

Glycine irrigation should be used cautiously in patients with hepatic impairment since any absorption and consequent metabolism may cause hyperammonaemia. The possible effects on fluid and electrolyte balance warrant cautious use in patients with cardiopulmonary or renal dysfunction; glycine irrigation is contraindicated in anuric patients.

Systemic absorption. Absorption of glycine irrigation solution during surgical procedures can cause disturbances of the circulatory and nervous systems.^{1,3} Often seen after transurethral resection of the prostate, these symptoms and signs have been referred to as the transurethral resection syndrome,¹ although they have also been described after other urological or gynaecological surgical procedures.^{4,5} Hyponatraemia and glycine toxicity are thought to be responsible for the clinical manifestations.^{1,2,5}

Symptoms and signs include chest pains, hypertension, hypotension, bradycardia, anuria, dyspnoea, nausea, vomiting, restlessness, confusion, apprehension, irritability, headache, and seizures.^{1,3-5} Chills, diarrhoea, and abdominal pain have also been reported,¹ as have visual disturbances and blindness.^{3,6} Myocardial infarction,^{7,8} coma, and death may occur.^{5,7}

Absorption may occur rapidly, through the intravascular route, or, more rarely, slowly via extravascular absorption.^{1,2,4} Extravasation should be suspected when abdominal pain and swelling are apparent.^{4,9} Ethanol has been added to the irrigation fluid, and ethanol breath tests performed regularly during procedures in order to detect and monitor absorption.^{1,2,4,9} However, the syndrome has still occurred despite monitoring,⁹ awareness of the pattern of ethanol changes and clinical symptoms associated with extravascular as well as intravascular absorption are considered essential.^{4,9}

- Olsson J, et al. Symptoms of the transurethral resection syndrome using glycine as the irrigant. *J Urol (Baltimore)* 1995; **154**: 123-8.
- Tauzin-Fin P. Complication des liquides d'irrigation à base de glycolle: le syndrome de résorption. *Thérapie* 2002; **57**: 48-54.
- Radziwill AJ, et al. Visual disturbances and transurethral resection of the prostate: the TURP syndrome. *Eur Neurol* 1997; **38**: 7-9.
- Hahn RG. Transurethral resection syndrome after transurethral resection of bladder tumours. *Can J Anaesth* 1995; **42**: 69-72.
- Siddiqui MA, et al. Glycine irrigant absorption syndrome following cystoscopy. *Clin Nephrol* 1996; **45**: 365-6.
- Karci A, Erkin Y. Transient blindness following hysteroscopy. *J Int Med Res* 2003; **31**: 152-5.
- Byard RW, et al. Glycine toxicity and unexpected intra-operative death. *J Forensic Sci* 2001; **46**: 1244-6.
- Hahn RG, Persson P-G. Acute myocardial infarction after prostatectomy. *Lancet* 1996; **347**: 335.
- Hahn RG. Life-threatening transurethral resection syndrome despite monitoring of fluid absorption with ethanol. *Eur J Anaesthesiol* 1995; **12**: 431-3.

Uses and Administration

Glycine is a non-essential aliphatic amino acid. It is used as a dietary supplement.

Glycine is sometimes used with antacids in the treatment of gastric hyperacidity. It is also used as an ingredient of some aspirin preparations with the object of reducing gastric irritation.

Sterile solutions of glycine 1.5% in water, which are hypotonic and non-conductive, are used as urogenital irrigation solutions during certain surgical procedures, particularly transurethral resection of the prostate.

Glycine hydrochloride has also been used.

Preparations

BP 2008: Glycine Irrigation Solution;
USP 31: Glycine Irrigation.

Proprietary Preparations (details are given in Part 3)

Fr.: Derm Hydralin; Gyn-Hydralin; **Hong Kong:** Gyn-Hydralin; **Mex.:** Glisretj.

Multi-ingredient: **Arg.:** Normoprost. **Compuesto;** **Austral.:** Cal Alkylin; **Austria:** Centramin; **Braz.:** B-Vesil; **Chile:** Dolotol I2; **Fr.:** Cristopal†; Deml'Intim; Item Alphasole; Phakan†; Pruniced; **India:** Cotary; **Ital.:** De-toxicon; Digestivo Antonetto; **Mex.:** Segel†; **Port.:** Phakan†; **Rus.:** Elacin (Элацин); **Spain:** Saniebt†; Tebetane. **Compuesto;** **Switz.:** DAM Antacidum; Phakolen†.

Used as an adjunct in: **Austral.:** Cardiprin; Disprin Direct; **Cz.:** Godasal; **Ger.:** Godamed; Praecineural; **Hong Kong:** Cardiprin; Glyprin; **Indon.:** Contrexun; Inzana; Minigrin; **Israël:** Lysoprin†; **Ital.:** Aspiglicina; Geyfritzt†; **Malaysia:** Cardiprin; Glyprin; **NZ:** Cardiprin†; **Pol.:** Alka-Prim; Asprocol; **Singapore:** Cardiprin; Glyprin; **Thai.:** Caparin; Cardiprin.

