

SECALE COR : A Comprehensive Study

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INTRODUCTION

Ergot is a fungus, from family Clavicipitaceae, botanical name being *Claviceps purpurea*. Secale Cor is made from the plant Rye infected by *Claviceps*. Rye is a grass that produced Rye was first cultivated rather late in human history, perhaps as recently as 2000 to 3000 years ago. It is still grown extensively in northern Europe and Asia. It lacks the proteins that make wheat suitable for living, and rye bread is denser and usually darker than the wheat bread, hence called Black Bread.

Ergot appears as black grain size fungal structures. In late spring, these ergots germinate and form tiny spore producing mushroom like structures. Infectious spores are carried by wind currents to the host during the flowering stage. Infection of the cereal flowers may produce a secondary phase called Honeydew. Honeydew is a shiny sticky liquid that oozes from infected flowers and contains large numbers of ergot spores. The spores spread to adjacent flowers and heads by insects and rain splash particularly to the open flowers of rye. Ergot that germinate in June can infect early flowering weed grasses, which produce honeydew when cereals are flowering.

It gives out a sickening heavy smell. Its colour is externally purplish black. Internally it is pinkish white. It has a nauseous and slightly acrid taste.

After an overdose of ergot or medications derived from ergot or from eating flour milled from ergot infected rye, humans and livestock may develop ergotism, a condition sometimes called as St. Anthony's Fire. The symptoms include Convulsions, Miscarriages and Dry Gangrene and may be Death. It contains the crystalline alkaloid Ergotamine, Ergotinine and the amorphous alkaloid Ergotoxine.

Dr Stearns of Waterford, New York introduced it in 1807 as a substance, which he had used for several years to expedite lingering labors when pains had subsided and were incomplete to expel the foetus. It is justly regarded as unfortunate if the labor does not come to an end soon after the administration of the Ergot, since if it be delayed there is reason to believe that the child will be poisoned by it.

"These poisonous effects are said to be due to the oil of the Ergot, which if given alone to a parturient woman, does not cause contraction of the uterus, but does poison the foetus. Whereas on the other hand the Ergot, deprived of its oil, acts on the uterus, but does not poison the foetus. This phenomenon has not been explained as yet..." (Dr Carol Dunham)

Ergot is the common name given to the sclerotium formed by that fungus. The sclerotium is the fungal mass that replaces the seed of the plant, it may have somewhat the same general configuration as the seed but is a larger, dark colored and hard.

Ergot has had several uses in the field of medicine. There are reports as far back as 1582 of European and Chinese midwives using it to reduce hemorrhage following childbirth. It has also been used to induce abortions. Two of the alkaloids of ergot, ergotoxine and ergotamine have also been found to have medical uses. Ergotamine and to a lesser extent ergotoxine, were found to be remarkable in the treatment of migraine headaches. However both ergotamine and ergotoxine cause gangrene with chronic use. It must therefore be used only under strict medical supervision.

One of the most famous derivatives of ergot was lysergic acid. In 1938, two Swiss researchers, Hofmann and Stoll, derived d-lysergic acid diethylamide (LSD). It was thought to be relatively uninteresting until Hofmann accidentally ingested a small quantity of the drug. He was the first person to go on an "acid trip". LSD is the most famous psychotomimetic drug and was used widely in North America and Europe through the 70's. After ingesting LSD, the user will experience optical changes, inability to concentrate, phases of uncontrollable laughter, anxiousness and the quite typical experience of the subject standing outside of the body watching these events. Senses are also enhanced. The "trip" lasts for about 8 hours with a state of self-centeredness that lasts for an additional 5 hours. The first major outbreak of dancing mania was in Aix-la-chapelle in July of 1374. A group of people was seen to dance uncontrollably in the streets, foaming at the mouth and screaming of wild visions. They kept on dancing until they collapsed from exhaustion, but even then they flailed about in agony until forcefully restrained. The dancing caught on, and spread rapidly

throughout France and the Low Countries. The dancing mania, especially as described in Aix-la-Chapelle, may have had a physical hypothesis, that the manic dancers (at least some of them) were victims of ergot poisoning, or ergotism. Ergotism, which was known in the Middle Ages as "St. Anthony's Fire", is a toxic condition in humans and animals which inadvertently eat rye and other grasses parasitized by *Claviceps purpurea* (ergot).

