Problems with the nomenclature of Charcot's osteoarthropathy

Ali Foster

ARTICLE POINTS

1 There is no consensus on the most appropriate name for Charcot's osteoarthropathy.

2 Charcot's osteoarthropathy is a complication of diabetic neuropathy and some other neurological conditions.

3 Imprecise description is unacceptable in diagnosis or treatment, and it should not be acceptable in the nomenclature of the Charcot foot.

4 If the term 'Charcot's osteoarthropathy' could be generally adopted, it would put an end to decades of confusion.

KEY WORDS
- **Charcot's osteoarthropathy**
- **Confused nomenclature**
- **Accurate classification**
- **Universal terminology**

Ali Foster is Honorary Consultant Podiatrist at the Diabetic Foot Clinic, King's College Hospital, London.

Introduction

Charcot's osteoarthropathy is a complication of diabetic neuropathy and some other neurological conditions. Scientific nomenclature should be accurate and specific. However, when describing Charcot's osteoarthropathy up until now, names have been chosen with lack of precision, extraordinary pedantry and frank inaccuracy. If there is confusion over the name of the condition, there is a consequent risk of confusion over diagnosis and treatment, which may be reflected in the alarming morbidity associated with this condition. Here, the author argues that if the term Charcot's osteoarthropathy could be generally adopted, it would put an end to decades of confusion.

There is no consensus on the correct name for Charcot's osteoarthropathy, which can lead to imprecise diagnosis and management. This can adversely affect outcomes in patients with diabetic foot problems.

Early descriptions of Charcot's osteoarthropathy

Charcot's osteoarthropathy is a complication of diabetic neuropathy and some other neurological conditions (*Table 1*).

William Musgrave, writing in *Antiquitates Britanno–Belgicae* (1748), described cases of neuropathic arthritis and emphasised the need to recognise that arthritis could be secondary to other diseases (Kelly, 1963). In 1831, JK Mitchell of Philadelphia wrote about 12 cases of joint afflictions (arthritis) in patients with lesions of the spinal cord (Mitchell, 1831).

The eminent 19th Century neurophysiologist Professor Jean-Martin Charcot (1868a; 1868b) described a progressive, destructive arthropathy in a group of his patients with neurosyphilis (tabes dorsalis) at La Salpêtrière Hospital in Paris, but Charcot himself acknowledged that Mitchell's was the earlier report. However, in 1882, the *Rapport du Congrès*, published in London, first named these distinct pathological changes as 'Charcot's joint' (MacCormac and Klockmann, 1881):

Table 1. Diseases associated with Charcot's osteoarthropathy.

- Syphilis (tabes dorsalis)
- Leprosy (Hansen's disease)*
- Diabetes**
- Spina bifida
- Congenital insensitivity to pain
- CHO neuropathy (alcohol abuse)
- Syringomyelia
- Meningomyelocele
- Cerebral palsy
- Spinal cord injury
- Spinal cord compression
- Peripheral nerve injuries

*In areas where Hansen's disease is endemic, leprosy is the most common cause of Charcot joint. The second most common cause is alcohol abuse.

**Patients with diabetes and end-stage renal disease treated with renal transplant have an increased incidence of Charcot's osteoarthropathy.

PAGE POINT

1 Charcot had a remarkable and admirable ability to see what was new and what was logically linked, and his name is associated with many other medical conditions.

'These bone changes constitute a distinct pathological entity. They deserve the name of "Charcot's joint".'

Charcot had a remarkable and admirable ability to see what was new and what was logically linked, and his name is associated with many other medical conditions (*Table* 2). In 1936, William Reilly Jordan made the first report of Charcot's osteoarthropathy in a patient with diabetes (Jordan, 1936).

Table 2. Other diseases, syndromes and eponyms associated with Professor Jean-Martin Charcot.