Halibut-liver Oil

Aceite de hígado de fletán; Aceite de Hígado de Hippogloss; Heil-buttleberöl; Öl. Hippogloss; Oleum Hippoglossi; Oleum Jecoris Hippoglossi.

Палтусовый Печёночный Жир
CAS — 8001-46-5.

Pharmacopoeias. In *Br*:

BP 2008 (Halibut-liver Oil). The fixed oil extracted from the fresh or suitably preserved liver of the halibut species belonging to the genus *Hippoglossus*. It contains not less than 30 000 units of vitamin A activity per g. Wt per mL 0.915 to 0.925 g. A pale to golden yellow liquid with a fishy, but not rancid, odour and

taste. Practically insoluble in alcohol; miscible with chloroform, with ether and with petroleum spirit. Store in well-filled containers. Protect from light.

Profile

Halibut-liver oil is used as a means of giving vitamins A (p.1971) and D (p.1986); the proportion of vitamin A to vitamin D is usually greater in halibut-liver oil than in cod-liver oil (p.1935). It is usually given in capsules.

Preparations

BP 2008: Halibut-liver Oil Capsules.

Proprietary Preparations (details are given in Part 3)

Arg.: Pancutan Base; **Canad.:** Nutrol A; **Switz.:** Halibut.

Multi-ingredient: **Arg.:** Eryteal; Klorane Bebe Eryteal; Pancutan; **Austria:** Nuri-Kapseln; Vitawund; **Chile:** Hipoglos; Mintaglos; Nistaglos; **Fr.:** Eryteal†; Preparation H; **Port.:** Halibut; **Switz.:** A Vogel Capsules polyvitaminees†.

Hetaflur (BAN, USAN, rINN)

Cetylamine Hydrofluoride; GA-242; Hétaflur; Hetaflurum; SKF-2208. Hexadecylamine hydrofluoride.

Гетафлур

$C_{16}H_{35}N$, HF = 261.5.

CAS — 3151-59-5.



Profile

Hetaflur is used as a source of fluoride (see Sodium Fluoride, p.1962) in the prevention of dental caries.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Israel:** Elmex†.

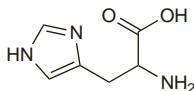
Histidine (USAN, rINN)

H; His; Histidiin; Histidin; Histidina; Histidinas; L-Histidine; Histidinum; Histidin; NSC-137773. L-2-Amino-3-(1H-imidazol-4-yl)propionic acid.

ГИСТИДИН

$C_6H_9N_3O_2$ = 155.2.

CAS — 71-00-1.



Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), and *US*.

Ph. Eur. 6.2 (Histidine). Colourless crystals or a white or almost white crystalline powder. Soluble in water; very slightly soluble in alcohol. Protect from light.

USP 31 (Histidine). White, odourless crystals. Soluble in water; very slightly soluble in alcohol; insoluble in ether. pH of a 2% solution in water is between 7.0 and 8.5.

Histidine Hydrochloride

Histidiinhydrokloridmonohydrat†; Histidina, hidrocloruro; Histidine (chlorhydrate d') monohydraté; Histidine Monohydrochloride; Histidinhydroklorid monohydrát; Histidiinhydrokloridmonohydrat; Histidin hydrochloridum monohydratum; Histidinium Chloride; Histidino hydrochloridas monohidricus; Histrydiny monochlorowodorek; Hisztidin-hidroklorid-monohidrát. L-Histidine hydrochloride monohydrate.

$C_6H_9N_3O_2 \cdot HCl \cdot H_2O$ = 209.6.

CAS — 645-35-2 (anhydrous histidine hydrochloride).

Pharmacopoeias. In *Chin.* and *Eur.* (see p.vii).

Ph. Eur. 6.2 (Histidine Hydrochloride Monohydrate). A white or almost white, crystalline powder or colourless crystals. Freely soluble in water; slightly soluble in alcohol. A 5% solution in water has a pH of 3.0 to 5.0. Protect from light.

Profile

Histidine is a basic amino acid that is essential for infant growth and which may be essential for some other groups, such as patients with uraemia. Histidine and histidine hydrochloride are used as dietary supplements.

Honey

Clarified Honey; Gereinigter Honig; Honung; Hunaja; Madu; Med; Medus; Mel; Mel Depuratum; Mel Despumatum; Miel; Miel Blanc; Miel purificada; Purified Honey; Strained Honey.

Méa

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), and *Jpn.* Also in *USNF*.

Ph. Eur. 6.2 (Honey; Mel). It is produced by bees (*Apis mellif-*

era) from the nectar of plants or from secretions of living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store, and leave in the honey comb to ripen and mature. If the bee has been exposed to treatment to prevent or cure diseases or to any substance intended for preventing, destroying, or controlling any pest, unwanted species of plants or animals, appropriate steps are taken to ensure that the levels of residues are as low as possible. It is an almost white to dark brown, viscous liquid which may be partly crystalline.