Ergot has been widely used for many centuries for a number of different purposes ranging from its medical uses to its recreational drug uses. It has also been the cause of great many epidemics across Europe from the early 10th to the late 19th century. Knowledge of this fungus has increased throughout the years, however further research into the alkaloid derivatives may still produce beneficial medical uses.

PHYSIOLOGICAL ACTION

This is a medicine for which no human proving has been done due to its toxicity. The pathogenesis and symptomatology has been derived from its effect on human race accidentally, by its effect on cattle, lower animals and some proving on lower animals. There were so many epidemics of ergotism, due to which the symptoms have been recorded and have been confirmed in clinical practice. In almost every branch of medicine it has been used for contractions during birth, dilation of veins, decreasing blood pressure and treatment of migraines etc.

Since ancient times it was known to produce ergotism which then was divided into two main groups, i.e., Gangrenous ergotism and Convulsive ergotism and another being Hallucinogenic ergotism. (Dr Peter J Burfening, Ph.D).

In gangrenous bodily extremities turn black, dry and become mummified, making it possible for infected limbs to spontaneously break off at the joints. In convulsive ergotism there were epileptic form seizures, violent retching, tongue biting or unusual breathing patterns. This resulted in permanent nerve damage, deformity and long recovery period. In hallucinogenic ergotism, there were vivid hallucinations, nervousness, jerky movements, persons used to perform strange dances with wild movements, hopping, leaping and screaming until exhausted which often lead to unconsciousness.

Dr Willard Ide Pierce writes : " The chief interest in the action of ergot centers about its power to produce tonic contractions of involuntary muscle fiber; the arterioles are violently and persistently contracted, causing dry coldness of the surface and even gangrene of the lower extremities, and we have records of terrible epidemics of what are now believed to have been due to ergotism; that have devastated sections of Europe from the ninth to the last century (1089 – 1816). Depending on observations for years together the action of *Secale Cor* on different parts of the body can be described as follows:-

CEREBRO SPINAL NERVOUS SYSTEM: Muscular Cramps, Epilepsy

It has a marked action on the brain and spinal cord. They are first stimulated for a short time which is soon followed by paralysis. This paralysis has often extended to the centres of respiration and cardiac contraction; and in chronic poisoning the filaments of sensory nerves are powerfully influenced. The first symptom of this makes its appearance in the form of an ant creeping over the skin. This formication continues during the whole course of sickness and it is the last symptom which disappears.

There is involuntary twitching in various group of muscles, e.g., in the tongue and extremities. They soon pass into continuous contractions, which specifically affect the flexors, so that the arm remains fixed in a bent position. When the contraction pass off, a state of exhaustion remains. But soon the painful convulsion returns and makes the patient moan and groan continuously. The contractions come in simultaneously in various group of muscles, like face, extremities, digestive tract, uro-genital system etc.

CIRCULATION AND VASCULAR SYSTEM: Arterial contraction, venous dilatation

Dr P.Eberty had done a study of ergot on heart and cardiac system. He found that in a frog, the injection of ergotine caused a diastolic arrest of the heart and that the viscous was unable respond at all to stimuli. Although the heart is a profoundly affected in acute poisoning by ergot, yet death is probably not due to this cause, since Dr Wright found that even though the heart after death was quiet, it commenced to beat as soon as the congestion was relieved by an incision, and continued to beat for a few minutes. It has unquestionable effect on pulse and reduces it. This has been confirmed by so many researchers. The amount of reduction varies from 10-35 beats per minutes.

The chief effect of ergot is upon arteries and veins. It contracts the arteries first and on the other hand there is a dilatation of veins. The result is diminished quantity of blood in arteries and corresponding increase in the contents of the veins. This was studied in frogs and rabbits by Dr Wernich, Dr Holmes and was micrometrically measured by Dr Briesemann. Dr Wernich sees in the dilatation of the veins the primary, in the contraction of the arteries and the action of the heart the secondary symptoms. The arteries therefore, collapse from want of sufficient quantity of blood, the action of the heart.

