



GREEN TOBACCO SICKNESS (GTS)

- GTS is an illness
- Green tobacco sickness is a potential risk to those working with the green tobacco plant
- GTS is a form of nicotine poisoning that may be contracted by handling wet green tobacco leaves/ exposure to green tobacco
- GTS occurs when tobacco workers hand-harvest, cut, or load tobacco plants, usually in the early morning or after a rainfall when tobacco plants are covered with moisture
- GTS occurs through skin exposure to dissolved nicotine from tobacco leaves
- The nicotine from the plant mixes with the moisture on the leaves, and then upon contact, the nicotine is absorbed through the skin, causing acute nicotine poisoning and its associated symptoms
- GTS occurs primarily among tobacco workers who hand-harvest tobacco leaves in the field and handle the leaves during the process of transferring green tobacco to the curing barn
- The process of cropping flue cured tobacco usually consists of pulling and twisting loose green leaves from the plant and collecting them in large bundles that are held either in the hand or underneath the arm and against the body
- Hand harvesting can lead to skin abrasions, further increasing the risk of contracting GTS
- Workers begin in the early morning, when the tender green tobacco is wet with dew
- GTS occurrence is influenced by rainfall, temperature and humidity
- In the process of cropping tobacco, leaves and stalks are often cracked, emitting a gummy substance that coats workers` hands, skin and clothing
- Some countries use mechanical harvesting equipment, thus reducing dermal exposure to tobacco leaves

THE CAUSES OF GTS

- Normally the leaves of the tobacco plant are dry, but in the morning or after a storm, they are wet.
- Nicotine, found in tobacco plants is soluble in water, causing it to be drawn out onto the surface of the leaves by rain, dew or perspiration
- The nicotine from the tobacco mixes with the water on the leaves and the sweat from farm workers
- This then allows the nicotine to penetrate into the skin and pass into the bloodstream and is distributed through the body (Nicotine is absorbed through the skin)
- When the workers cannot change clothes, the nicotine stays on them all day in direct contact with their skin
- The amount of nicotine present in a tobacco leaf depends on a number of factors including genetics, soil, fertilization practices, weather, cultivation and harvesting techniques



- The percentage of dew-laden nicotine absorbed transdermally (entering through the dermis, or skin) is not known

INTERNATIONAL DISTRIBUTION OF GTS

- USA
 - Kentucky
 - Florida
 - Tennessee
 - North Carolina
- India
- Japan

RISK FACTORS INCLUDE

- Age – younger workers are more likely to develop GTS
- Environmental conditions – Workers working in hot, wet conditions are more likely to develop GTS
- Personal tobacco use – Smokers should not smoke to prevent GTS as handling tobacco and smoking both increase nicotine levels
- Type of labour performed – harvesting increases GTS
- Type of contact
 - Cuts and abrasions provide a direct route of nicotine entry into the bloodstream
 - Direct and prolonged contact of nicotine with skin (hands, forearms, thighs, backs and feet) increases risk

THE SYMPTOMS OF GTS

- Weakness
- Headaches
- Vomiting
- Dizziness
- Abdominal cramps (Stomach cramps)
- Difficulty breathing
- Abnormal temperature
- Nausea (a sensation of unease and discomfort in the upper stomach with an involuntary urge to vomit)
- Pallor - an unhealthy pale appearance (paleness)
- Severe prostration
 - the action of lying stretched out on the ground.
- Diarrhea
- Chills
- Fluctuations in blood pressure or heart rate
- Increased perspiration/excessive sweating
- Salivation



- collapse, weakness, debility, lassitude, exhaustion, fatigue, tiredness, enervation

DISEASE ONSET

- The nicotine temporarily affects part of the brain, and may cause reflex vomiting, and may excite nerves in the gastrointestinal tract that bring about nausea and cramping
- Nausea and faintness can occur within 15 minutes of skin contact
- The symptoms of GTS may present themselves in as little as one hour after starting work and can last from 12 to 48 hours
- The onset of the illness is 3 to 17 hours after exposure and the duration of illness is 1 to 3 days
- During GTS onset, early symptoms include headache and nausea, followed by vomiting, weakness, pallor, dizziness, headaches, increased perspiration, chills, abdominal pain, diarrhea and increased salivation

EFFECTS OF NICOTINE

- Once nicotine is in the bloodstream, it is distributed throughout the body including the brain
- The nausea and vomiting characteristics is mediated by the direct action of nicotine on the emetic chemoreceptor trigger zone in the medulla oblongata leading to reflex vomiting
- Nicotine also excites sensory nerves from the gut and parasympathetic nerves in the gastrointestinal tract, which lead to an overall increase in gastrointestinal secretion and motility
- The pharmacological effects of nicotine on nicotinic receptors in the central nervous system and at post-synaptic autonomic ganglia have been well elaborated, and help to explain the toxic effects of nicotine

GTS DIAGNOSIS

- If a worker becomes ill, while working with tobacco, and requires medical attention, the doctor should be informed of the exposure to nicotine to aid in diagnosis to avoid misdiagnosis
- The diagnosis of GTS may be made by testing the blood or urine for nicotine
- Diagnosis can also be made by testing for cotinine (a nicotine metabolite) in saliva



WHAT CAN CAUSE MISDIAGNOSIS?

