# A study profile and incidence of organophosphate poisoning at Gandhi hospital, Hyderabad, and Telangana- A three year study

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## Abstract

**Introduction:** Nowadays, organophosphate (OP) compounds are widely used in agricultural field as an insecticide. Toxicity with these compounds is owing to inhibition of acetylcholinesterase enzyme. Patients are presented with muscarinic and nicotinic side effects.

**Objective:** To study the clinical aspect of OP poisoning in detail with hospital stay, clinical course, complication, and recovery and mortality in OP poisoning.

**Materials and Methods**: This study was done at Gandhi Medical College and in association with ayan Institute of Medical Sciences, Hyderabad India, comprising 271 cases of OP poisoning. After taking written consent, personal history of the patients was taken. Then, a detailed history regarding poison and clinical symptoms was taken. Then, general and systematic examinations of patients were carried out, and blood samples were sent for investigations. We followed up the patients till discharge or death.

**Result**: In our study, maximum incidence of OP poisoning was in between 21-30 years age group (40%), and male to female ratio was 4:1. Clinical symptoms such as unconsciousness, stupor (90.47%), vomiting (9.42%), convulsions (66.00%) are froth at mouth and nostrils (62.00%) and the common symptoms whereas constricted pupils (85.71%), pulmonary oedema (88.00%), Tachycardia (76.17%), hypotension (28.57%)are the common signs noted in this series of cases who were treated in the hospital and where the hospital records were available. Post-mortem appearances no specific anatomic changes are found in acute poisoning the changes are suggestive os asphyxia. The appearances are external or internal. The histopathological findings are not significant. Histopathological examination of tissue revealed usually congestion of brain, oedema and congestion of lungs and fatty degeneration in liver and in some cases cloudy swelling and tubular necrosis in kidneys.

**Conclusion:** Detailed history and thorough clinical examination of patients are helpful in diagnosing the patients of OP poisoning. Life-threatening complications occurred in these patients. Early detection and immediate treatment in intensive care units with injections atropine and PAM can increase the chances of survival rate of patients.

**Keywords:** Tachycardia, pulmonary oedema.

## Introduction

The organophosphate insecticides are the insecticide group of choice in the agricultural world and are the most common cause of poisoning among the pesticides. Over 80% of hospitalizations from pesticides poisoning were due to the organophosphate group, primarily involved were farmers, skilled and unskilled laborious and children.

The organophosphates have achieved great popularity because of their effectiveness as insecticides and their lack of persistence in the environment. Because of their unstablestructure, they disintegrate into harmless radicals within days after application. Thus they do not persist in body tissues, as do chlloraphenoethane (DDT) and the organochlorines and subsequently have replaced DDT as the insecticides group of choice.[1]

It was not until the great toll of lives that the insecticides took in Kerala 1958, that the effectiveness of the insecticides poisoning was fully realized. The following the knowledge of the highly lethal nature of these drugs, people have started using them in great numbers, particularly for suicidal purposes. The methods adopted by the prospective suicides have undergone are valuation in recent times. In Hyderabad the age old tradition of perspective suicides to die by drowning in to the hussain sagar lake or by taking death leap from the top of charminar have been replaced by the recent methods of killing one self by using organophosphorus compounds. In Telanagana poisoning due to insecticides is on the increase year after year. In the districts the incidence of deaths due to the use of Endosulfan (A chlorinated hydro carbon) is showing steady increase where as in the city of Hyderabad deaths due to TIC 20 have become frequent. This increase in deaths due to these poisons is perhaps due to easy availability of these insecticides. TIC 20 is being widely used almost in every household to get rid of the bugs and is easily available in the city. Similarly Endosulfan is used as an insecticide to protect the crops from insect pests and is available to all the cultivators. Statistics from the Gandhi Hospital show that the recent few years a good number of cases have been admitted into the hospital due to the poisoning with these insecticides and many of these cases proved fatal.