UTERUS: Vile uterine contraction, abortifacient, haemorrhagic tendency. It produces violent contractions of uterus causing abortions. Through the nerve centres of the brain and lumbar region of the spinal cord, ergot has a powerful and fixed action upon the pregnant uterus. It was proved by Dr Schlesinger and Dr. Wernich, that, even in the impregnated uterus of animals, movements take place under the influence of ergot. But those movements according to present experience, these are not as primary effect of the poison, but as secondary, and dependent on the arterial anemia produced by ergot. It might always be assumed that the influence of ergot upon the movement of the uterus proceeds solely from an influence of the poison upon the nerve centers of these movements in the lumbar region of the cord and its higher situated parts, as well as in the brain.

The experiments of Dr Schlesinger and Oser have proved that the arterial anemia is to be regarded as the stimulating cause of the movements of the uterus, and secondly, that the uterine contractions are caused by excitement from the central organs. The abortions produced by ergot are thus accounted for by its increasing uterine contractions. The evidence of those who have used ergot for the induction of premature labor in women tallies very closely with that which is brought forward in regard to lower animals. Prof Ramsbotham states he has a great number of trials and found that expulsive action soon followed with very few exceptions.

INFLUENCE OF ERGOT ON FOETUS:

There are instances that ergot administered in tedious and difficult, slow labors has proved very destructive to the life of the child. Dr Moore of New York says "It appears to be injurious to the child at all times; for, in every case in which I have seen it exhibited, the child has been stillborn."

In fact if the cervix is not dilated and ergot is administered, due to contraction of uterus gives pressure on the child which may cause the death. According to Dr Meigs it should be employed at the moment of, or just before, the birth of the child, in order to secure a good contraction of the womb in women who are known to be subject to hemorrhage.

DIGESTIVE SYSTEM: Increased peristalsis, diarrhea, vomiting

The most evident symptom in the early stage of the action of ergot is retching, vomiting, diarrhea and profuse salivary secretion which are consequences of the action of the poison on the sensory nerves of the mucous membrane of the alimentary canal, these are excitement, communicated to the motor and secretory regions.

In Dr Wright's experiments, the intestines were found in very active peristalsis at the post-mortem examination of the poisoned animals.

In rabbits it also produced very violent peristalsis. It produced involuntary stools, which may be its effect on the sphincter muscles of anus and bladder.

SKIN: (Gangrenous ergotism): Diaphoresis, Gangrene, Purpura, Coldness of Skin

The symptoms which characterize gangrenous ergotism as such often appear within from two to seven days. An erysipelatous redness shows itself on some spots in the periphery, most frequently on the toes and feet, but also on the fingers and hand, more rarely on the ears and the nose; soon after the epidermis is raised like a bladder by serous exudation; the ichorous contents of this are soon discharged, and a gangrenous spot develops very rapidly at the affected spot. The part affected is very painful but later on it becomes quite insensible. The gangrene depends on the fact that the part affected is deprived of its blood supply, and its nutrition thereby arrested, consequently, it must pass into a state of decomposition. The only question is whether it is inflammation which leads to gangrene, or whether the process is of a non-inflammatory character, resembling that which occurs when all the vessels going to a limb are ligatured. When we consider that the initial so called erysipelatous redness is simply dependent on the cyanosis, and that these spots are not, as in a case of inflammation hot and swollen, but on the contrary, they become very cold, and warmth can not be restored in them, and that the affected limb is not at all swollen, the hypothesis that such a gangrene is of an inflammatory character may be rejected as there is no fever also.

TEMPERATURE: Lowers down the temperature, hence there is coldness of the skin. It may come down by 4-5 degrees. It is the result of its action on the heart and vascular system

SYMPTOMATOLOGY

MAKE UP

Thin, scrawny, feeble, cachectic and pale, sunken countenance
Very old looking, feeble persons
Lax muscular fibers, everything seems loose and open
Irritable, cross, mildest words offend her
Nervous temperament
HOT patient.
The skin is cold, yet the patient doesn't want covering
Hemorrhagic Diathesis

FEMALE SYMPTOMS

MENSE

Irregularly regular
Passive hemorrhage in feeble, cachectic women
Burning Pain in uterus
Copious flow of black, liquid blood, worse from movement
Hemorrhage with spasmodic contraction of uterus
Too frequent, too profuse with prolonged bearing down pain
Cold extremities
Worse just before the menses
Continuous oozing of watery blood until next period

