Unexpected outcome (positive or negative) including adverse drug reactions

An unusual effect of interferential therapy

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Summary

In this report, a patient with severe shoulder pain was treated with interferential currents, a commonly used modality in physiotherapy for the management of pain. He reported loss of concentration, drowsiness, decreased alertness and gait disturbance, along with analgesia, for 4–5 h after each treatment. He was regularly taking tramadol HCl for pain relief. Endogenous opioids produced in response to interferential therapy may be excessive or may interact with the tramadol HCl and potentiate its effect. There is no published report of interferential-induced symptoms, as described above, in the authors' knowledge. The clinician using interferential currents should be aware of this possible effect.

BACKGROUND

Interferential therapy (IFT) is a commonly used modality in physiotherapy practice for pain relief. Pain relief is believed to be achieved through the production of endogenous opioids like endorphins and enkephalins. We report an unusual effect of interferential in which the patient reported dizziness, decreased alertness, gait disturbance and an inability to concentrate on activities of daily living such as shopping. These effects, which have been unreported in the literature to date, lasted for up to 4 h postinterferential treatment. We believe it is important for therapists to be aware of these potential side effects or excessive effects, especially with regard to specific age groups who may have premonitory balance and cognitive deficits and who are using tramadol HCl tabs.

CASE PRESENTATION

The patient was a 69-year-old man. He sustained extensive injury to his left shoulder due to a fall on concrete onto his outstretched arm with his shoulder in extension. He was seen in A&E after the fall and any fracture or medical problems were ruled out.

He was seen in the physiotherapy department a month after the injury. He reported severe pain in the left shoulder. The pain was constant and movements were further aggravating the pain. The remarkable findings on examination were: rupture of the long head of biceps with distinct 'popeye' sign; painful active range of motion; pain throughout the passive range of motion with empty end feel and loss of strength in all muscle groups around the glenohumeral joint. The subjective and objective findings were suggestive of acute pain and extensive injury to the left shoulder inclusive of ruptured long head of biceps and injury to the rotator cuff muscles.

His medical history was remarkable. He had bilateral knee and hip replacements, rupture of the left rectus femoris muscle and spondylolysis of the spine. The degenerative changes in his whole spine give him discomfort off and on. He reported no worsening of his spinal (including neck) symptoms after the fall.

He could not tolerate non-steroidal anti-inflammatory medication because of severe gastric irritation and was consequently taking tramadol HCl tab on a long-term basis for pain relief. He reported no unwanted side effects from the tramadol prior to IFT sessions.

Pain relief and maintenance of range of motion were the major concerns. He was treated with IFT while awaiting an MRI and subsequent surgical opinion for his condition.

INVESTIGATIONS

- ▶ ECG
- ▶ 24 h monitoring of blood pressure
- ▶ x-Ray shoulder

DIFFERENTIAL DIAGNOSIS

- ▶ Cardiac arrhythmias
- ▶ Hypotension

TREATMENT

The patient was taking 75 mg tramadol HCl at around 10:00 daily for pain relief. Other non-steroidal anti-inflammatory pain killers were increasing his gastric irritation. His physiotherapy appointments were always 4–5 h postmedication.

In the physiotherapy department he was treated with an interferential current modality and range of motion exercises.

An Enraf Nonius Sonopulse 492 machine was used for IFT. Four electrodes were placed on the anterior and posterior aspects of the shoulder joint in a criss-cross current pattern. Parameters used were 0–100 Hz beat frequency, intensity 25–30 mA for 20 min on each occasion.

He had four sessions of IFT, one session per week.

OUTCOME AND FOLLOW-UP

The patient reported not only good pain relief but also loss of concentration, drowsiness, decreased alertness and tendency to fall after each treatment session for 4–5 h. The symptoms were described as severe.

He attended his general practitioner (GP) for an investigation of these symptoms when they first appeared. An ECG and 24 h monitoring of blood pressure were carried out and no abnormality was detected. Any medical condition causing the above symptoms was ruled out by his GP.

The patient declined further treatment with IFT due to the deleterious effects. The patient, the physiotherapist and the GP were all convinced about the IFT as the cause of the symptoms.

DISCUSSION

The effectiveness of IFT for pain relief in various painful musculoskeletal conditions is reported in the literature. IFT is widely used for pain relief, muscle stimulation, increased local blood flow and reduction of oedema.^{1 2 3} This therapy has been studied extensively and its effective relief of pain in musculoskeletal conditions has been reported.^{1 4 5} IFT produces a low-frequency (0–250 Hz) effect within the tissue through the interference of two higher frequencies (4000 Hz) and acts primarily on the excitable (nerve) tissues with the strongest effects likely to be those which are a direct result of such stimulation (ie, pain relief and muscle stimulation) (<http://www.electrotherapy.org/modalities/ift.htm>, retrieved 09/2012). Interferential has been believed to produce endogenous opioids such as endorphin and enkephalin at a spinal level to block the pain transmission.^{4 6}

IFT is reported to be a safe intervention for pain relief with virtually no side effects. The patient in this case reported symptoms consistent with a side effect of, or overdose of, opioids. Common side effects of opioids including synthetic tramadol are reported as sedation, dizziness, physical dependence and loss of alertness.^{7 8} Endorphins or enkephalin produced through IFT may be excessive or may interact with tramadol HCl and potentiate its effects. Caution should therefore be taken in using IFT to treat patients who have comorbid medical problems and are taking tramadol or other opioids.

There are numerous medical problems which present with these symptoms. However, with reference to the duration and onset of these symptoms cardiac arrhythmias and hypotension were the possible differential diagnoses and needed to be ruled out. ECG and 24 h monitoring of blood pressure were therefore done. These were normal.

On analysis of the pattern of symptoms, there appeared to be a link to the IFT: the symptoms had remained for 4–5 h after each treatment; no reported symptoms the following day; no recurrence of the symptoms once the IFT was stopped; no recurrence of the symptoms over the 4 months since the IFT was discontinued.

The use of IFT is generally considered safe with virtually no side effects. Precautions are, however, recommended in patients with pacemaker, local infection, tumours and hypersensitivity to the gel electrodes. The current case emphasises an unusual excessive morphine-like effect.

Learning points

- ▶ Interferential therapy (IFT) may potentiate the effect of tramadol and opioids.
- ▶ Care must be taken in treating musculoskeletal pain with IFT if the patient is already using tramadol.
- ▶ IFT combined with tramadol may produce excessive pain relief.

Competing interests None.

Patient consent Obtained.

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