

Charcot neuroarthropathy
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How prevalent are Charcot feet?

- The average general practitioner might see one Charcot patient in a lifetime
- Community podiatrists perhaps one or two

Specialist centre

- RIE DFC around one new Charcot patient every 1-2 months
- Over six new patients per year
- We currently have over 40 patients on active review

Underdiagnosed?

Maybe they have all died off

Gazis et al

| | |
|---------------------|----------------|
| 47 pts with Charcot | Controls |
| 3.7yr follow up | 3.1yr |
| 23.4% amputation | 10% amputation |

| | |
|------------|----------|
| 44.7% died | 34% died |
|------------|----------|

Not rare just not recognised?

- Prevalence of blindness 1.0-2.3%
- Prevalence of end stage renal failure 1.0%
- Prevalence of Charcot?
 - Not formally recorded but clues

Charcot Neuroarthropathy

Clinical associations

Long duration of diabetes

- In Type 1 patients at least 15yrs of diabetes is typical
- In Type 2 patients duration is harder to determine due to the long period of glucose abnormalities pre diagnosis

Dense peripheral neuropathy

- Many studies eg Stevens et al and Young et al
- All show that a dense neuropathy is universal
- Selective fibre loss?

Autonomic neuropathy

- Peripheral autonomic neuropathy is universal in Charcot feet

Active bone turnover (osteoporosis)

- Multiple studies confirm low bone mass in the affected limb
- Even before the process starts

Eating disordered young Type 1 women Winocour et al.

- Calcium loss , Underweight , No periods

Foot fractures in other bones

Cavanagh et al 1994

- 15% had fractures in other foot bones
- 9% of PN patients had Charcot changes

Good blood supply

- Clinical observation
- Post revascularisation procedures
- Anecdotal in truth?

Other complications

- Again anecdotal
- Dialysis and transplant patients seem over represented

Charcot neuroarthropathy

Prevalence surveys

- Armstrong et al 1997
 - Clinical 0.8%
- Harrelson 1993
 - Clinical in selected popn 7.5%
- Cavanagh et al 1994
 - Radiological 9% of 30% - 2.7%

Charcot Neuroarthropathy

Diagnosis

Clinical

- Hot (2° versus other foot) Hands can detect half a degree or less
- Swollen
- Often some pain
- History of trauma in 50% Caputo et al 1998

- Pakarinen
 - “A physician should consider Charcot oesthoarthropathy in diabetic patients with an inflamed foot”
 - Normal WCC, CRP, temp, No ulcer
- average delay 29 weeks

Charcot Neuroarthropathy

Diagnosis

Radiological

- Plain Xray
- 3 phase bone scan
- MRI or CT

Bilateral

- Up to 80% have radiological evidence of bilateral Charcot change

Charcot Neuroarthropathy

Diagnosis

- Markers of bone turnover are poor representatives of Charcot activity

Pyridine cross links

- A raised Alkaline phosphatase activity level is specific but poorly sensitive

Staging - Eichenholz

STAGE 0 - PRE-FRAGMENTATION

CLINICAL:

- Acute inflammation and hyperaemia.
- Joint hot, swollen and erythematous

X-RAY:Appears normal

Staging - Eichenholz

STAGE 1 - FRAGMENTATION

CLINICAL:

- Acute inflammation and hyperaemia.
- Joint hot, swollen and erythematous

X-RAY:Bone dissolution fragmentation, dislocation

Staging - Eichenholz

STAGE 1 - FRAGMENTATION

CLINICAL:

- Acute inflammation and hyperaemia.
- Joint hot, swollen and erythematous

X-RAY:Bone dissolution fragmentation, dislocation

Staging - Eichenholz

STAGE 2 -COALESCENCE

CLINICAL:

- Less oedema
- Reduction in redness and warmth

X-RAY:New bone formation

Staging - Eichenholz

STAGE 3 -CONSOLIDATION

CLINICAL:

- Resolution of oedema
- Joint enlarged by bony deformity

X-RAY:Bone healing with residual deformity

Current approaches to treatment

Charcot Neuroarthropathy

Management

Total contact casting

- Reduces activity in 18 weeks
- Compares to 30 weeks in shoes

- 18% of Charcot joints restart once removed from cast

Bisphosphonates

- IV pamidronate N=6
- Shortened activity as measured by temperature and alkaline phosphatase in one uncontrolled study and one controlled trial
Selby Young and Boulton 1993

Bisphosphonates for acute Charcot

N=39. Four centres. Single infusion of 90mg pamidronate

Reduction in bone turnover markers Less discomfort Jude et al Diabetologia 2001

Charcot Neuroarthropathy

Surgery

- American experience is that surgery to immobilise the foot during the destructive phase is associated with a poor outcome
- Late surgery - after the active phases are over can correct the rocker bottom deformity and reduce ulcer risk
- Catanzarati et al Surgery of the medial column has better outcome than lateral column surgery

Amputation Jones and Young 1996

- 8 ankle Charcot patients
- Once destruction occurred
- Patients who opted for early amputation had a better outcome

Conclusions

- Keep a high index of suspicion
- Refer early
- Avoid orthopaedic surgeons!