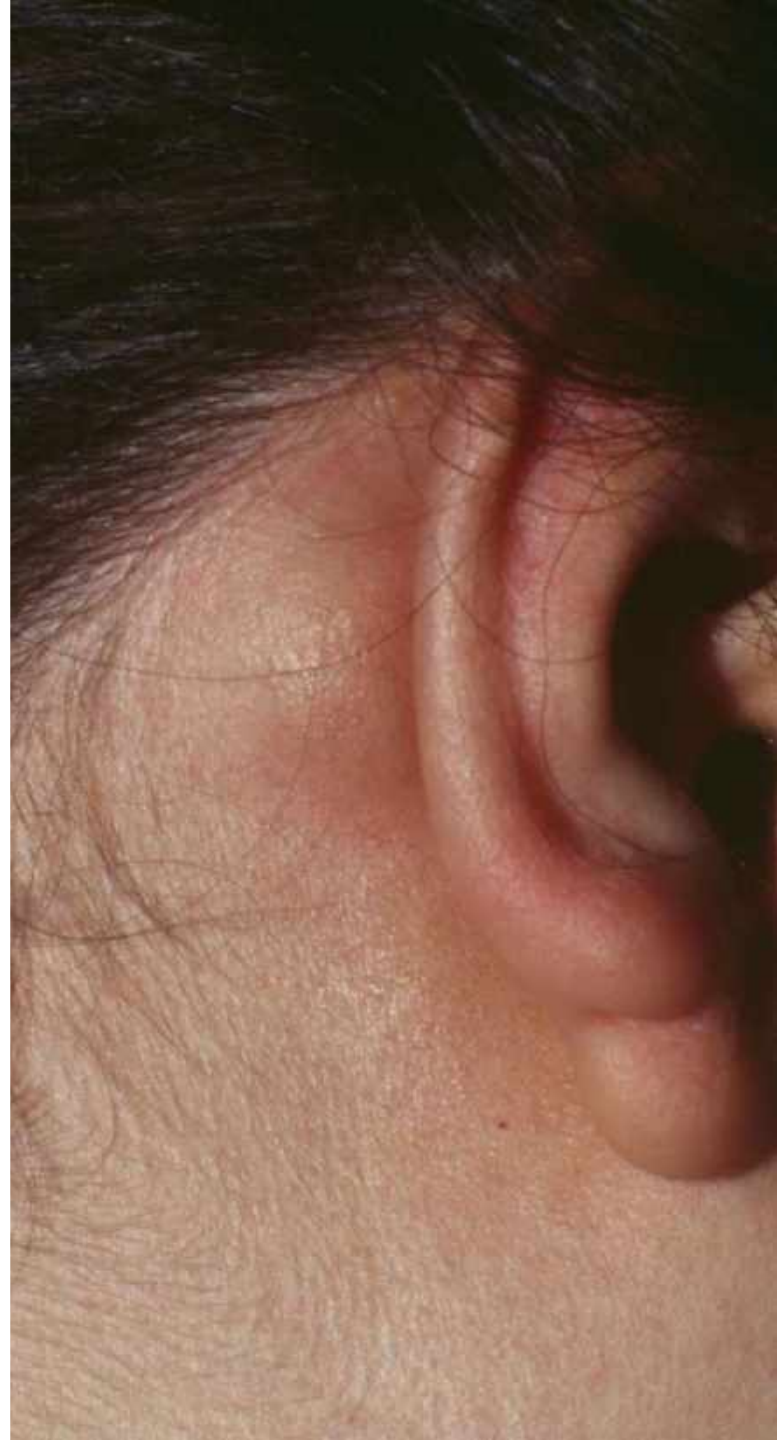
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TIBOLA





Rickettsia slovaca in *Dermacentor marginatus* and Tick-borne Lymphadenopathy, Tuscany, Italy

Marco Selmi,* Luigi Bertolotti,†
Laura Tomassone,† and Alessandro Mannelli†[‡]

Table 1. Patients bitten by *Dermacentor marginatus* and admitted to emergency units, Tuscany, Italy

Patient no.	Year of birth	Sex	Site of tick bite	Tick	Symptoms	Therapy T1	Therapy T2	PCR result	Tick-borne lymphadenopathy
31	2005	F	Head	1	Small redness	Yes	No		
40	1937	M	Trunk	2	Itching	Yes	No		
49	2004	M	Head	1	No		No	<i>R. slovaca</i>	
117	1943	F	Trunk	3	Viol. painful rash (20 mm) over 32 h	Yes			
121	1954	F	Arm	M	Nausea		No		
128	1958	M	Head	1	Nausea		No		
148	2001	F	Head	2	Enlarged cervical lymph node, painful lymph node, fever, oliguria		Yes	<i>R. slovaca</i>	Yes
180	1939	F	Head	2	Fever		No	<i>R. slovaca</i>	
154	1930	M	Trunk	1	Nausea		Yes		Yes
155	1968	F	Head	2	Enlarged cervical lymph node, painful lymph node, fever, weakness		Yes		
159	1950	M	Trunk	M	Itching		No		
176	2000	M	Head	2	Enlarged cervical lymph node, itchy nose, oliguria		Yes		Yes
153	1958	F	Head	1	Enlarged cervical lymph node, painful lymph node, weakness, myalgia		Yes	<i>R. slovaca</i>	Yes
254	1942	F	Head	2	Nausea		Yes		
256	1949	F	Trunk	2	Itchy nose, itching, small sores		Yes	<i>R. slovaca</i>	
273	2003	F	Head	M	Fever, headache		200 + 15x		
294	2001	M	Head	3	Pain at tick bite site, enlarged, painful cervical lymph node		200 + 12x	<i>R. slovaca</i>	Yes

T1, tick engorgement index (based on size of engorgement); female ticks: 1, completely engorged; 2, subadult (abscise length < 7 mm); width < 5 mm; engorged (abscise length > 7 mm); male ticks: M, male tick.
 T2, therapy administered (days) after patients were discharged from emergency unit.
 PCR, polymerase chain reaction; R, *Rickettsia slovaca*; Yes, *R. slovaca* was diagnosed; numbers indicate duration of treatment in days.
 †Patients identified by tick immunofluorescence in postmortem tissue.
 ‡Chlorhexidine.



Ticks Tick Borne Dis. 2012 Dec;3(5-6):393-5. doi: 10.1016/j.ttbdis.2012.10.007. Epub 2012 Oct 22.

Rickettsia slovaca from *Dermacentor marginatus* ticks in Sardinia, Italy.

Masala G, Chisu V, Satta G, Socolovschi C, Raoult D, Parola P.

