freely soluble in 0.1N hydrochloric acid. pH of a 10% solution in water is between 3.0 and 5.0. Store in airtight containers.

Profile

Tiletamine has similar properties to ketamine (p.1787). It is used as the hydrochloride with zolazepam (p.1037) for general anaesthesia in veterinary medicine.

Trichloroethylene *(rINN)*

Trichlorethylene; Trichlorethylenum; Trichloroethene; Trichloroéthylène; Trichloroethylenum; Trichloroetylen; Tricloroetileno.

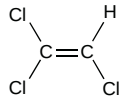
Трихлороэтилен

$CHCl:CCl_2$ = 131.4.

CAS — 79-01-6.

ATC — N01AB05.

ATC Vet — QN01AB05.



NOTE. The following terms have been used as 'street names' (see p.vi) or slang names for various forms of trichloroethylene: Trichlo.

Stability. NOTE. Trichloroethylene used for anaesthetic purposes contains thymol 0.01% w/v as a stabiliser and is coloured blue for identification. It is non-flammable.

Adverse Effects and Precautions

Trichloroethylene increases the rate and decreases the depth of respiration and may be followed by apnoea. The sensitivity of the heart to beta-adrenergic activity may increase, possibly with ventricular arrhythmias.

Acute exposure to trichloroethylene may be followed by dizziness, lightheadedness, lethargy, nausea, and vomiting; hepatic and renal dysfunction may follow. Fatalities have occurred, although temporary unconsciousness is a more common manifestation.

Chronic poisoning may result in visual disturbances, intolerance to alcohol as manifested by transient redness of the face and neck (degreasers' or trichloroethylene flush), impairment of performance, hearing defects, neuralgia, and mild liver dysfunction. Prolonged contact with trichloroethylene can cause dermatitis, eczema, burns, and conjunctivitis.

Dependence has been reported in medical personnel and factory workers who regularly inhale trichloroethylene vapour.

If trichloroethylene is used as an anaesthetic it should not be used in closed-circuit apparatus since there is a reaction with soda lime to produce a toxic end product that may cause cranial nerve paralysis and possibly death.

See also Adverse Effects and Precautions for General Anaesthetics, p.1779.

◊ Reviews of the toxicity of trichloroethylene.

1. Health and Safety Executive. Trichloroethylene. *Toxicity Review* 6. London: HMSO, 1982.
2. WHO. Trichloroethylene. *Environmental Health Criteria 50.* Geneva: WHO, 1985. Available at: http://www.inchem.org/documents/ehc/ehc/ehc50.htm (accessed 26/05/04)
3. Davidson IWF, Beliles RP. Consideration of the target organ toxicity of trichloroethylene in terms of metabolite toxicity and pharmacokinetics. *Drug Metab Rev* 1991; **23:** 493–599.

Abuse. Toxicity associated with inhalation of volatile substances including trichloroethylene has been reviewed.[1,2] Trichloroethylene can damage the kidney, liver, heart, and lung. However, in young healthy subjects, organ toxicity becomes apparent only with intensive and protracted abuse of volatile substances.

1. Marjot R, McLeod AA. Chronic non-neurological toxicity from volatile substance abuse. *Hum Toxicol* 1989; **8:** 301–6.
2. Anonymous. Solvent abuse: little progress after 20 years. *BMJ* 1990; **300:** 135–6.

Carcinogenicity. The use of trichloroethylene in foods, drugs, and cosmetics was banned by the FDA after studies demonstrating that hepatocellular carcinomas could be induced in *mice* by chronic exposure to very high doses. However, similar effects have not been found in *rats* and larger species and several epidemiologic studies have failed to demonstrate an increased incidence of liver tumours, total mortality or mortality due to cancer in workers exposed to trichloroethylene. Suggestions that the carcinogenicity of trichloroethylene is due to one of its intermediate metabolites, cloral hydrate, have raised concern over the continuing use of cloral hydrate as a medicine. For further details, see p.979.

Effects on the liver. References[1,2] to hepatotoxicity after occupational exposure to trichloroethylene. See also Carcinogenicity, above.

