CASE REPORT

Bilateral pneumothorax, surgical emphysema and pneumomediastinum in a young male patient following MDMA intake

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SUMMARY

MDMA (3,4-methylenedioxymethamphetamine) or 'Ecstasy' is an illicit drug frequently used by young people at parties and 'raves'. It is readily available in spite of the fact that it is illegal.[1] It is perceived by a lot of young people as being 'harmless', but there have been a few high-profile deaths associated with its use.[2] Known side effects of MDMA include hyperthermia, rhabdomyolysis, coagulopathy and cardiac arrhythmias.[3] Rarer side effects include surgical emphysema and pneumomediastinum, which have been better described with cocaine abuse.[4–6] We present a case of bilateral pneumothorax, surgical emphysema and pneumomediastinum in a young man after taking ecstasy.

BACKGROUND

This is an important case as it simply illustrates a rare phenomenon of surgical emphysema and pneumomediastinum in a young individual with recent intake of ecstasy.

CASE PRESENTATION

An 18-year-old man was admitted to the hospital after ingesting a few tablets of ecstasy at a music festival. He claimed not to have taken any other drugs or alcohol. There was no history of vomiting after ingestion. His clinical examination on the day of presentation was, essentially, normal and he was kept in overnight for observation.

INVESTIGATIONS

His full blood count, urea, electrolyte and creatinine were normal, as were his liver function tests, and paracetamol and salicylate levels. His creatine kinase level was elevated at 801 units/L, and this was attributed to the effects of ecstasy.

The next day, he complained of pain in his neck. Clinical examination revealed redness over the right side of his face and neck, with evidence of crepitus on palpation. He had a chest X-ray, which showed pneumomediastinum with extensive subcutaneous emphysema in the supraclavicular region extending to his neck and slightly overshadowing a small left-sided apical pneumothorax (see figure 1). A contrast-enhanced CT scan of the thorax and abdomen showed evidence of pneumomediastinum tracking into the major fissures of both lungs with extensive surgical emphysema in the soft tissues of the neck, chest and upper abdominal walls. Small, bilateral, apical pneumothoraces were also noted (see figures 2, 3 and 4). There was no evidence of pericardial effusion or oesophageal tear. A

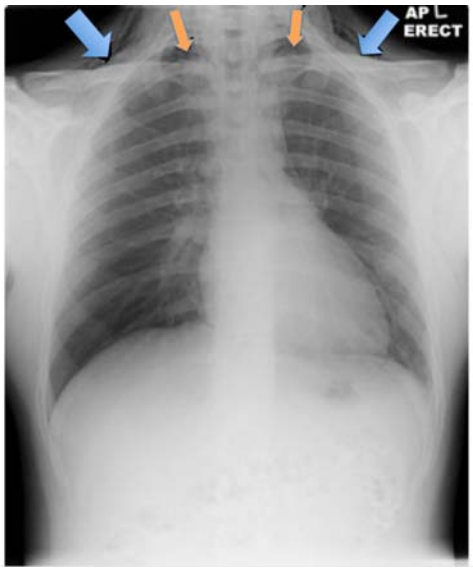

Figure 1 Chest X-ray showing apical pneumothoraces and subcutaneous emphysema. AP, anteroposterior.

