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Leptospirosis report 2005: New Caledonia

Introduction

Leptospirosis is one of New Caledonia's major infectious diseases. Against the background of a year-round endemicity, outbreaks usually occur during the warmer and wetter months. Cases of human infection are routinely recorded in west coast cattle farming areas and rural Melanesian settings (tribal-style habitations).

The New Caledonia Pasteur Institute (*Institut Pasteur de Nouvelle-Calédonie* – IPNC) handles all locally prescribed testing for the biological diagnosis of leptospirosis. This situation gives the testing results clear epidemiological value.

Rainfall figures in 2005 were below the usual average, which probably explains why the number of diagnosed cases, while significantly higher than in 2004 (40 cases as against 13), remained low. At the same time, the laboratory was approached all year round to test specimens from the surrounding region (Wallis and Futuna, French Polynesia, Fiji, Tonga, Federated States of Micronesia and Vanuatu) and in this way took part in outbreak confirmation in these countries.

1 – Diagnostic strategy

Diagnostic parameters

The main assay for leptospirosis diagnosis is the microscopic agglutination test (MAT, after Martin and Pettit), based on the agglutination of living suspensions of Leptospira by the serum to be tested. This process detects total antibodies and turns positive 10–12 days after the onset of the disease. The response is serovar-specific and requires the use of a representative set of the Leptospira strains described in New Caledonia (at present, 10 antigens are selected). When necessary, in particular for regional studies, the complete panel (23 antigens) is used. While the principle involved is simple, MAT is still an unstandardised technique that is challenging to maintain and calls for sound experience on the part of technicians. To guarantee the quality of the test, IPNC has for the past three years taken part in international quality control programmes (Royal College of Pathologists of Australasia and the National Reference Laboratory in Melbourne).

Whenever possible, a pair of samples – early and late – is requested to study the development of agglutinating titres and, in most cases, to determine the serovar concerned.

On the early specimens (Day 1 to Day 6 from symptom emergence), the laboratory can reveal bacterial DNA by a molecular biology technique (PCR). This assay gives a quick result and can now totally replace bacteriological culture for testing early samples. Since 2004, IPNC has been using a locally developed technique of real-time gene amplification, involving the SYBR-Green technology on LightCycler (Roche Diagnostics). This protocol was validated and published in 2005 *(FEMS Microbiology Letters*, 2005, 249: 139–147). The current procedure delivers a result in less than two hours, with greater automatisation and the opportunity to quantify the bacterial load.

Interpretation

Probable case: Patient presenting an MAT titre over 1/400th for a pathogenic serovar from a single specimen. Even if epidemiological or clinical arguments strengthen the presumed diagnosis, this kind of result may correspond to the immunological scar from a previous leptospirosis infection.

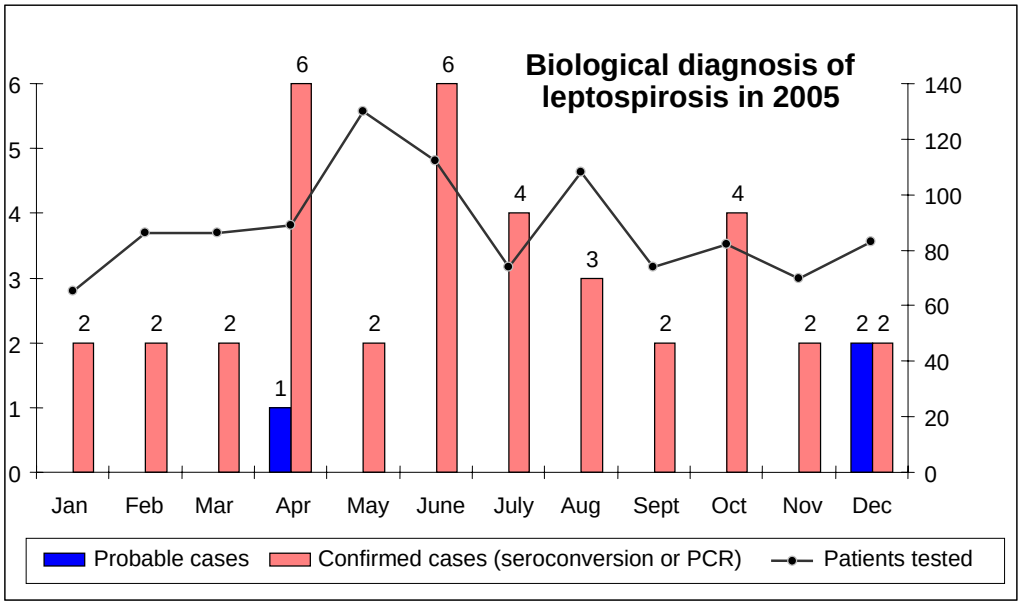
Confirmed case: Detection of the bacterium (culture) or its genome (PCR) from an early specimen or by a clear variation in the MAT titre from two specimens taken one after the other – true seroconversion (shift from a titre agglutinating at 0 to at least 1/400th) or 'seroascension' (variation by a factor of 4 between the two tests of the agglutinating titre for a pathogenic serovar).