Table 2. Temporal distribution of *Dermacentor* spp. bites and tick-borne lymphadenopathy cases, Tuscany, Italy, 2006

Characteristic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Dermacentor</i> spp. tick bite	0	0	0	4	2	0	3	0	1	4	1	2
Tick-borne lymphadenopathy cases	0	0	0	2	1	0	0	0	0	1	0	1

Rickettsia slovaca Infection, France

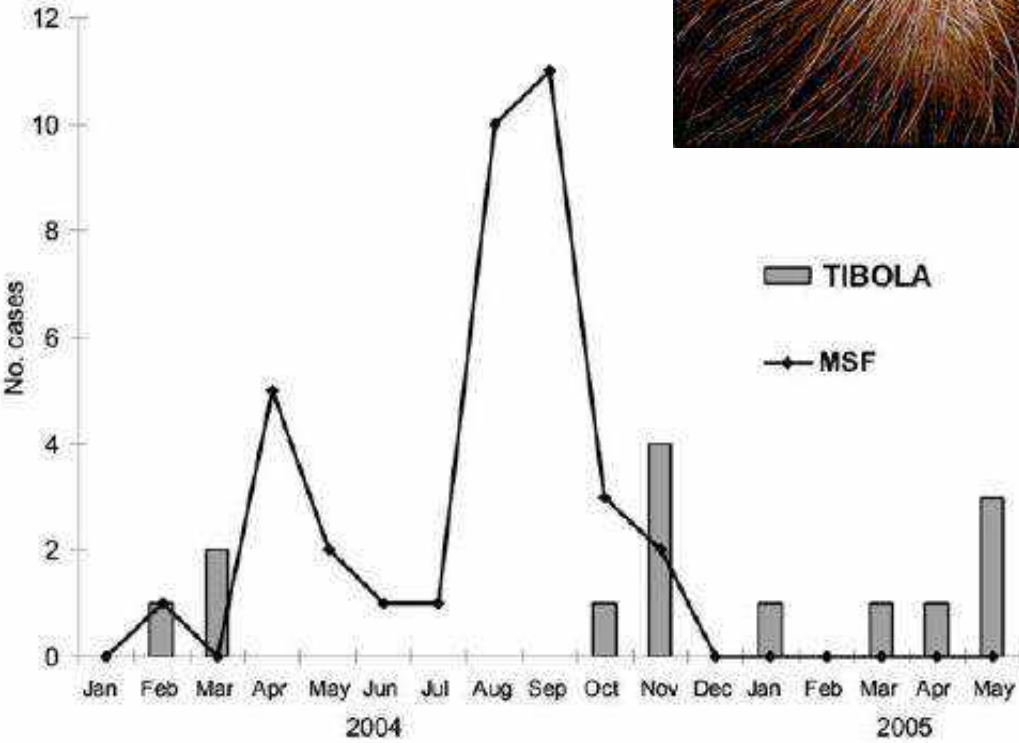


Figure. Seasonal distribution of Mediterranean spotted fever (MSF) and tickborne lymphadenopathy (TIBOLA) in southern France from January 2004 to May 2005.

***Rickettsia slovaca* and *R. raoultii* in Tick-borne Rickettsioses**

**Philippe Parola, Clarisse Rovey,
Jean Marc Rolain, Philippe Brouqui,
Bernard Davoust, and Didier Raoult**

Tick-borne lymphadenopathy (TIBOLA), also called *Dermacentor*-borne necrosis erythema and lymphadenopathy (DEBONEL), is defined as the association of a tick bite, an inoculation eschar on the scalp, and cervical adenopathies. We identified the etiologic agent for 65% of 86 patients with TIBOLA/DEBONEL as either *Rickettsia slovaca* (49/86, 57%) or *R. raoultii* (7/86, 8%).





• May 18



• May 19



• May 20



• May 26



• May 30



• May 31



• June 16



• June 26



• September 25

***Dermacentor*-borne necrosis erythema and lymphadenopathy: clinical and epidemiological features of a new tick-borne disease**

J. A. Oteo¹, V. Ibarra¹, J. R. Blanco¹, V. Martínez de Artola², F. J. Márquez³, A. Portillo¹, D. Raoult⁴ and P. Anda⁵

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ABSTRACT

This paper describes the epidemiological and clinical features of a tick-borne disease differing somewhat from other tick-borne diseases found previously in Spain. All patients were bitten by *Dermacentor marginatus* or a large tick.

The clinical features include a crustaceous or necrotic lesion at the site of the tick's attachment, surrounded by an erythema (erythema migrans-like) and painful regional lymphadenopathies.

The probable aetiological agent is *Rickettsia slovaca*. Similar cases have been reported in other European countries.

logical and clinical characteristics of the patients

Month	Village	Location of eschar	Tick	Incubation (days)	Erythema	Regional lymph nodes	Fever	Headache	Transaminases
April	Viguera	Head	UN	5	Yes ^a	Yes	Yes	Yes	Elevated
January	Arnedo	Head	DM	7	Yes	Yes	Yes	Yes	Elevated
November	Arnedo	Arm	DM	6	Yes ^a	Yes	No	No	Normal range
March	Arnedo	Head	DM	4	Yes	Yes	No	No	Normal range
November	UN	Head	DM	4	Yes	Yes	No	Yes	Normal range
December	UN	Head	UN	7	Yes	Yes	Yes	Yes	Normal range
February	UN	Head	UN	5	Yes	Yes	No	Yes	Normal range
October	UN	Head	UN	5	Yes	Yes	Yes	Yes	Normal range
October	UN	Head	DM	3	Yes	Yes	No	Yes	Normal range
November	Logroño	Head	UN	4	Yes	Yes	Yes	Yes	Normal range
November	Sotes	Head	DM	3	Yes	Yes	Yes	Yes	Elevated
December	Préjano	Head	DM	4	Yes	Yes	Yes	Yes	Normal range
January	M. de Ocón	Head	UN	3	Yes ^a	Yes	No	Yes	Normal range
October	Arnedo	Head	DM	6	Yes	Yes	No	Yes	Normal range
December	Arnedillo	Head	UN	4	Yes	Yes	Yes	Yes	Normal range
November	Arnedo	Chest	DM	8	Yes ^a	Yes	No	No	Normal range
March	Arnedo	Head	UN	5	Yes ^a	Yes	Yes	Yes	Elevated
March	Aldeanueva	Head	DM	4	Yes ^a	Yes	No	Yes	Normal range
April	Tudelilla	Axilla	DM	8	Yes ^a	Yes	No	No	Normal range
April	V. de Ocón	Head	UN	1	Yes	Yes	Yes	Yes	Normal range
January	UN	Head	UN	3	Yes	Yes	No	Yes	Normal range
January	Sta. Engracia	Head	UN	1	Yes ^a	Yes	No	Yes	Elevated

s; F, Female; M, Male; NP, not performed; UN, unknown.

ter.