Charcot's disease	A rare disease of the nervous system with degeneration of the nerves conducting signals to muscles
Charcot's oedema	Local, painful oedema with bluish appearance of the extremities associated with hysterical paralysis
Charcot's fever	Intermittent fever caused by cholangitis and biliary obstruction (impacted gallstones); often associated with jaundice and abdominal discomfort
Charcot's syndrome I	Intermittent gait disturbance caused by obliterating angiopathy with reduced circulation of blood in the musculature of the legs
Charcot's triad I	The combination of nystagmus, intention tremor and scanning speech
Charcot's triad II	Combination of jaundice and fever, usually with rigor and upper-quadrant abdominal pain
Charcot's vertigo	Cough syncope; a rare condition in which vertigo or syncope, caused by an attack of coughing, results in laryngeal spasm or closure of the glottis
Charcot's zones	Hysterogenic zones
Charcot–Bouchard aneurysm	Microaneurysm on small cerebral vessels that may cause intracranial bleeding
Charcot–Leyden crystals	Colourless, hexagonal, double-pointed and often needle-like phosphate crystals found in the sputum of patients with bronchial asthma or in the faeces of patients with amoebic and ulcerative colitis
Charcot–Marie-tooth disease	A syndrome characterised by slow, progressive wasting and weakness of the distal muscles of the arms and feet; the commonest disease within a group of conditions called hereditary motor and sensory neuropathies
Charcot–Neumann crystals	Phosphate crystals observed in semen
Charcot–Weiss–Baker syndrome	Transient attacks of syncope with marked slowing in heart rate, lowering of blood pressure and loss of consciousness
Charcot–Wilbrand syndrome	Neuro-ophthalmic syndrome consisting of visual agnosia (agraphia) and inability to revisualise images
Erb–Charcot paralysis	Spinal syphilis with paraesthesia, spastic weakness and tiredness of the legs associated with pain, sphincter disorders, exaggerated deep reflexes, muscle atrophy, sensory disorders and paraplegia
Souques–Charcot geroderma	A variant of Hutchinson–Gilford disease, consisting of loose, shiny, dry skin, subcutaneous atrophy, eunuchoid habitus and intellectual deficit

PAGE POINTS

1 Although over 200 papers and numerous book chapters have been devoted to Charcot's osteoarthropathy, there is no consensus on what is the most appropriate or correct name.

2 Many authors have allocated different names to Charcot's osteoarthropathy in articles authored or co-authored by them over a period of time.

3 Clinicians managing Charcot's osteoarthropathy need to know the name of the disease, the stage, the site affected, the type and degree of residual deformity after the acute stage has resolved, and the presence of ulceration, infection or instability of a joint.

Confused nomenclature and lack of consensus

Although over 200 papers and numerous book chapters have been devoted to Charcot's osteoarthropathy – and in spite of the different stages of the condition having been described in considerable detail by Harris and Brand (1966), Lennox (1974), Horibe et al (1988), Sanders and Frykberg (1991), Barjon (1993), Brodsky and Rouse (1993), Johnson (1995) and Dounis (1997) – there is no consensus as to what is the most appropriate or correct name (*Table 3*). In a review of Charcot's osteoarthropathy by Solomon Tesfaye's group (Rajbhandari et al, 2002), 39 names were used to describe Charcot's osteoarthropathy in the references cited (*Table 4*).

Furthermore, many authors have allocated different names to Charcot's osteoarthropathy in articles authored or co-authored by them over a period of time. There is no consensus and much confusion.

Discussion

For practical purposes, clinicians managing Charcot's osteoarthropathy need to know:

Table 3. Inaccuracies, undesirable features and lack of specificity in names previously chosen to describe Charcot's osteoarthropathy (see *Table 4*).

- No mention of osteopathy
- No mention of arthropathy
- No mention of Charcot
- Tautologous (e.g. joint + arthropathy)
- Not logically sound (e.g. all patients with profound diabetic peripheral neuropathy have neuropathic joints but they do not all have Charcot's osteoarthropathy)
- Unnecessarily repetitious (e.g. including 'neuro-' and 'Charcot' when all the joints described by Charcot were in patients with neuropathy)

- the name of the disease
- the stage (acute, bony destruction, resolving or resolved)
- the site affected (in patients with diabetes this will usually be forefoot, midfoot, hindfoot, ankle or, rarely, the knee)
- the type and degree of residual deformity (rocker bottom, medial convexity) after the acute stage has resolved
- the presence of ulceration, infection or instability of a joint.

The name of the condition alone is not enough to guide treatment and predict outcomes.

However, Newman (1987) wrote of Charcot's osteoarthropathy:

'the terminology has become confusing.'

There is no consensus on the most appropriate name for Charcot's osteoarthropathy. The *International Consensus on the Diabetic Foot* (International Working Group on the Diabetic Foot, 1999) suggested the rather unwieldy name of 'neuro-osteoarthropathy (Charcot-foot)', but this name has not been adopted.