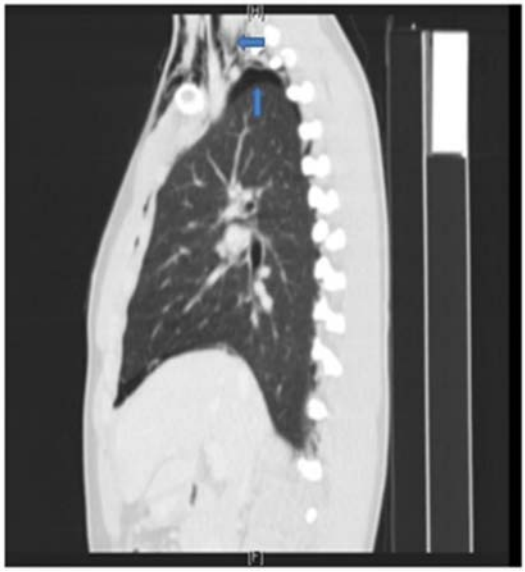

Figure 2

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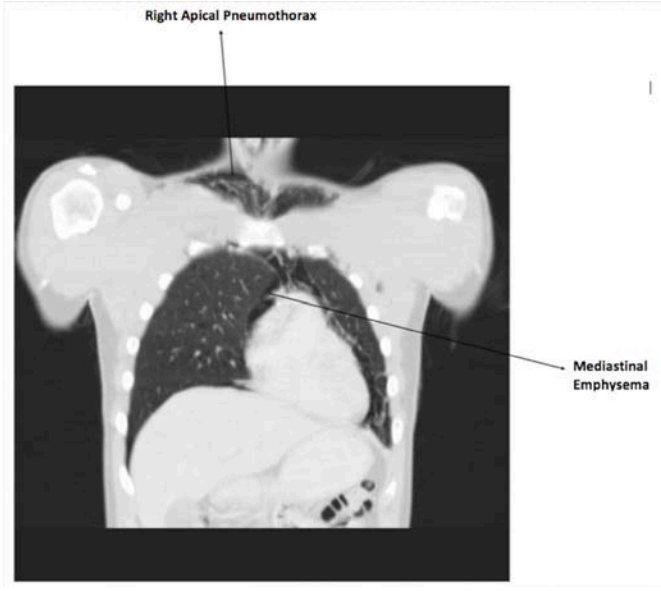

Figure 3 CT of the thorax showing pneumothorax and mediastinal emphysema.

water-soluble contrast gastrografin did not show any evidence of contrast extravasation to suggest oesophageal perforation (see figure 5).

He was managed, expectantly, on the respiratory ward and did not require a chest drain. A surgical opinion was sought from the regional thoracic centre, and following review of the scans they recommended that the patient be managed conservatively. He improved over the course of a few days in the hospital. His repeat chest X-ray showed that the pneumomediastinum and most of the surgical emphysema had resolved, leaving only some residual emphysema over the neck and right anterior chest wall. The bilateral apical pneumothoraces had also resolved.

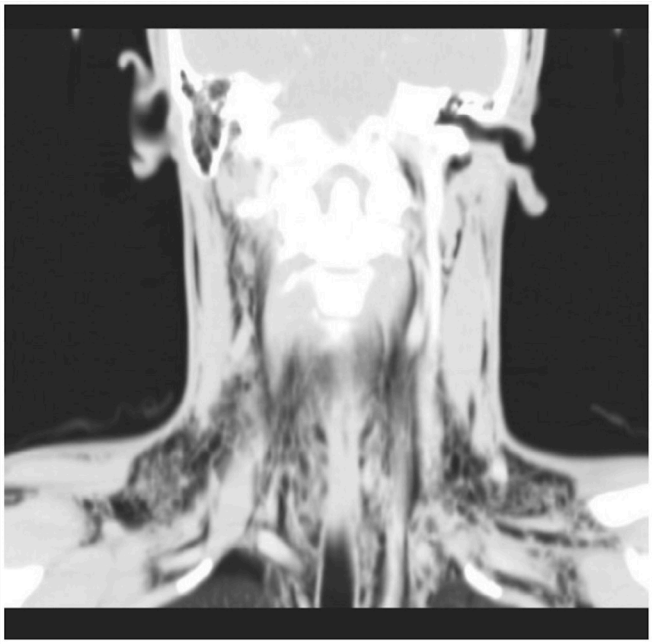

Figure 4

He was discharged home, with a follow-up appointment to be reviewed by the respiratory physicians.

DIFFERENTIAL DIAGNOSIS

1. Boerhaave's syndrome.

OUTCOME AND FOLLOW-UP

1. Subcutaneous emphysema and pneumomediastinum are rare but recognised complications of ecstasy use.
2. They should be suspected in any patient who comes in after ecstasy ingestion and who complains of neck pain or facial pain, especially if there is evidence of crepitus on examination.
3. Where subcutaneous emphysema or pneumomediastinum is detected, Boerhaave's syndrome should be excluded, particularly if there is associated vomiting; a soluble contrast barium swallow should be undertaken to exclude a perforated oesophagus.