USNF 26 (Purified Honey). It is obtained by purification of honey from the comb of the bee, *A. mellifera* and all subspecies of *A. mellifera*. The honey is extracted by centrifugation, pressure, or other suitable procedures. Specific gravity 1.400 and 1.435 at 20°. Store in airtight containers. It is not intended for infants under one year of age unless it is free from *Clostridium* spp.

Profile

Honey, which contains about 70 to 80% of glucose and fructose, is used as a demulcent and sweetening agent, especially in linctuses and cough mixtures (p.1547). Preparations containing honey are used in the management of skin ulcers, wounds, and burns.

Contamination. Honey has been identified as a source of *Clostridium botulinum* spores and thus recommendations have been made that honey should not be given to infants under 1 year because of the risk of causing infant botulism.^{1,2}

Honey produced from certain species of *Rhododendron* plants has been found to contain grayanotoxins. Grayanotoxin I is responsible for the honey poisoning, manifest as bradycardia, cardiac arrhythmias, hypotension, gastrointestinal disturbances, dizziness, loss of consciousness, blurred vision, chills, cyanosis, sweating, and salivation.^{3,4} Convulsions have also been reported.⁴

- Arnon SS, et al. Honey and other environmental risk factors for infant botulism. *J Pediatr* 1979; **94**: 331-6.
- Tanzi MG, Gabay MP. Association between honey consumption and infant botulism. *Pharmacotherapy* 2002; **22**: 1479-83.
- Özhan H, et al. Cardiac emergencies caused by honey ingestion; a single centre experience. *Emerg Med J* 2004; **21**: 742-4.
- Dilber E, et al. A case of mad honey poisoning presenting with convulsion: intoxication instead of alternative therapy. *Turk J Med Sci* 2002; **32**: 361-2.

Wounds. Anecdotal reports and traditional usage dating back to ancient Egypt suggest that honey may be of some value as a wound dressing (p.1585). Its antibacterial properties are attributed both to high osmolality and the liberation of hydrogen peroxide, but may vary with the source:¹⁻⁴ in Europe, some of the best activity has been seen with lime-flower honey.² Sterilised manuka honey (p.2337) was reported to heal a leg ulcer infected with methicillin-resistant *Staphylococcus aureus*,⁵ although a randomised open-label study found no evidence that dressings impregnated with manuka honey improved the healing of venous leg ulcers at 12 weeks compared with usual care.⁶ In a preliminary study, honey obtained from the tea plant (see Xanthine-containing Beverages, p.2415) significantly reduced the incidence of grade 3 and 4 radiation-induced oral mucositis.⁷

A group from India⁸ has reported that the properties of honey offer a potentially simple and cheap means of preserving skin grafts in developing countries, with 100% uptake of reconstituted grafts stored for up to 6 weeks and 80% uptake of those stored for 7 to 12 weeks. In comparison with sulfadiazine silver, occlusive honey dressings were also found to be more effective for the treatment of superficial partial thickness thermal burns.⁹

However, concern has been expressed since honey may contain not only chemical contaminants but clostridial spores (see also above), and it has been suggested² that to be medically acceptable, honey must be sterile, residue-free, and of measured antibacterial activity.

Sugar has been used similarly to honey in treating wounds (see p.1970).

- Greenwood D. Honey for superficial wounds and ulcers. *Lancet* 1993; **341**: 90-1.
- Postmes T, et al. Honey for wounds, ulcers, and skin graft preservation. *Lancet* 1993; **341**: 756-7.
- Molan PC. Re-introducing honey in the management of wounds and ulcers - theory and practice. *Ostomy Wound Manage* 2002; **48**: 28-40.
- Booth S. Are honey and sugar paste alternatives to topical antibiotics? *J Wound Care* 2004; **13**: 31-3.
- Natarajan S, et al. Healing of an MRSA-colonized, hydroxyurea-induced leg ulcer with honey. *J Dermatol Treat* 2001; **12**: 33-6.
- Jull A, et al. Honey as Adjuvant Leg Ulcer Therapy trial collaborators. Randomized clinical trial of honey-impregnated dressings for venous leg ulcers. *Br J Surg* 2008; **95**: 175-82.
- Biswal BM, et al. Topical application of honey in the management of radiation mucositis: a preliminary study. *Support Care Cancer* 2003; **11**: 242-8.
- Subrahmanyam M. Storage of skin grafts in honey. *Lancet* 1993; **341**: 63-4.
- Subrahmanyam M. A prospective randomised clinical and histological study of superficial burn wound healing with honey and silver sulfadiazine. *Burns* 1998; **24**: 157-61.

Preparations

Proprietary Preparations (details are given in Part 3)

Austral.: Antibacterial Honey Barrier; **Ital.:** Oramil; **Neth.:** Melrosium; **UK:** Medihoney Antibacterial Wound Gel; Mesitrán.

Multi-ingredient: **Arg.:** Expectosan Hierbas y Miel; **Austral.:** Logiclin Natural Lozenges†; **Braz.:** Calmatos†; Elixir de Inhamet†; Expectomel; Melagria; Melbit†; Peitoral Martel†; **Canad.:** Mielocol; **Chile:** Fray Ro-