2 – Activity in 2005: results for New Caledonia

Activity and number of cases in 2005

Number of specimens tested		1059
Patients testing positive for leptospirosis	Confirmed cases	37 (9 by seroconversion or 'seroascension', 28 by PCR)
	Probable cases	3
	Total	**40**

Changes over the year



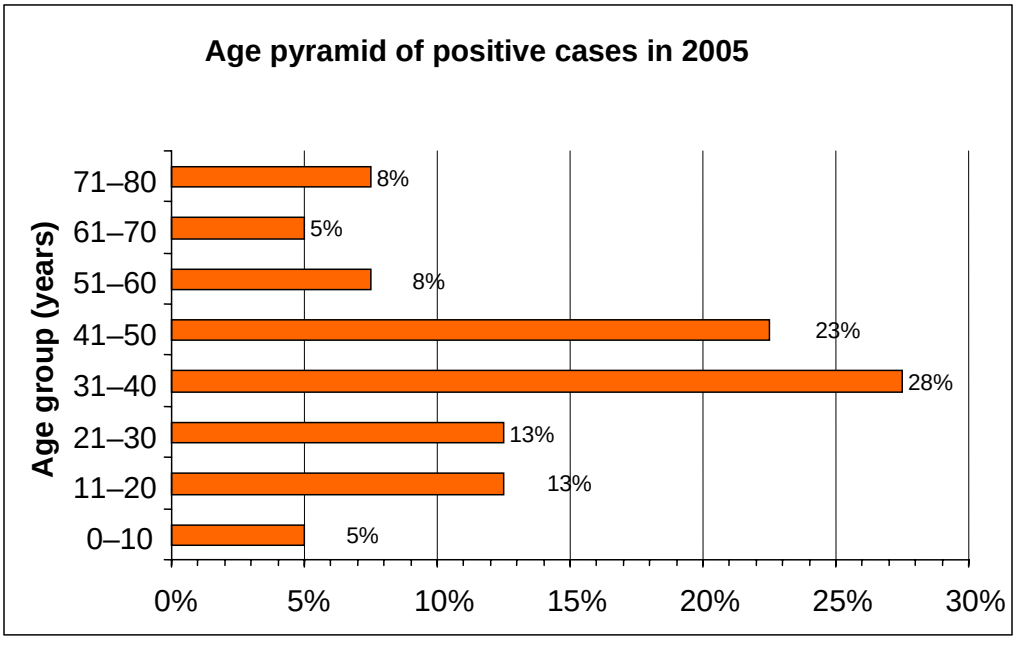
In 2005 the peak that usually occurs during the hot season was not evident. This trend probably reflects the absence of a clear outbreak; instead, case recruitment was on a sporadic basis, which supplied the underlying leptospirosis endemic pattern in New Caledonia. The total number of cases recorded remained low but still showed a clear increase over 2004.

Demographic data on positive patients

Geographic origin (commune of residence)	Number of cases	%	Geographic origin (commune of residence)	Number of cases	%
Bourail	6	15%	Canala	3	8%
Boulouparis	1	3%	Hienghene	2	5%
La Foa	1	3%	Houailou	5	13%
Mont-Dore	2	5%	Kouaoua	1	3%
Nouméa	9	23%	Poindimié	1	3%
Païta	2	5%	Ponheriouen	2	5%
Vao Ile des Pins	1	3%	Touho	1	3%
Total Province Sud	**22**	**55%**	Voh	1	3%
Tadine	1	3%	**Total Province Nord**	**16**	**40%**
We	1	3%	**Total**	**40**	**100%**
Total Province des Îles	**2**	**5%**			

Although the number of cases detected was too low to be deemed representative, this case location pattern suggests widespread leptospirosis distribution in the three provinces of New Caledonia.

A clear majority of patients were male: 31 out of 40, or 77% of positives. The mean age was 37.9 years (low and high ends: 5 to 74). The age-group distribution of patients was as follows.



