Interesting Case

Thyroiditis and iodide mumps following an angioplasty

R. S. Moisey¹, S. McPherson², M. Wright³ and S. M. Orme¹

¹Department of Endocrinology, ²Department of Radiology and ³Department of Renal Medicine, Leeds Teaching Hospitals NHS Trust, Leeds General Infirmary, Leeds, LS1 3EX, UK

Keywords: contrast media; haemodialysis; iodide mumps; renal failure; thyroiditis

Case history

A 51-year-old man on maintenance haemodialysis developed an acute and dramatic swelling of the thyroid and salivary glands, following administration of iodine containing contrast media. He underwent an aortofemoral angioplasty for peripheral vascular disease requiring 300 ml of Visipaque® 320 contrast media; the following day he developed a grossly enlarged, tender thyroid with swelling and tenderness of the sub-mandibular and parotid salivary glands (Figure 1). He had refused haemodialysis immediately following the procedure as he complained of back pain. He subsequently underwent dialysis 24 h later.

He was apyrexial, his CRP was 81 mg/l (reference range <10) and ESR 36 mm/h (RR 1–10). An ultrasound confirmed an enlarged, oedematous thyroid and salivary glands with swelling of surrounding soft tissue (Figure 2). He had no dysphagia or dyspnoea. He had no past history or family history of thyroid disease. Initial thyroid function tests showed mild hypothyroidism [TSH 2.1 miu/l (RR 0.2–6.0), FT4 9.7 pmol/l, (RR10.0–25.0)] that recovered after a few days (TSH 4.2 miu/l, FT4 12.1 pmol/l). Thyroid peroxidase antibodies and thyrotrophin-binding inhibiting immunoglobulin were undetectable. We diagnosed acute thyroiditis and iodide mumps secondary to the iodinated contrast media. High-dose steroids (prednisolone 40 mg daily) were commenced and within 48 h the swelling and pain significantly improved. A repeat US confirmed normal size, echotexture and vascularity of the thyroid and salivary glands (Figure 3). His prednisolone dosage was reduced and discontinued after a total of 2 weeks.

Serial measurements of thyroid function have remained normal. Serum iodine levels were assayed before and during his second haemodialysis following the angioplasty and were grossly elevated (Table 1). The serum iodine level was repeated 10 days later, after a further 4 dialysis treatments and remained grossly elevated (15,313 µg/l).

Correspondence and offprint requests to: S. M. Orme, MBChB, MD, FRCP, Department of Endocrinology, Leeds Teaching Hospitals NHS Trust, Leeds General Infirmary, Leeds, LS1 3EX, UK. Email: Steve.Orme@leedsth.nhs.uk
Visipaque® (Iodixanol) is a non-ionic iodine containing contrast media favoured for its iso-molar properties. With normal renal function, 97% is excreted unchanged in urine within 24 h. With increasing renal dysfunction, the elimination half-life is prolonged. Iodinated contrast media contain predominately organically-bound iodine with only a tiny amount of inorganic iodide. It is the iodide that is metabolically and biologically important. Visipaque® 320 contains 320 mg of iodine per ml and between 25 μg to 60 μg of iodide per ml. In uraemic patients, the retained iodine is subject to deiodination, increasing the concentration of non-organic ‘free’ iodide [1]. Iodide concentrations have been shown to be elevated following the administration of iodinated contrast media in a patient on haemodialysis [2]. Iodixanol has a molecular weight of 1550 Da and is readily dialysable by standard dialysis membranes [3]. The manufacturer recommends that patients on renal replacement therapy undergo dialysis immediately after the use of iodixanol. We measured iodine levels during our patient’s second treatment with haemodialysis following the procedure. The assay measures both iodine and iodide: it was not possible to measure iodide levels separately. The grossly elevated levels of iodine demonstrate that the elimination of contrast media in renal failure patients is dramatically delayed. Although iodixanol was eliminated through the dialysis membrane (A Cobe Century system 3, with a Fresenius FX10 low flux polysulphone membrane was used at the time) the level of iodine/iodide remained grossly elevated, despite a total of 5 dialysis treatments following his angioplasty.

Iodide mumps is a rare complication following iodinated contrast media and was particularly dramatic in this patient. The reaction is idiosyncratic and the aetiology remains unclear. It is likely to be a reaction related to toxic accumulation of iodide in the ductal systems of the salivary glands [4], which are capable of collecting and concentrating high levels of non-organic iodide [5]. Our patient was at an increased risk because of his end-stage renal failure and the delay in dialysis for the first 24 h may have contributed further. This delay was because he had complained of back pain. It is possible that this was secondary to mild pancreatic ‘mumps’, which has an aetiology thought to be similar to iodide induced sialadenitis [6]. As his back pain was self-limiting, no further investigations were performed and we cannot confirm this. The observed transient thyroid dysfunction is a recognized complication of iodinated contrast media and is generally self-limiting [7].

The evidence for steroids is lacking but his reaction was so extreme that we treated him with high-dose prednisolone and his improvement within 48 h was dramatic. Although he underwent dialysis shortly after the steroids were commenced, his rapid recovery, in spite of persistently high levels of contrast media, suggests a benefit. Previous reports describe a rapid onset and resolution of symptoms with no treatment required [8]. One previously published case of iodide mumps and thyroid swelling in a haemodialysis patient reported no improvement with steroids, although the swelling improved rapidly following dialysis [9].

Discussion

Visipaque® (Iodixanol) is a non-ionic iodine containing contrast media favoured for its iso-molar properties. With normal renal function, 97% is excreted unchanged in urine within 24 h. With increasing renal dysfunction, the elimination half-life is prolonged. Iodinated contrast media contain predominately organically-bound

Table 1. Serum iodine and iodide levels before and during the second treatment of haemodialysis following the angioplasty. Reference range for serum iodine 50–80 μg/l

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<tr>
<td>Post-dialysis</td>
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Fig. 2. Ultrasound appearance of right submandibular gland 24 h after onset of symptoms.

Fig. 3. Right submandibular gland 24 h after resolution of symptoms.

Table 1. Serum iodine and iodide levels before and during the second treatment of haemodialysis following the angioplasty. Reference range for serum iodine 50–80 μg/l
Conclusion

Thyroiditis and iodide mumps are rare complications following iodinated contrast media. It was particularly dramatic in this patient. He was at an increased risk because of his end-stage renal failure and the delay in dialysis for the first 24 h may have contributed further. With the addition of steroids he recovered within 48 h and remains well. It is recommended that patients on maintenance haemodialysis should undergo haemodialysis within 24 h of a procedure requiring iodinated contrast media.

Conflict of interest statement. None declared.

References


Received for publication: 1.11.06
Accepted in revised form: 29.11.06