LABOR

There is no expulsive pain
There is irregular pain, which is too weak, feeble and ceasing occasionally
Everything seems to be loose and open, but no action
There may be fainting attack during labor
Too long, too painful, severe contraction after labor
Dark offensive lochia
Retained placenta
Suppression of milk in lean and thin exhausted women. Breast do not fill properly
Puerperal fever, putrid discharges, suppressed urine

ABORTION

Threatened abortion at 3rd month
Associated with prolonged bearing down forcing pains
May be due to over lifting, straining and hard work
Strength of uterus is weakened by too early efforts

It is also useful in cases of Mole, Polypi and morbid growth in the uterus with prolonged forcing pains."It has been used successfully in chronic metritis, uterine fibroids, polypi and sub involution of the uterus." (Dr Hilderbrandt

DIGESTIVE SYSTEM

STOMACH

Unnatural ravenous appetite even with diarrhea
Craving for acids and lemonade
Unquenchable thirst for large quantities of cold water
Nausea
Vomiting of blood and coffee ground fluid
Aversion to food, drinks especially hot
Constant eructation with bad odor

ABDOMEN

Cholera like symptoms due to summer weather, suppression of discharges
Profuse watery, fetid, brown exhausting, involuntary stools as if the anus
was wide open
Cold skin , yet can not bear to be covered
Cramps, extensor type
Pale face, pinched , sunken Hippocratic look with blue rings around eyes
Diarrhea with coldness of parts with aggravation by covering
Profuse exhaustive diarrhea
Involuntary stools
Olive green, thin, putrid stools
< heat > cold

SKIN

Shriveled, numb, mottled
Dusky, blue tinge
Sclerema
Gangrene, developing slowly
Burning sensation better by cold
Wants parts uncovered
Skin cold to touch yet < by covering
Great aversion to heat
Large ecchymosis and blood blisters
Skin hangs in folds as if very loose
Slight wounds continue to bleed, petechiae
Boils, small, painful with green contents
Formication under skin
Varicose ulcers

HAEMORRHAGE	Continuously oozing Thin, watery, black Fetid Blood with a strong tendency to putrescence Continuous bloody watery discharge between two periods so that it is practically speaking a continued flooding Great debility with hemorrhage Trifling would causes persistent bleeding Passive hemorrhage
MIND	Great anguish and fear of death Fear with desire to jump into water Loss of consciousness or consciousness seems to continue to the last breath and just before death, it seems as though the patient would improve Sad, irritable, nervous
NUMBNESS	Sensation of creeping or as if ants are crawling is very important Feels better by rubbing Numbness of limbs Sensation of deadness in any part Hemorrhage proceeded by numbness and tingling
MODALITY	
<u>AGGRAVATION</u>	Heat, warmth, warm application Covering Just before menses Touch
<u>AMELIORATION</u>	Open air Cold, cold drinks, cold application Uncovering Rubbing Wants to be fanned

A COMPARISON ON FEMALE SYMPTOMS:

	SECALE COR	SEPIA	ACT. RAC	SABINA
Menses	Copious Long lasting	Too late or too early Irregular	Delayed, irregular Profuse Suppressed	Menorrhagia, too early too profuse Too long lasting
Type of Blood	Dark blood Regular oozing until next period	Too scanty Too profuse Irregular	Coagulated Very offensive More the flow, more the pain	In paroxysms Protracted Partly liquid , partly clotted
Concomitants	Crampy pain Ü Coldness of skin	Bearing down sensation Ü Pain from back to front	Severe pain Ü Pain from hip to hip	Labor like pain From sacrum to pubes

	Internal heat	Prolapse uterus Yellow leucorrhoea before menses	With hysterical and chorea Rheumatic pains	Music is intolerable Rheumatism
Labor	Weak labor pain No expulsive action		False labor pain Electric like pain Shivering in 1 st stage	
Abortion	3 rd month			3 rd month
Constitution	Thin , cachectic Hemorrhagic diathesis HOT	Weak, earthy, yellow spots on face 'tell tale face' CHILLY	Hysterical Mental symptoms are important CHILLY	Tendency to abortion Hemorrhagic diathesis Chlorotic HOT
Modality	< just before menses, covering	< morning, washing, laundry work, before thunderstorm	< cold, during menses	< motion, warmth
	> open air, uncovering, cold application	> exercise, pressure, warmth	> warmth	> cold applications