1. McCunney RJ. Diverse manifestations of trichloroethylene. *Br J Ind Med* 1988; **45:** 122–6.
2. Schattner A, Malnick SDH. Anicteric hepatitis and uveitis in a worker exposed to trichloroethylene. *Postgrad Med J* 1990; **66:** 730–1.

Effects on the skin. A report[1] of scleroderma in 3 patients occupationally exposed to trichloroethylene and, in 2 cases, also to trichloroethane.

1. Flindt-Hansen H, Isager H. Scleroderma after occupational exposure to trichlorethylene and trichlorethane. *Acta Derm Venereol (Stockh)* 1987; **67:** 263–4.

Interactions

The arrhythmogenic effects of trichloroethylene may be potentiated by sympathomimetics such as adrenaline. Alcohol consumption after chronic exposure to trichloroethylene may result in a reddening of the skin (see Adverse Effects and Precautions, above).

See also Interactions of General Anaesthetics, p.1779.

Pharmacokinetics

Trichloroethylene is rapidly absorbed by inhalation and ingestion. Percutaneous absorption can occur. Some of the inhaled trichloroethylene is slowly eliminated through the lungs; trichloroethylene is metabolised primarily in the liver, cloral hydrate (see p.979) being the first stable major metabolite formed; most is then metabolised to trichloroethanol and trichloroacetic acid which are excreted in the urine. The latter may be used as an indicator of industrial exposure. Trichloroethylene diffuses across the placenta.

Uses and Administration

Trichloroethylene is a volatile halogenated anaesthetic given by inhalation. It has been used in some countries for the maintenance of light anaesthesia (p.1780) but it has weak anaesthetic properties compared to other halogenated anaesthetics and poor muscle relaxant activity, and safer anaesthetics are generally preferred. It has also been used to supplement anaesthesia with nitrous oxide-oxygen or halothane. Trichloroethylene is a potent analgesic and has been used in subanaesthetic concentrations to provide analgesia for obstetrics, emergency management of trauma, and other acutely painful procedures.

Trichloroethylene is used in industry as a solvent for oils and fats, for degreasing metals, and for dry cleaning. It has also been used in type correction fluids but is no longer included in most brands.

Xenon

Ksenon; Xénon; Xenón; Xenonum.

Xe = 131.293.

ATC — N01AX15.

ATC Vet — QN01AX15.

Profile

Xenon is a non-explosive gas. Mixtures of 60 or 70% v/v xenon with oxygen have been tried as a general anaesthetic.

◊ References.

1. Lachmann B, *et al.* Safety and efficacy of xenon in routine use as an inhalational anaesthetic. *Lancet* 1990; **335:** 1413–15.
2. Yagi M, *et al.* Analgesic and hypnotic effects of subanaesthetic concentrations of xenon in human volunteers: comparison with nitrous oxide. *Br J Anaesth* 1995; **74:** 670–3.
3. Goto T, *et al.* Emergence times from xenon anaesthesia are independent of the duration of anaesthesia. *Br J Anaesth* 1997; **79:** 595–9.
4. Rossaint R, *et al.* Multicenter randomized comparison of the efficacy and safety of xenon and isoflurane in patients undergoing elective surgery. *Anesthesiology* 2003; **98:** 6–13.
5. Sanders RD, *et al.* Xenon: no stranger to anaesthesia. *Br J Anaesth* 2003; **91:** 709–17.
6. Bedi A, *et al.* Use of xenon as a sedative for patients receiving critical care. *Crit Care Med* 2003; **31:** 2470–7.
7. Preckel B, Schlack W. Xenon—cardiovascularly inert? *Br J Anaesth* 2004; **92:** 786–9.
8. Sanders RD, *et al.* Xenon: elemental anaesthesia in clinical practice. *Br Med Bull* 2005; **71:** 115–35.
9. Baskar N, Hunter JD. Xenon as an anaesthetic gas. *Br J Hosp Med* 2006; **67:** 658–61.

Preparations

Proprietary Preparations (details are given in Part 3)

Port.: Lenoxe.