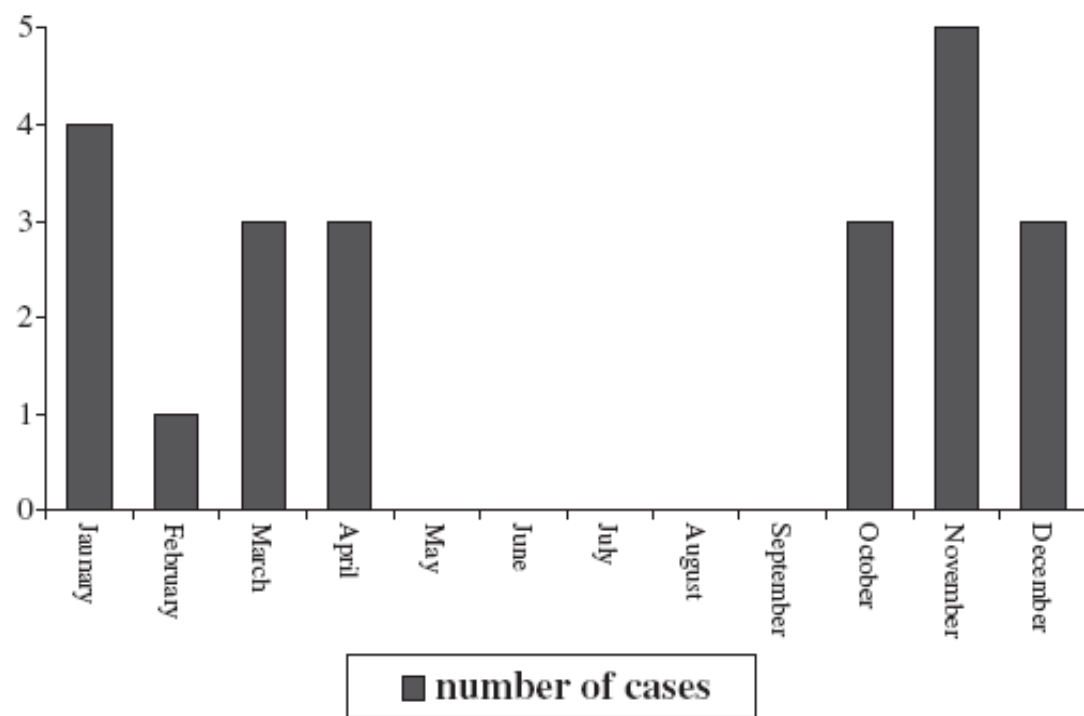


Fig. 1. Distribution of cases by months.







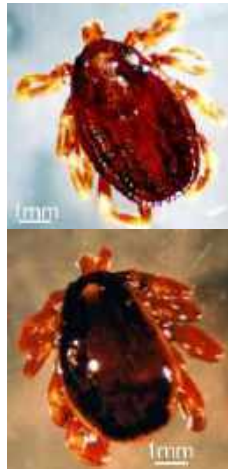
Emerg Infect Dis. 2013 Jul;19(7):1176-7. doi: 10.3201/eid1907.130232.

***Rickettsia aeschlimannii* infection in a man, Greece.**

Germanakis A, Chochlakis D, Angelakis E, Tselentis Y, Psaroulaki A.



Lymphangitis-Associated Rickettsiosis, a New Rickettsiosis Caused by *Rickettsia sibirica mongolotimonae*: Seven New Cases and Review of the Literature



Pierre-Edouard Fournier,¹ Frédérique Gouriet,¹ Philippe Brouqui,^{1,2} Frédéric Lucht,³ and Didier Raoult^{1,2}

¹Unité des Rickettsies, Université de la Méditerranée, Faculté de Médecine, and ²Service de Maladies Infectieuses et Tropicales, Hôpital Nord, Marseille, and ³Service de Maladies Infectieuses, Hôpital Bellevue, Saint-Etienne, France

Background. *Rickettsia sibirica mongolotimonae* has been found in *Hyalomma* ticks in Inner Mongolia (in China) and Niger and in humans in France and South Africa. To date, only 3 cases of human infection have been reported.

Methods. Patients received a diagnosis of *R. sibirica mongolotimonae* infection on the basis of culture and/or PCR results plus serological test results.

Results. From January 2000 to June 2004, *R. sibirica mongolotimonae* infection was diagnosed in 7 patients. In 3 patients, the bacterium was cultivated from the inoculation eschar. The other 4 patients had cases that were diagnosed with use of PCR of samples obtained from the eschar (2 patients) or blood (2 patients), plus specific Western blot before (2 patients) and after (2 patients) cross-adsorption. The clinical presentation included fever (temperature, $>38.5^{\circ}\text{C}$), a maculopapular rash, and ≥ 1 inoculation eschar in 6 patients, enlarged regional lymph nodes in 4 patients, and lymphangitis in 3 patients. On the basis of the study of 9 cases, *R. sibirica mongolotimonae* infection differed from other tick-borne rickettsioses in the Mediterranean area in the following ways: it involved a specific incidence in the spring, the presence of 2 eschars in 2 (22%) of the patients, the presence of a draining lymph node in 5 (55%) of the patients, and lymphangitis expanding from the inoculation eschar to the draining node in 4 (44%) of the patients. The most recent patient in our series received a clinical diagnosis on the basis of such findings. All patients recovered without any sequelae.

Conclusions. We propose that this new rickettsiosis be named “lymphangitis-associated rickettsiosis.” Lymphangitis-associated rickettsiosis should be considered in the differential diagnosis of tick-borne rickettsioses in Europe, Africa, and Asia.



***Rickettsia mongolotimonae*: A Rare Pathogen in France**

Pierre-Edouard Fournier,* Hervé Tissot-Dupont,*†
Hervé Gallais,† and Didier Raoult*

*Faculté de Médecine, Université de la Méditerranée, Marseille
and †Hôpital de la Conception, Marseille, France

Human *Rickettsia sibirica* *mongolotimonae* Infection, Spain

To the Editor: *Rickettsia sibirica mongolotimonae* has been recently reported as a subspecies of *R. sibirica* (1). The first evidence of *R. sibirica mongolotimonae* pathogenicity in humans was documented in France in 1996 (2). Since then, 11 more cases in France, Algeria, South Africa, Greece, and Portugal have been reported (3–6). Because the main clinical mani-

• www.cdc.gov/eid • Vol. 14, No. 3, March 2008



***Rickettsia* *sibirica* subsp. *mongolotimonae* Infection and Retinal Vasculitis**

To the Editor: *Rickettsia sibirica* subsp. *mongolotimonae* is an intracellular bacterium that belongs to the species *R. sibirica* (1). To date, only 11 cases of infection with this bacterium have been reported (2–6). We report a case in a pregnant woman with ocular vasculitis.