It is always desirable to use language to order concepts in a way that is logically sound, elegant and well suited for potential users of the description. Some names are steeped in history: 'diabetes mellitus', the 'honey siphon' of the ancient Greeks, for instance, describes some of the symptoms of untreated diabetes very well, so there is a good reason for preserving it.

Scientific nomenclature should be accurate and specific. Up until now, however, when describing Charcot's osteoarthropathy, names have been chosen with a lack of precision, extraordinary pedantry and frank inaccuracy. In some cases, the desire to cover all possible eventualities has resulted in a 'scattergun' approach, with every possible descriptive term appended together with afterthoughts in brackets.

Few would deny that Professor Jean-Martin Charcot was both deserving of

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1 Charcot's osteoarthropathy is not just an arthropathy; it can also affect bone alone, so it is properly described as an osteoarthropathy.

2 Although Charcot described many other diseases and syndromes, he did not describe any other bone and joint condition, so there is no possibility of confusion when we refer to Charcot's osteoarthropathy.

Table 4. Names used by previous authors to describe Charcot's osteoarthropathy.

Arthropathy associated with neurological disorders
Bone disease Charcot neuropathy
Charcot arthropathy
Charcot's arthropathy
Charcot's diabetic neuroarthropathy
Charcot's disease
Charcot foot
Charcot foot deformity
Charcot foot osteoarthropathy
Charcot joint
Charcot joint disease
Charcot's joint
Charcot neuroarthropathy
Charcot neuroarthropathy joint
Charcot's neuroarthropathy
Charcot's neurogenic osteoarthropathy
Charcot's osteoarthropathy
Diabetic Charcot foot
Diabetic Charcot neuroarthropathy
Diabetic Charcot's arthropathy
Diabetic neuropathic arthropathy
Diabetic neuropathic osteoarthropathy
Diabetic osteoarthropathy
Neuroarthropathy
Neuroarthropathy (Charcot joint)
Neuroarthropathy (Charcot's joint)
Neuroarthropathy/Charcot joint
Neuropathic affection of the joint
Neuropathic arthritis
Neuropathic arthropathy
Neuropathic (Charcot) arthropathy
Neuropathic bone and joint disease
Neuropathic foot and ankle
Neuropathic (Charcot) foot deformity
Neuropathic joint
Neuropathic joint disease (Charcot's joint)
Neuropathic osteoarthropathy
Neurotrophic arthropathy
Neurotrophic foot

honour and possessed of a beguiling name, as reflected by the fact that there are at least 14 medical eponyms associated with this great physician.

If the first describer of a disease is the one to be honoured, the disease should be called 'Musgrave's' or 'Mitchell's' osteoarthropathy. If we want a specific name for Charcot's osteoarthropathy in diabetes, the disease should be 'Jordan's' osteoarthropathy. However, once a name has become firmly associated with a condition it is hard to change it, so it seems that potential claimants such as Musgrave, Mitchell and Jordan had better bow down to Charcot.

Regarding precise semantics, Charcot's osteoarthropathy is not just an arthropathy; it can also affect bone alone, so it is properly described as an osteoarthropathy. In the early stages it may be hard to tell whether an initial osteopathy will progress to an arthropathy. Some radiologists, therefore, describe it as an osteopathy. However, since it is usually more than just osteopathy, affecting joints as well as bones, arthropathy should be included in the name.

Although Charcot described many other diseases and syndromes (*Table 2*), he did not describe any other bone and joint condition, so there is no possibility of confusion when we refer to Charcot's osteoarthropathy. However, we should not just call Charcot's osteoarthropathy 'the Charcot foot'.

Conclusion

Imprecise description is unacceptable in diagnosis or treatment, and it should not be acceptable in the nomenclature of Charcot's osteoarthropathy. Many clinicians may be reading or writing about Charcot's osteoarthropathy in a language that is not their own first language. If there is confusion over the name of the condition, there is a consequent risk of confusion over diagnosis and treatment, which may be reflected in the alarming morbidity associated with this condition (Jeffcoate, 2005).

The author has no doubt that Charcot's osteoarthropathy is the most

'The author has no doubt that Charcot's osteoarthropathy is the most appropriate name, and justly honours a great neurophysiologist and acute observer.'

appropriate name, and justly honours a great neurophysiologist and acute observer. If this nomenclature could be generally adopted, it would put an end to decades of confusion. ■

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SB Communications Group,
15 Mandeville Courtyard,
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