

REVISITING KEY WEST SCUBA DISEASE

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“Scuba Disease” which was prevalent between 1955 and 1959 in the U.S. Navy Diving Operations in Key West was shown to be due to contaminated Scuba hoses and regulators. This health hazard was attributed to the aspiration of Gram-negative organisms, especially *Pseudomonas*.

Bradley and Bornmann¹ compared Scuba Disease with Salt Water Aspiration Syndrome described by Edmonds². Both conditions have symptoms resembling a flu-like illness, viz. chills, anorexia, nausea, malaise, headache, aches and coughs. However, Bradley and Bornmann indicated three major differences between the two conditions:

elbows and back, which were shifting in nature. He also experienced headache, nausea and a feeling of faintness, as well as hot and cold sensations. There was pleuritic chest pain, marked dyspnoea, aggravated by even the mildest exertion. The shortness of breath continued to worsen, he had to stop on two occasions whilst cleaning his teeth. That evening, some 24 hours after the dive, he was awoken by dyspnoea, whence he started coughing which was dry and nonproductive initially. In the ensuing few days, the coughing became productive of mucoid sputum. Two other divers who used the same equipment had similar symptoms, but these were much milder and without the respiratory component. Because they were at sea, the diver only consulted the local hospital 7 days after his dive.

At the local hospital, there were no significant clinical findings apart from his obvious shortness of breath. The chest x-ray showed a diffuse, granular picture. Due to the

Table 1

Legionella Pneumophilia	Gp.1	Gp.2	Gp.3	Gp.4	Gp.5	Gp.6
Total Globulin						
Day 7	Neg	Neg	Neg	Neg	Neg	Neg
Day 9	64	—	128	—	—	—
Day 31	512	—	512	64	—	128

- Length of the prodromal period (two hours for salt water aspiration versus 24 hours for scuba disease);
- Less incidence of dyspnoea and production of sputum in scuba disease;
- Length of illness (6-24 hours for salt water aspiration versus 24-72 hours for scuba disease).

Furthermore, Edmonds² indicated that Salt Water Aspiration Syndrome was more common in the colder months. Bradley and Bornmann¹ deemed Salt Water Aspiration Syndrome a form of Scuba Disease.

Case Report

A 30 year old diver was diving using hookah equipment in the north west of Western Australia. Some 12 hours after his last dive, he developed aches and pains in his knees,

lack of laboratory facilities to perform more sophisticated investigations, the patient was transferred to a metropolitan teaching hospital.

Further enquiries revealed that the patient smoked 60 cigarettes per day; his father developed asthma late in life.

Clinical examination showed a suntanned, fit looking male with fast, shallow respiration, at a rate of 28 per minute. There were bilateral inspiratory basal crepitations. Other systems were essentially normal. Arterial blood gases on air showed a PO_2 83, PCO_2 39. Respiratory function tests showed a low FEV_1 3.291 (4.28 ± 0.55), normal FVC 5.47 (5.47 ± 0.74), low FEV_1/FVC 60.1% and MMFR 1.94 l/s (4.48 ± 1.12). Lung volumes were essentially normal, however, the Diffusing Capacity near TLC was 19.5 (34.9 ± 5.1) D_{LCO} ml/min/mm.Hg. Histamine Provocation Test showed a PC_{20} greater than 16 mg/ml, indicating a normal nonspecific bronchial reactivity. The tests showed a moder-

ate airflow limitation, but not characteristic of currently symptomatic asthma. The diffusing capacity was suggestive of an interstitial lung disease. Arterial Blood Gases repeated 15 hours later showed a PO_2 110 and PCO_2 28. The $P(A-a)DO_2$ was within the normal range.

There was a leucocytosis with a count of 15,000 and ESR 31. Extensive studies of fungal, viral and bacteriological examination were normal. The diving equipment was examined but no abnormality was detected. Immunoglobulins were also normal.

With bed rest, he improved with no treatment, albeit marked lethargy was present for over 2 weeks.

Seventeen days after the onset of symptoms, leucocytosis peaked at 23,000, ESR had fallen to five. However, serological examination for legionella showed:

Results are expressed as the reciprocal of the titre or as 'neg' when the titre is less than 64. A fourfold rise in titre provides evidence of recent infection.

Seventeen days after the dive, his chest x-ray was clear, the respiratory function tests were essentially normal, although there was still a slight reduction of the diffusion capacity at 27.3. White cell count dropped to 14,000 by the 23rd day. Repeat respiratory function tests done on day 31 were normal.

Discussion

The case presented shared many of the symptoms and signs of Scuba Disease and of Salt Water Aspiration Syndrome. It was unfortunate that the patient did not present to hospital until six days after his last dive and that the other divers did not attend the hospital at all.

Beaty and Pasculle³ in their discussion on Legionella infections pointed out that cigarette smokers are more susceptible to infection. Symptoms of malaise, headache, fever and shaking chills are common. An early nonproductive cough which progresses in severity occurs and usually becomes productive of mucoid to mucopurulent sputum. Other symptoms include dyspnoea, pleuritic chest pain and myalgia. Gastrointestinal symptoms are present in about 25% of patients. Tachypnoea and tachycardia are also common. The disease becomes worse during the first four to six days and another four to five days may pass before dramatic clinical improvements begin. Many patients experience weakness and early fatigability for weeks after the acute stages of the illness. Laboratory findings show an elevated ESR and leucocytosis greater than 20,000. Abnormal renal and liver function tests have also been reported. Chest x-ray shows parenchymal infiltrates in about 65% of the cases. A firm diagnosis is made by the demonstration of legionellae in the respiratory secretions by either culture or immunofluorescent straining.

The patient, a heavy smoker, had all the symptoms described. In common with Salt Water Aspiration Syndrome, he had a fall in FEV_1 and in P_aO_2 ; the $P(A-a)DO_2$ gradient was normal, however. A low diffusing capacity suggestive of interstitial lung disease was present. It was unfortunate that no respiratory function tests were obtained for the patients with Scuba Disease.

Edmonds¹ stated that in the differential diagnosis of Salt Water Aspiration Syndrome, one must consider the possibility of other occupational diseases of divers, e.g. Decompression Sickness, Pulmonary Barotrauma and Scuba Disease. One should bear in mind also the other causes of pneumonitis such as chemical or hypersensitivity.

Legionella pneumophila, a gram-negative bacterium was unknown until the outbreak of a severe respiratory illness in Philadelphia in July of 1976.

Retrospective studies using serologic techniques traced the earliest outbreak of Legionnaires Disease to 1957 among employees of a meat packing plant in Austin, Minnesota.

Key West Scuba Disease was shown to be due to pseudomonas infections, also gram-negative bacteria. Could some of the victims of Key West Scuba Disease be due to infection by Legionella pneumophila?

Summary

A case history is presented of a diver using hookah equipment in the subtropical climate of the Northwest of Western Australia. The symptoms, signs and laboratory findings were similar to those of Scuba Disease and of Salt Water Aspiration Syndrome. Pseudomonas was not isolated from this patient. A diagnosis of Legionella pneumophila infection was made.

REFERENCES

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