A 20-year-old woman in the 10th week of her pregnancy was admitted in June 2005 to St. Eloi Hospital in Montpellier, France, with an 8-day history of fever, eschar, hemifacial edema, and headache. On examination the day of admission, she had a fever of 38.5°C, headache, and frontal eschar surrounded by an inflammatory halo. Painful retroauricular and

Lymphangitis in a Portuguese Patient Infected with *Rickettsia sibirica*



Imported rickettsioses in Italy.

[Beltrame A](#), [Angheben A](#), [Casolari S](#), [Castelli F](#), [Magnani G](#), [Gaiera G](#), [Brillo F](#), [Cattani G](#), [Anselmi M](#), [Tomasoni L](#), [Prati F](#), [Norberto C](#), [Socolovski C](#), [Bisoffi Z](#), [Raoult D](#), [Parola P](#).

Author information



Abstract

BACKGROUND: In Italy few cases of rickettsioses have been reported in travellers and autochthonous cases are attributed predominantly to *Rickettsia conorii*, the agent of Mediterranean spotted fever.

METHOD: The purpose of this study was to investigate some epidemiological and clinical features of tick-borne spotted fever group rickettsiosis acquired abroad or in Italy. Serum specimens collected prospectively from patients with suspected rickettsioses were tested by immunofluorescence assay. A definitive diagnosis was made on the basis of positive serological test results at the WHO collaborative centre for rickettsial diseases, Marseille, France. We compared the clinical features of patients with confirmed rickettsioses and those showing typical clinical symptoms/signs without definitive diagnose.

RESULTS: Eight of 26 patients suspected cases had confirmed rickettsioses. All patients were travellers returning from southern Africa (75% *Rickettsia africae*). Inoculation eschars were significantly more common in patients with confirmed rickettsioses ($p = 0.004$).

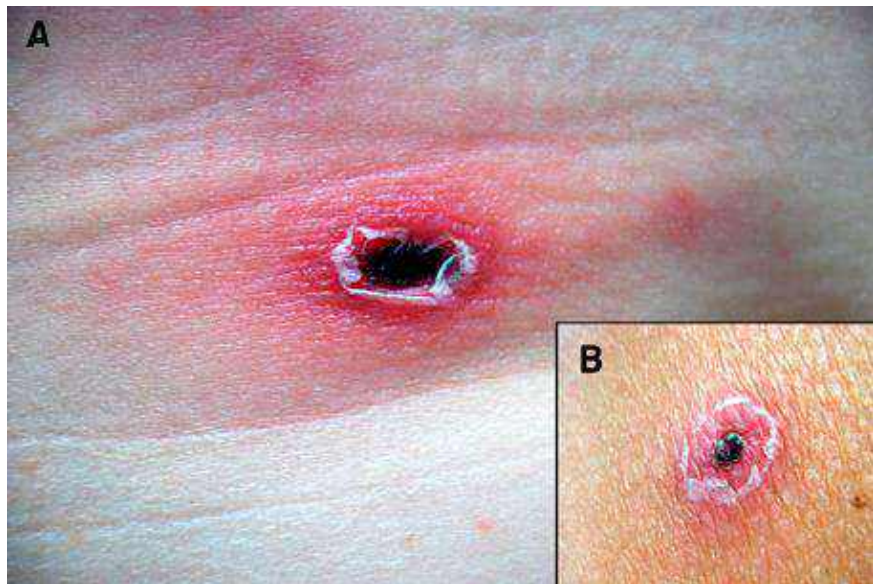
CONCLUSIONS: Our study demonstrates that *R. africae* is the most frequent rickettsia observed in Italian travellers. Prior to receiving the laboratory results, physicians should start empirical treatment on the basis of epidemiologic data (e.g., travel history to Africa), and clinical findings compatible with rickettsioses (e.g., eschars).

Images in Clinical Tropical Medicine

Tache Noire in African Tick Bite Fever

Dennis Tappe,* Gerhard Dobler, and August Stich

Department of Tropical Medicine, Medical Mission Hospital, Würzburg, Germany;
Bundeswehr Institute of Microbiology, Munich, Germany

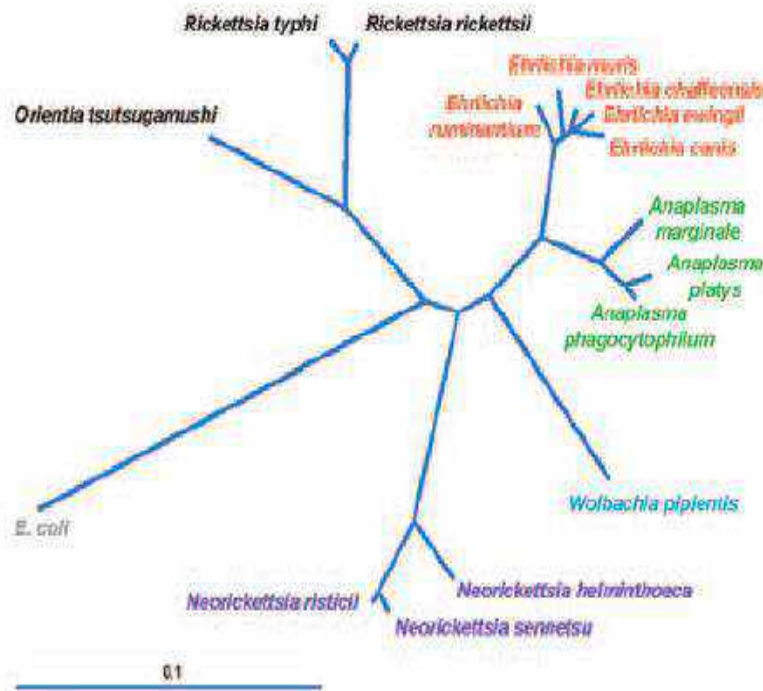


- African tick bite fever is endemic in large parts of sub-Saharan Africa and is the most common rickettsiosis in travelers.
- Aggressive cattle ticks (*Amblyomma* sp.) act as vectors and reservoirs.
- Unlike Rocky Mountain spotted fever, ATBF is not a life-threatening disease.

A fever of 39°C, headache, and malaise developed in a traveler from Germany who had returned from a four – **week** vacation to the east coast of South Africa. She had visited friends in a rural area and had been on a safari. During the tour, she had discovered a painless lesion on her abdomen. A similar, but smaller lesion had developed on her arm. On examination, two typical eschars were found. There was no rash or regional lymphadenopathy. The patient did not recall a tick bite and no other travelers in her group were affected.