- Symptoms of GTS are similar to those induced by
 - pesticide exposure,
 - heat exhaustion/heat stress
 - nicotine intoxication experienced by novice (new/inexperienced) smokers
 - organophosphate poisoning,
 - Organophosphate compounds are used as commercial insecticides
 - E.g: isulfoton, phorate, dimethoate, ciodrin, dichlorvos, dioxathion, ruelene, carbophenothion, supona, TEPP, EPN, HETP, parathion, malathion, ronnel, coumaphos, diazinon, trichlorfon, paraoxon, potasan, dimefox, mipafox, schradan, sevin, and dimetonon) in chemical warfare (nerve gases such as tabun and sarin)
 - They are applied as aerosols or dusts
 - They can be rapidly absorbed through skin and mucous membranes or by inhalation.

LONG TERM EFFECTS OF GTS

- Not associated with mortality
- GTS is debilitating (weakening) causing
 - significant discomfort among tobacco workers
 - lost productivity among tobacco workers

INITIAL TREATMENT OF GTS

- It can take as much as 10 hours before GTS symptoms occur
- Once GTS symptoms occur, the worker should avoid increased contact with green tobacco by:
 1. Cessation of work
 2. Change of clothing
 3. Showering
 4. Fluid intake
 5. Rest



TREATMENT FOR WORSE CASES OF GTS

6. Intravenous rehydration

- Intravenous rehydration is the process by which sterile water solutions containing small amounts of salt or sugar are injected into the body through a tube attached to a needle which is inserted into a vein.
- Intravenous rehydration is used to restore the fluid and electrolyte balance of the body due to illness, surgery, or accident. Electrolytes are salts (sodium, potassium, chloride, calcium, magnesium, phosphate, sulfate, and bicarbonate) that become ions when mixed with fluids in the body and blood and have the ability to conduct electricity.
- The body uses electrolytes to carry electrical impulses from cell to cell. Moderate to severe dehydration can interfere with the body's normal functioning. Restoration of fluids and electrolytes through intravenous means is the swiftest means to achieve fluid balance.
- Intravenous (IV) rehydration is used to treat moderate to severe cases of dehydration.

7. Anti-emetics

- An antiemetic is a drug that is effective against vomiting and nausea.
- Antiemetics are typically used to treat motion sickness
- Motion sickness, also known as kinetosis and travel sickness, is a condition in which a disagreement exists between visually perceived movement and the vestibular system's sense of movement. Depending on the cause, it can also be referred to as seasickness, car sickness, simulation sickness or airsickness.
- Dizziness, fatigue, and nausea are the most common symptoms of motion sickness

8. Supportive care

9. H1 blockers e.g. Dimenhydrinate

- Dimenhydrinate (marketed as Dramamine, Gravol and many other brand names) is an over-the-counter antiemetic used for the treatment of the symptoms of motion sickness.
- It is most commonly prepared as tablets, although it is also available in liquid form and in suppositories
- Dimenhydrinate is primarily used to treat nausea, vomiting, and dizziness caused by motion sickness

TIPS TO AVOID GTS / PREVENTATIVE MEASURES OF GTS

- GTS IS PREVENTABLE
- Knowledge is the best means of prevention. People should be educated on



- the causes and symptoms of GTS
 - the hazards associated with harvesting wet tobacco
 - the importance of safe work practices in preventing GTS
- Using PPE (long sleeved shirts, raingear, plastic aprons, rain-suits, protective water-resistant clothing and chemical resistant gloves, boots and socks) to minimize skin exposure to the green plant and nicotine
- All workers should periodically change wet and tobacco-soaked clothes
- Harvesting tobacco should be up to 7 hours a day only
- Avoid harvesting tobacco in the rain
- Begin harvesting after dew evaporates in the morning
- Working in cooler and drier conditions (Avoid field work until leaves have dried after the rain)
- Wait to work until leaves are dry
- Take breaks periodically, as incidence of GTS increases with amount of physical exertion
- Ensure that workers wash their hands and body with warm soapy water after working with green tobacco
- Dimenhydrinate – as a prophylactic (preventive, preventative, precautionary, protective,) measure before harvesting tobacco

IMPORTANCE OF PPE (PERSONAL PROTECTIVE EQUIPMENT)

- PPE is important to avoid skin exposure to the green leaf
- Examples of PPE are
 - Long-sleeved shirts
 - Gloves
 - raingear

QUESTIONS

Q1: Which stages do farmers handle tobacco leaves?

Q2: Given the potential risk of GTS, which 3 groups of people must not be involved when harvesting tobacco?

Q3: What are the health effects of handling wet tobacco leaves?

Q4: - Define GTS?

Q5: - What is the toxic agent of GTS?



Q6: - What is the exposure environment of GTS?

Q7: What are GTS exposure attributes?

Q8: - What are the symptoms of GTS?

Q9: - What is GTS onset for the illness?

Q10: - What is the duration of the illness if untreated?

ANSWERS

A1: - When topping, harvesting and loading tobacco barns

A2: - People under 18, pregnant women and breastfeeding women

A3: - Green tobacco sickness

A4: - GTS is a form of nicotine poisoning that affect workers who have direct contact with tobacco plants during cultivation and harvesting

A5: - Nicotiana tabacum (nicotine)

A6: - Tobacco workers hand harvesting, cutting, or loading tobacco plants during harvest; usually (but not necessarily) in the early morning or after rainfall when tobacco plants are covered with moistures

A7: - Skin exposure (hand, forearms, thighs, backs and feet) to dissolved nicotine from wet tobacco leaves. Dew from tobacco leaves often saturates workers` clothing within minutes of beginning work

A8: - Most common are weakness, headache, nausea, vomiting and dizziness. Other serious symptoms include abdominal cramp, difficulty breathing, abnormal temperature, pallor, diarrhea, chills, fluctuations in blood pressure or heart rate, increased perspiration and salivation

A9: - Range of onset from 3 – 17 hours (median 10 hours)

A10: - Mean duration of the sickness is 2.4 days