DISCUSSION

MDMA (3,4-methylenedioxymethamphetamine; ecstasy) is a synthetic amphetamine derivative. First patented in Germany in 1914, it is a hallucinogenic drug similar to mescaline, another amphetamine derivative.[1] Although side effects such as hyperthermia, rhabdomyolysis and cardiac arrhythmias have been well described with ecstasy,[3] subcutaneous emphysema and pneumomediastinum are much less known associations. These were first described by Levine *et al*[7] in 1993 in a 17-year-old boy admitted with vomiting after taking ecstasy tablets. He developed subcutaneous emphysema and pneumomediastinum.[7] Boerhaave's syndrome was initially suspected as the mechanism underlying this, although there was no concomitant vomiting. However, an oral soluble contrast swallow showed no evidence of oesophageal perforation. He did not require surgical treatment, the pneumomediastinum and subcutaneous emphysema resolved without any invasive intervention, and he was discharged home with follow-up arrangements. Other case reports[7–13] and case series reports[14] have followed, but this remains a rare complication of ecstasy. It should be suspected in any patient taking ecstasy who complains of facial or neck pain.[8–13]

The pathophysiological mechanism is thought to be due not so much to the ecstasy itself, but to the increased stamina it induces; this can lead to prolonged and strenuous activity at the parties and 'raves', which are the usual scenarios in which these drugs are taken.[14] The Valsalva manoeuvre (expiration through closed glottis), which a lot of the subjects perform, is thought to lead to rupture of peripheral alveoli, resulting in back-tracking of air through the perivascular interstitial space, the mediastinum and retroperitoneum, and subsequently the subcutaneous planes in the cervical, chest and abdominal wall.[15] The end result can be pneumomediastinum, pneumoretroperitoneum and subcutaneous emphysema.[15] Subcutaneous emphysema and pneumomediastinum are generally uncommon and mainly occur due to barotrauma from blunt or penetrating injuries.[15]

Spontaneous, subcutaneous emphysema and pneumomediastinum are much rarer as in this case. In this group of patients, it is important to exclude oesophageal rupture or perforation as they can lead to mediastinitis. Both mediastinitis and pneumomediastinum are potentially fatal complications. In the case of the young man presented, he had not had a history of vomiting, and a water-soluble contrast swallow had not shown evidence of oesophageal perforation. He did not require chest drain but was closely monitored on the respiratory ward, and supported with intravenous fluids and antibiotics. There was good liaison with the thoracic unit.

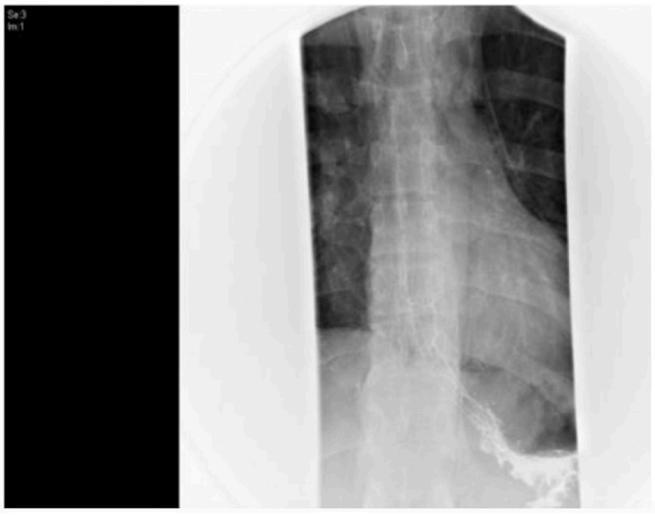

Figure 5 Soluble oral contrast gastrografin—no evidence of contrast extravasation.

The pneumothoraces resolved spontaneously, as did the surgical and mediastinal emphysema, which steadily diminished. He improved and was discharged without any need for thoracic surgical intervention. Most of the reported cases of subcutaneous emphysema and pneumomediastinum associated with ecstasy did not require surgical intervention.[7–13] However, these patients do need to be kept under close observation as pneumomediastinum can be fatal.

Learning points

- Always consider the possibility of subcutaneous emphysema in any patient who comes to a hospital having taken ecstasy.
- Do a chest X-ray especially if they complain of pain over their neck or face and if they complain of breathlessness.
- Although pneumomediastinum is rare in this context, it is important to recognise it as it can be fatal if missed.
- When pneumomediastinum is found, it is important to perform a soluble oral contrast barium swallow to exclude a perforated oesophagus.

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