Ehrlichioses and anaplasmoses

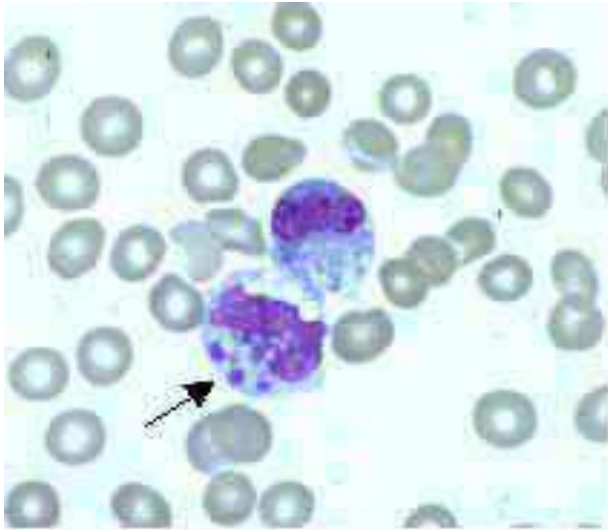
- are caused by intracellular bacteria of the family Anaplasmataceae.
- Four pathogens have been recognized in humans:



- *Neorickettsia sennetsu* (formerly *Ehrlichia sennetsu*) the agent of glandular fever reported during the 1960s in Japan
- *Ehrlichia chaffeensis* causing human monocytic ehrlichiosis
- *Ehrlichia ewingii* causing granulocytic ehrlichiosis or ewingii ehrlichiosis
- *Anaplasma phagocytophilum* causing human granulocytic anaplasmosis

Figure 2. Current phylogeny and taxonomic classification of genera in the family Anaplasmataceae. The distance bar represents substitutions per 1,000 basepairs. *E. coli*, *Escherichia coli*.

E. chaffeensis (human monocytic ehrlichiosis)



Ehrlichia chaffeensis primarily infects mononuclear leukocytes (predominantly monocytes and macrophages), but may also be seen occasionally in the granulocytes of some patients with severe disease.

(Morulae in cytoplasm of monocyte)



Lone star tick (*Amblyomma americanum*)



The disease resembles Rocky Mountain spotted fever except that the rash does not develop in most (80%) patients. In addition leukopenia is observed due to destruction of the leukocytes. Mortality is low (5%). Microscopic observation of morula in blood smears is rare and although culture is possible it is rarely attempted. Serological test are available and are the most commonly employed test. DNA probes are available and may replace serological test.

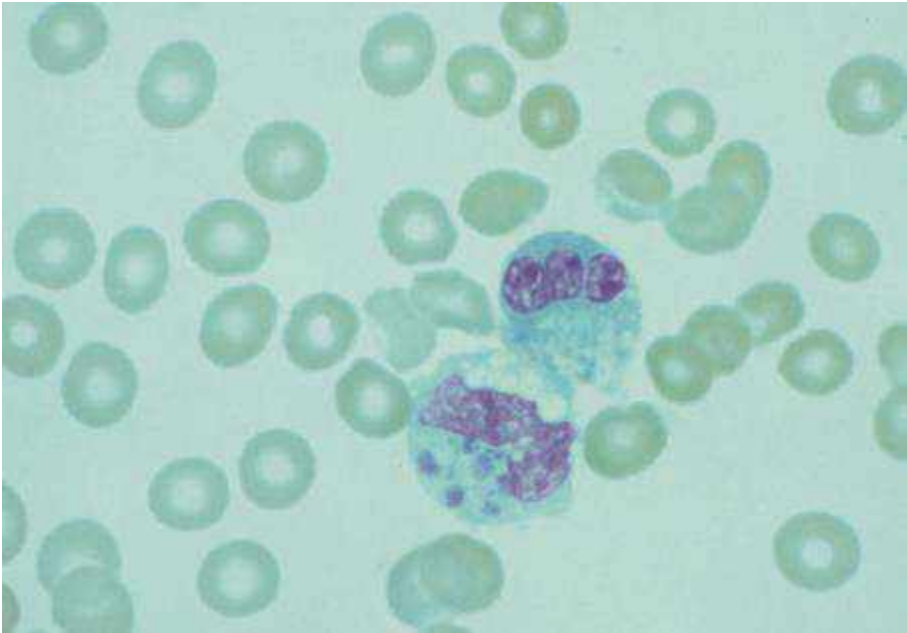
Ehrlichia chaffeensis: a Prototypical Emerging Pathogen

Christopher D. Paddock* and James E. Childs

Viral and Rickettsial Zoonoses Branch, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia

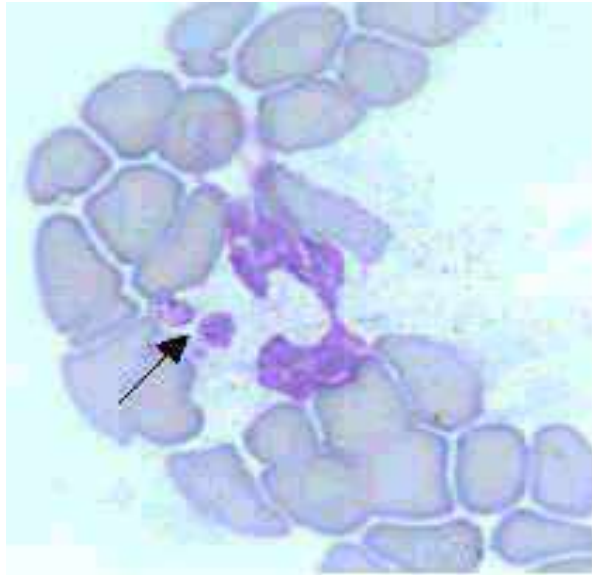
TABLE 1. Selected clinical characteristics and outcomes of ehrlichiosis for patients infected with *E. chaffeensis*, *A. phagocytophila*, or *E. ewingii*, extracted from case series and state surveillance activities

Clinical characteristic or outcome	No. of patients with positive results/no. for whom data were available (%) for:		
	HME ^a	HGE ^b	<i>E. ewingii</i> ehrlichiosis ^c
Fever	256/262 (98)	151/154 (98)	8/8 (100)
Headache	189/244 (77)	110/143 (77)	5/8 (63)
Myalgias	158/242 (65)	99/122 (81)	3/8 (37)
Vomiting	83/231 (36)	16/65 (25)	1/4 (25)
Rash	95/270 (35)	11/111 (10)	0/4 (0)
Cough	54/215 (25)	13/65 (20)	0/4 (0)
Mental-status changes	39/197 (20)	9/65 (14)	NA ^d
Hospitalization	196/306 (64)	61/128 (48)	6/8 (75)
Death	9/287 (3.1)	3/266 (1.1)	0/8 (0)



Peripheral blood smear from a patient with HME, demonstrating variably sized basophilic inclusions (morulae) within the cytoplasm of a monocyte (lower cell). Each morula consists of a cluster of *E. chaffeensis* contained with a vacuole. Modified Wright's stain. magnification, 1,000.

