



Risk factors for Lyme borreliosis: a German case-control study May-Dec. 1999

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Lyme borreliosis

- Most frequent tick-borne disease in Europe
- *Borrelia burgdorferi*:
 - *B. burgdorferi sensu stricto*, *B. garinii*, *B. afzelii*
- Chronic disease possible
- Erythema migrans (EM):
 - Acute infection
 - Pathognomonic





Study background

- Most studies from the USA
 - Only one of three *B. burgdorferi* species
 - Other ticks
 - In the study area (Landkreis Oder-Spree, LOS)
 - Lyme borreliosis notifiable since 1996
 - 10-50/100000 in surrounding districts
 - 48/100000 in LOS
- => Case-control study for risks of Lyme borreliosis in this area





Methods: Case-control study

- Cases
 - Patients with erythema migrans ≥ 5 cm
 - Notified between May-Dec. 99
 - Living in study area
 - Written consent
- Controls
 - Enrolled by random digit dialling
 - Person with the next birthday in the family
 - No reported EM in 99
 - Living in study area
 - Oral consent





Methods: Case-control study

- Standard telephone interviews
 - Household environment
 - Leisure activities
 - Work exposure
 - Pets
- Exposure in a 4-week interval
 - Cases: 4 weeks before EM
 - Controls: 4 weeks before interview





Methods:

Prevalence of *Borrelia* in ticks

- 969 ticks from 4 different locations within the area were collected
- 455 from 3 locations tested with immunofluorescence test (IFT) for *Borrelia burgdorferi*
- 514 from 4 locations tested with polymerase chain reaction (PCR)





Results: included cases/controls

Case recruitment

EM patients between May and Dec. 1999	63
▶ No consent for the interview	13
▶ Not reached by phone	2
Cases included	48

Control recruitment

Interviewed	148
▶ With EM lesion 1999	2
▶ Not living in LOS	2
▶ Interviewed in November	26
Controls included	118





Results:case-control

	Cases (n=48)	Controls (n=118)	OR	CI95%
Age>50 years	29	48	2.2	1.1 –4.7
Visited garden close to wood	31	54	2.2	1.1-4.6
Weeding	34	62	2.2	1.0-4.8
Deers at/in the garden	13	15	2.6	1.0-6.4
Skin contact with bushes in nature	18	34	1.9	0.9-4.2
Skin contact with bushes in garden	27	49	1.8	0.9-3.8
Dog or cat	24	66	0.8	0.4-1.6
Pets with tick	16	20	2.5	1.1-5.7





Results:case-control

Multiple regression model

- Garden close to wood aOR* 4.3 (1.3-12.0)
- Skin contact with bushes in nature aOR 3.6 (1.5-9.0)
- Age>50 years aOR 3.3 (1.5-7.4)
- Pets with ticks aOR 1.5 (0.6-3.6)

* adjusted OR





Results:case-control

Preventive measures

Always	Cases	Controls
Wearing long trousers when outside	50%	47%
Wearing light coloured cloth	13%	17%
Never		
Tucking trousers in socks when outside	88%	90%
Using repellent	81%	80%
Checking for ticks	54%	70%





Prevalence of *Borrelia burgdorferi* s.l. in ticks

- IFT:
 - 22% (100/455) of the ticks were positive for *Borrelia*
 - No difference in the 3 locations
- PCR:
 - 12% (62/514) of the ticks were positive for *Borrelia*
 - Prevalence differed from 2 to 23% between areas





Summary

- Risk factors were
 - Age >50 years
 - Visiting garden close to the woods
 - Skin contact with bushes or grass in nature
- Preventive measures were not done routinely by cases and controls
- Prevalence of *Borrelia burgdorferi* in the ticks varied from 12 to 23% depending on laboratory method





Recommendations

- Inform public about risks for Lyme borreliosis
 - Garden (especially close to the woods)
 - Skin contact with bushes
- Teach about preventive measures
- Need to further standardize laboratory methods





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Results:case-control

Skin contact with bushes or grass in nature

times	cases	controls	OR	P-value*
0	23	81	Ref	
1-14	12	27	1.6	
> 14	6	7	3.1	0.05

stratified

Not visited a garden close to woods

0	7	47	Ref	
1-14	4	15	1.8	
> 14	4	2	13.4	0.005

Visited a garden in close to woods

0	16	34	Ref	
1-14	8	12	1.4	
> 14	2	5	0.9	0.8

* Chi square for trend