Clinical and epidemiological data

The following tables were prepared on the basis of the patient records accompanying 189 test requests (including 20 confirmed or probable cases out of the 40 recorded in 2005).

Epidemiological context:

	Confirmed/probable cases		Unconfirmed cases	
	20	100%	169	100%
Environmental contamination				
Swimming	6	30%	52	31%
Hunting	5	**25%**	16	9%
Fishing	6	**30%**	22	13%
Contact with animals				
Cattle	9	**45%**	24	14%
Deer	1	5%	10	6%
Horses	7	**35%**	20	12%
Dogs	9	45%	79	47%
Pigs	4	20%	24	14%
Rats	10	**50%**	48	28%

Hunting and freshwater fishing and contact with livestock and rats are the exposure factors regularly encountered.

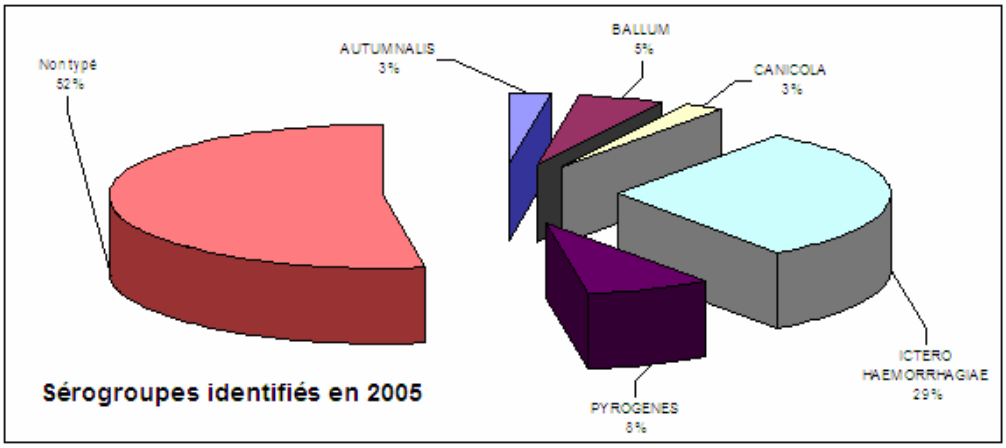
Clinical context:

Symptom	Confirmed/probable cases			Unconfirmed cases			p
	Number investigated	Symptom present		Number investigated	Symptom present		
Headache	18	13	**72%**	141	111	79%	0,35
Myalgia	19	18	**95%**	135	106	79%	0,08
Haemorrhage	15	6	40%	102	11	11%	**<0,01**
Jaundice	17	13	**76%**	112	39	35%	**<0,01**
Conjunctival suffusion	19	11	58%	100	38	38%	0,1
Pulmonary syndrome	12	3	25%	83	19	23%	0,8
Meningeal syndrome	16	0	0%	86	7	8%	0,56
Cardiac syndrome	16	4	25%	87	7	8%	0,07
Renal syndrome	17	10	59%	86	24	28%	0,03

The patient recruitment symptoms are headaches, myalgia and jaundice; the most specific are haemorrhagic events and jaundice.

Identifiable serogroups in positive cases (19 out of 40)

The serogroup is identified on an assumption basis by the antigen giving the highest titre in the serological microscopic agglutination reaction.



[Serogroups identified in 2005]

In 2005 a measure of diversity was noted in the strains identified, in particular the minor contribution from serogroup *Icterohaemorrhagiae*, which usually predominates. Also noteworthy was the lack of visible circulation of the serogroup *Australis*, which seemed to be emerging in New Caledonia in the recent past.

Conclusion

With more than 1000 patients investigated, 2005 was characterised by a moderate level of laboratory activity that was nevertheless intense enough to enable a realistic description of leptospirosis in New Caledonia. Since 2000, a clear drop in the number of cases diagnosed has been evident. This trend is partly influenced by the prevailing weather conditions, but may also reflect a genuine dawning awareness in the community about the seriousness of this disease and its prevention. Leptospirosis has for some time been a disease people talk about in New Caledonia, through messages and campaigns from the various health authorities but also in the media. At the same time, regional activity has been kept up, principally as part of IPNC's involvement in PPHSN.

In 2006, other international initiatives are planned in the area of biological diagnosis of leptospirosis, in particular as part of a coordinated activity between Pasteur Institutes (ACIP) involving the Cambodia Pasteur Institute, and through a regional training session on leptospires at IPNC (see article in this issue).

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