HGA agent (**human granulocytic anaplasomosis**)



A. phagocytophilum primarily infects granulocytes (neutrophils and rarely eosinophils).. (Morulae in cytoplasm of neutrophil)

The disease is similar to human monocytic ehrlichiosis except that mortality rates may be higher (10%) Laboratory diagnosis - Same as *E. chaffeensis*



Western blacklegged tick
(*Ixodes pacificus*)



Blacklegged tick
(*Ixodes scapularis*)

HGA in Europe



The main vector *A. phagocytophilum* is *I. ricinus*. The prevalence of *A. phagocytophilum* in ticks ranges from 0.4 to 66.7%; infection is more prevalent in adults than nymphs.



The reservoirs are small mammals as the wood mouse, the common shrew, and the bank vole. However, dogs, sheep and lambs have also been described as reservoirs.



Serosurveys for human anaplasmosis have shown that as many as 1.5–21% of tick-exposed subjects can seroconvert.



Human cases have a seasonal distribution and occur mainly during summer, when ticks are most active.

Human Granulocytic Anaplasmosis in Northeastern Italy

ANNA BELTRAME,^a MAURIZIO RUSCIO,^b ALESSANDRA ARZESE,^c
GIADA RORATO,^a CAMILLA NEGRI,^a ANGELA LONDERO,^a
MASSIMO CRAPIS,^a LUIGIA SCUDELLER,^a AND PIERLUIGI VIALE^a

nt	Sex	Age (years)	History of tick bite	Area of occasional forest visit	Clinical presentation	IgG to HGA at diagnosis	IgM to HGA at diagnosis	Seroconversion	HGA diagnosis	Co-infection
1	M	33	Yes	Trieste	Asymptomatic	128	0	No	Possible	No
2	F	69	Yes	Pontebba	Asymptomatic	64	1280	Yes	Confirmed	Lyme disease
3	F	41	Yes	Tarvisio	Fever, arthralgia, myalgia	256	0	No	Probable	Lyme disease
4	F	48	Yes	Martignacco	Erythema migrans	128	0	No	Possible	Lyme disease
5	F	17	No	Rivignano	Fever headaches Nucal rigidity Arthralgia, myalgia	128	80	Yes	Confirmed	No

In the 1-year study, 79 patients were enrolled and 30 (38%) received a diagnosis of TBD: 24 (30%) with Lyme disease and 5 (6%) with HGE. Our findings indicate the presence of HGA in northernstern Italy; so, since co-infection with Lyme disease appeared to be frequent, physicians assessing patients after a tick bite should consider HGA in the diagnosis.

Human Anaplasmosis Presenting as Atypical Pneumonitis in France

V. Remy,¹ Y. Hansmann,¹ S. De Martino,² D. Christmann,¹ and P. Brouqui³

Human anaplasmosis is a febrile illness caused by *Anaplasma phagocytophilum*, an intracellular bacterium transmitted by *Ixodes* ticks in the United States and Europe. Although cough is reported in 30% of the American cases, interstitial pneumonitis has been noted only once. Of the 9 confirmed cases reported in Europe, 3 presented with atypical pneumonitis. *A. phagocytophilum* should be added to the list of agents responsible for interstitial pneumonitis, especially in areas where human anaplasmosis is endemic.

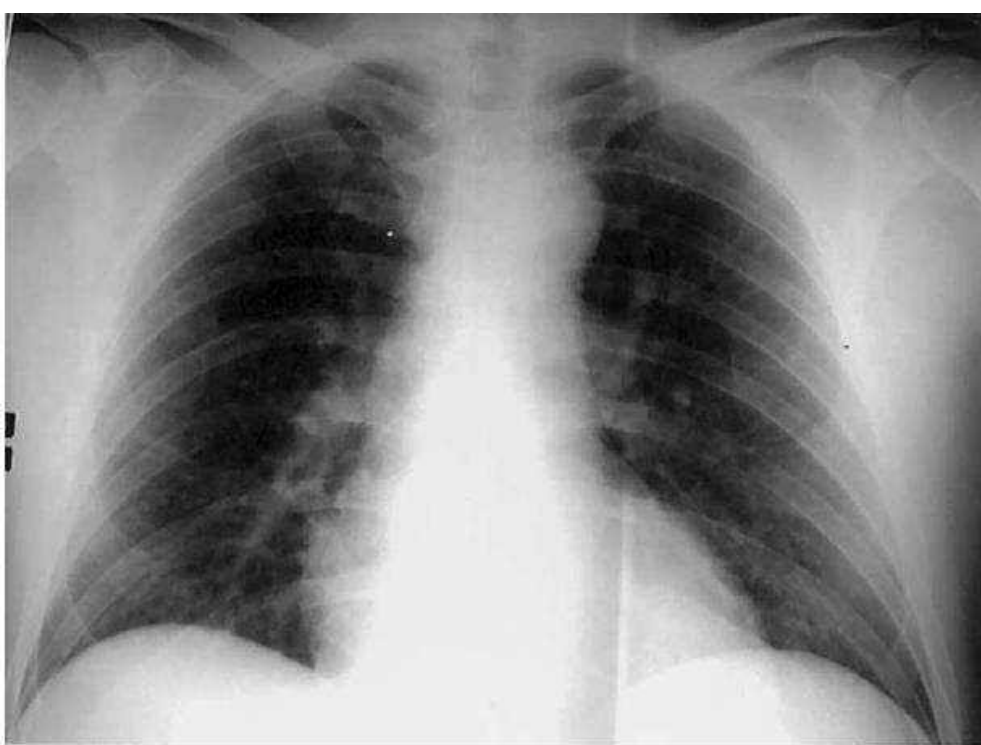
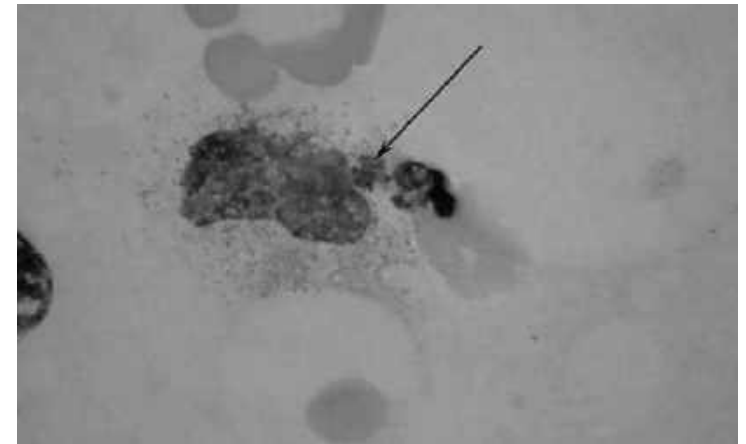


Figure 1. Chest radiograph of the patient showing interstitial pneumonitis



Giemsa-stained smears of bone marrow specimens obtained from the patient. *Arrow, Morula within an apparent metamyelocyte (original magnification, 400).*

Human granulocytic ehrlichiosis in Europe

J. R. Blanco and J. A. Oteo

Internal Medicine and Infectious Diseases Service, Hospital de La Rioja, Logroño, La Rioja, Spain

Country	Month	Age/Sex	Tick-bite/Days	Clinical findings and physical examination
Slovenia [6,24]	June	70/F	Yes/12	Fever (40 °C), headache, nausea, vomiting, malaise, myalgias, arthralgias, conjunctivitis, lymphadenopathy
Slovenia [6]	June	59/F	Yes/21	Fever (41 °C), chills, headache, vertigo, nausea, malaise, myalgias, arthralgia
Slovenia [6]	July	43/M	Yes/7	Fever (40 °C), chills, headache, vertigo, nausea, malaise, myalgias, arthralgia, cough
Slovenia [6]	August	55/F	Yes/30	Fever (39.3 °C), headache, vertigo, nausea, malaise, myalgias, arthralgia, vomiting
Slovenia [32]	August	36/M	Yes/15	Fever (39.2 °C), malaise, headache, chills, lymphadenopathy, hepatosplenomegaly
Slovenia [7]	February	11/F	Yes/9	Fever (38 °C), fatigue, headache, nausea, abdominal pain, conjunctivitis, erythematous throat
The Netherlands [25]	September	58/M	No	Fever (39.8 °C), chills, diarrhea
Spain [26]	August	19/M	Yes/15	Fever (39 °C), malaise, headache, myalgias, abdominal pain
Sweden [27]	August	5/F	NA	Fever, headache, facial palsy
Sweden [27]	October	41/M	NA	Fever, headache, dyspnea, cough, conjunctivitis, rash
Sweden [27]	August	32/F	Yes/> 30	Fever, chills, headache, stiff neck
Sweden [28]	October	41/M	No	Fever (39 °C), myalgias, headache, cough, dyspnea, conjunctivitis, rash
Poland [31]	June	40/F	No	Fever (39 °C), malaise, headache, nausea, hepatomegaly
Poland [31]	July	41/M	Yes/7	Fever (40 °C), headache, vertigo, nausea, weakness, hepatomegaly
Poland [31]	July	22/M	Yes/7	Fever (39.2 °C), headache, nausea, vomiting, abdominal pain, diarrhea, splenomegaly

Molecular Survey of *Ehrlichia canis* and *Anaplasma phagocytophilum* from Blood of Dogs in Italy

L. SOLANO-GALLEGO, M. TROTTA, L. RAZIA, T. FURLANELLO,
AND M. CALDIN

Ann. N.Y. Acad. Sci. 1078: 515–518 (2006). © 2006 New York Academy of Sciences.
doi: 10.1196/annals.1374.101

ABSTRACT: We investigated the prevalence of *Ehrlichia canis* (*E. canis*) ($n = 601$) and *Anaplasma phagocytophilum* (*A. phagocytophilum*) ($n = 460$) infection by means of real-time PCR from blood of Italian dogs. The prevalence of *E. canis* in northern, central, and southern Italy was 2.9%, 8%, and 9.7%, respectively. The prevalence of *A. phagocytophilum* was 0%.

Characterization of *Anaplasma* Infections in Sicily, Italy

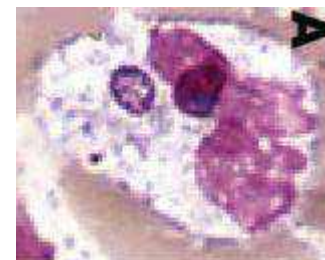
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TABLE 1. Evidence of *Anaplasma* spp. in Humans, Animals, and Ticks Sampled during 2003–2006

Sample	<i>Anaplasma</i> spp.		<i>A. marginale</i>	<i>A. ovis</i>	<i>A. platys</i>	<i>A. phagocytophilum</i>	
	Serology (MSP5 cELISA)	PCR (16S rDNA)	PCR (msp4)	PCR (msp4)	PCR (16S rDNA, groESL, gltA)	Serology (IFA)	PCR (msp4, 16S rDNA)
Horse	ND	ND	ND	ND	ND	12/154 (8)	0/111 (0)
Donkey	0/3 (0)	5/11 (45)	0/3 (0)	0/3 (0)	ND	14/74 (19)	3/76 (4)
Cattle	627/1097 (57)	141/233 (60)	89/222 (40)	0/222 (0)	ND	27/168 (16)	13/78 (17)
Sheep	151/217 (70)	70/123 (57)	0/106 (0)	7/106 (7)	ND	17/153 (11)	3/90 (3)
Goat	10/22 (45)	ND	0/16 (0)	3/16 (19)	ND	0/13 (0)	0/48 (0)
Pig	ND	1/28 (4)	ND	ND	ND	ND	ND
Dog	ND	18/372 (5)	0/344 (0)	0/344 (0)	14/344 (4)	39/87 (45)	0/344 (0)
Cat ^a	ND	1/1 (100)	0/1 (0)	0/1 (0)	ND	1/1 (100)	1/1 (100)
Roe deer ^b	ND	6/8 (75)	0/8 (0)	0/8 (0)	ND	ND	4/8 (50)
Wild boar	ND	0/9 (0)	0/9 (0)	0/9 (0)	ND	ND	0/9 (0)
Human ^a	ND	2/2 (100)	0/2 (0)	0/2 (0)	ND	1/1 (100)	2/2 (100)
Tick ^c	ND	1/1 (100)	5/89 (6)	0/89 (0)	ND	ND	1/89 (100)

Human Granulocytic Anaplasmosis and *Anaplasma phagocytophilum*

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Table. Metaanalysis of clinical manifestations and laboratory abnormalities in patients with human granulocytic anaplasmosis*

Characteristics	All			North America		Europe	
	Median %†	Mean %	n‡	Mean %	n	Mean %	n
Symptom or sign							
Fever	100	92	480	92	448	98	66
Myalgia	74	77	514	79	448	65	66
Headache	89	75	378	73	289	89	66
Malaise	93	94	90	96	271	47	15
Nausea	44	38	256	36	207	47	49
Vomiting	20	26	90	34	41	19	49
Diarrhea	13	16	90	22	41	10	49
Cough	13	19	260	22	207	10	49
Arthralgias	58	46	497	47	448	37	49
Rash	3	6	685	6	289	4	53
Stiff neck	11	18	22	22	18	0	4
Confusion	9	17	211	17	207	0	4
Laboratory abnormality							
Leukopenia	38	49	329	50	282	47	47
Thrombocytopenia	71	71	329	72	282	64	47
Elevated serum AST or ALT§	74	71	170	79	123	51	47
Elevated serum creatinine	15	43	72	49	59	0	13

Table 6 Complications reported in Europe and the USA

Europe	USA
Vertigo	Vertigo
Facial palsy	Facial palsy
Severe opportunistic and nosocomial infection	Severe opportunistic and nosocomial infection
Adult respiratory distress syndrome	Adult respiratory distress syndrome
Rhabdomyolysis	Sepsis-like syndrome with DIC
	Peripheral neuropathies
	Plexopathy
	Pancarditis
	Pericardial effusion and tamponade

Table 4 European seroprevalence in *Ixodes ricinus* ticks and human sera

Country	<i>I. ricinus</i> ticks	Human
Bulgaria [43]		9.7% ^a
Denmark [47,54]		3.8% to 21% ^a
England [15]	1.4–9%	
France [5,17]	1.25%	1.6% ^a to 17% ^b
Germany [46]		11.4% ^a to 14% ^c
Hungary [5]		12.5% ^c
Italy [10,48]	24.4%	1.5% ^b to 8.6% ^c
Norway [12,52]	6–11.5%	10.2% ^a
Scotland [8]	0.25–2%	
Slovenia [19,44]	3.2%	15.4% ^d
Spain [9,16]	0–25% of adults; 0.4–66.7% of nymphs	0% ^d to 1.9% ^d to 2.3% ^a
Sweden [20,45,53]	6.6%	8.1% ^a to 11.5% ^b
Switzerland [14,18,23,36,49]	0.4–2.1%	7.4% to 17.1% ^c
UK [50,56]		1.5% ^c to 5% ^c to 7.5% ^a
Wales [11]	7%	

^aPatients with Lyme borreliosis or neuroborreliosis.

^bPatients who live in *I. ricinus*-exposed areas.

^cTick-exposed individuals (hunters, forestry workers, farm workers).

^dHealthy individuals.

Acute anaplasmosis in humans in Cyprus

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A 27-year-old woman was admitted on 14 May 2007, into the hospital of Famagusta (Cyprus) with an 11-day fever (up to 39.5°C). She reported no direct contact with domestic animals or ticks; however, she lived in a rural area, where sheep and goats are abundant. On physical examination, hepatosplenomegaly and an enlarged lymph node were observed. Initial laboratory examination demonstrated moderate anaemia (Hb 11.5 g/dL), thrombocytopenia (PLT 95000), increased transaminases (AST 178 u/L, ALT 313 u/L), γ GT (79 u/L), LDH (698 u/L) and increased CRP (10.4 mg/L) and ESR (80 mm/h). The electrocar-



The natural history of *Anaplasma phagocytophilum*

Zerai Woldehiwet

Anaplasma phagocytophilum is the recently designated name replacing three species of granulocytic bacteria, *Ehrlichia phagocytophila*, *Ehrlichia equi* and the agent of human granulocytic ehrlichiosis, after the recent reorganization of the families *Rickettsiaceae* and *Anaplasmataceae* in the order *Rickettsiales*.

Tick-borne fever (TBF), which is caused by the prototype of *A. phagocytophilum*, was first described in 1932 in Scotland. A similar disease caused by a related granulocytic agent was first described in horses in the USA in 1969; this was followed by the description of two distinct granulocytic agents causing similar diseases in dogs in the USA in 1971 and 1982. Until the discovery of human granulocytic anaplasmosis (HGA) in the USA in 1994, these organisms were thought to be distinct species of bacteria infecting specific domestic animals and free-living reservoirs. It is now widely accepted that the agents affecting different animal hosts are variants of the same Gram-negative obligatory intracellular bacterium, which is transmitted by hard ticks belonging to the *Ixodes persulcatus* complex. One of its fascinating features is that it infects and actively grows in neutrophils by employing an array of mechanisms to subvert their bactericidal activity. It is also able to survive within an apparently immune host by employing a complex mechanism of antigenic variation. Ruminants with TBF and humans with HGA develop severe febrile reaction, bacteraemia and leukopenia due to neutropenia, lymphocytopenia and thrombocytopenia within a week of exposure to a tick bite. Because of the severe haematological disorders lasting for several days and other adverse effects on the host's immune functions, infected animals and humans are more susceptible to other infections.

Human Infection with *Ehrlichia Canis* Accompanied by Clinical Signs in Venezuela

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ABSTRACT: A total of 20 human patients with clinical signs compatible with human monocytic ehrlichiosis (HME), who were admitted to the emergency clinic in Lara State, Venezuela, were studied. Thirty percent (6/20) patients were positive for *Ehrlichia canis* 16S rRNA on gene-specific polymerase chain reaction (PCR). Compared with the U.S. strains, 16S rRNA gene sequences from all six patients had the same base mutation as the sequence of the *E. canis* Venezuelan human *Ehrlichia* (VHE) strain previously isolated from an asymptomatic human. This study is the first report of *E. canis* infection of human patients with clinical signs of HME.

RESEARCH ARTICLE

Open Access

Prevention of tick bites: an evaluation of a smartphone app



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A Molecular Survey of *Rickettsia felis* in Fleas from Cats and Dogs in Sicily (Southern Italy)

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- *Rickettsia felis*, the agent of flea-borne spotted fever, has a cosmopolitan distribution. Its pathogenic role in humans has been demonstrated through molecular and serologic tests in several cases. The cat flea (*Ctenocephalides felis*) is considered the main reservoir and the biological vector. The aim of this study was to assess the presence and occurrence of *R. felis* in fleas collected from dogs and cats in various sites of Palermo (Sicily). Between August and October 2012, 134 fleas were collected from 42 animals: 37 fleas from 13 dogs and 97 fleas from 29 cats. Two species of fleas were identified: 132 *Ctenocephalides felis* (98.51%) collected on all animals and only two *C. canis* (1.49%) on one dog. Out of 132 *C. felis*, 34 (25.76%), 12 from dogs (32.43%) and 22 (22.68%) from cats, were positive for *R. felis* DNA by a polymerase chain reaction (PCR), confirmed by sequencing. The only two *C. canis* fleas were negative. About half of examined animals (47.62%, 20/42) were infested with at least one infected flea; in particular 46.15% of dogs (6/13) and 48.28% of cats (14/29). It seems that in the Palermo district there is a peri-domestic cycle, with a relatively high prevalence of *R. felis* infection in the cat flea, an insect widely diffused in home environments and which can frequently bite humans. The results also suggest that *R. felis* should be considered in the human differential diagnosis of any spotted-like fever or febrile illness without a clear source of infection in Sicily, especially if the patient is known to have been exposed to flea bites.