Organophosphate insecticides are highly toxic chemicals rapidly absorbed by all routes –respiratory, Gastrointestinal ocular and dermal. In spites of extensive regulations, careful labelling and educational efforts the public persist in being unaware that minute quantities of any chemical can be harmful or even fatal and that a chemical can penetrate intact skin without producing sensation. Here in lies the danger of these highly toxic compounds.[1, 2]

Individual organophosphate exhibits wide range of differences in their ability to penetrate skin, their oral absorption, and their toxicity. Tetra ethyl Chlorophosphate

(TEPP) was the first Organophosphate, synthesized in 1854, it came into use in Germany during World War II as an agriculture substitute for nicotine and for possible use as nerve gas in chemical warfare. Since TEPP is water soluble and directly acting, its absorption and on set of action are the most rapid by either the oral or dermal route. It is also the most highly toxic of the organophosphate insecticides.[2]

Parathion, organic derivatives of phosphoric acid was, recognised shortly after world war II as the most effective of the 50 or more organophosphate for insecticidal use. Since parathion must first be converted to paradoxes to be physically native, symptoms from parathion intoxication are often delayed for 6- 24 hrs. of the organophosphate group. Parathion is the most common cause of human poisoning and fatality.

**Clinical effects of Organophosphate poisoning**

A dropin the choline esterase activity to 30percent of normal or lower is associated with toxic symptoms. In acute poisoning, manifestations generally occur only after more than 50percent cholinesterase is inhibited. The main clinical effects of organophosphate poisoning are:-

1. Muscarine effects
2. Nicotine effects
3. Centralnervous system effect

Illness first effects involuntary muscles and secretary glands then voluntary muscles, and finally brain centres.

The high incidence of poisoning and high incidence of mortality rate have prompted me to undertake a study of these cases in detail.

## Materials and Methods

**Place of the study and study period**

Cases of suspected poisoning with organophosphate and carbamate compounds were studied amongst the dead bodies that have come for post-mortem examination to the Department of Forensic Medicine, Gandhi Hospital, and Hyderabad in associating with Ayan Institute of Medical Sciences, Hyderabad during the period between January2016 to December 2018.

A through postmartem examination was done, on each case. The entire case histories of the patients from hospital records and from the patients relatives were taken to learn the antimortem behaviour of they patients. After the post-mortem examination the tissue were submitted to Histopathological examination, all the viscera were sent to the Director, Forensic Science Laboratory, Govt. of Telangana for necessary toxicological analysis.

The diagnosis of poisoning with organo phosphate and carbamate in the cases under study was made on the basis of clinical history, post-mortem examination findings and report of chemical analysis. However in these cases, where the post-mortem appearance and clinical history were clearly and unequivocally indicating that the cause of death was due to pesticide poisoning, much reliance was not attached to negative chemical analysis report.

An attempt has been made to ascertain the manner of death in case of each, taking into consideration the history given in the inquest, the age of the deceased, the nature of the poison responsible for the death and other available information.

**Routes of administration**

In all the cases whether suicidal, Homicidal or accidental the poison is administered orally. Only in some cases poisoning resulted from accidental contamination of the skin while spraying, Poisoning through respiratory tract also can occur due to inhalation of poison while spraying even while spraying with protected cloths.

**Physical Examination**

On physical examination the presence of diaphoresis (Increased sweating), meiosis, Lacrimation, excessive, salivation, Reparatory distress with wheeze, disturbances in consciousness or orientation, Rhonchi and rales, Bradlycardia or Irregular heartbeat, weakness or paralysis, extension plantar responses and muscle fasciculation may be noted.

**Post-mortem appearances**

No specific anatomic changes are found in acute poisoning. The changes are suggestive of asphyxia the appearances are external or internal

Externally the face is cyanosed. There is froth at the nose and mouth, and the froth may be blood strained. Kerosene like smell may be perceived.

Internally the stomach contains greenish oily substances used as diluents and their kerosene like smell easily perceived. The contents of the stomach are blood stained, mucosa is congested and sub mucosal patecheal haemorrhages and hyperacimea are seen. The other post mortem findings are pulmonary oedema, capillary dilation, patecheal haemorrhages and hyperaemia of lungs, brain and other organs. In delayed paralysis of extremities induced by parathion, malathionand other compounds the findings are demylenation of ascending and descending spinal tracts with degeneration of motor horn cell. Organophosphate compounds resist the decomposition and they have been detected in highly decomposed bodies that have been between 3-7 days prior to post-mortem examination.

Since alcohol makes the smell and these compounds have been used with alcohol for homicidal purposes the viscera for chemical analysis should be preserved in saturated solution of sodium chloride in suspected cases of organophosphate poisoning.

**Chemical analysis**

The viscera of the study group cases (50%) were subjected to chemical analysis which revealed the presence of organophosphate compound in 36 cases, carbamate insecticide in 12 cases, no poisonous substance could be analyzed in one case and in one case final opinion is pending report of director state forensic sciences laboratory. In all the positive cases the poison was found in stomach, small intestine, liver, kidney and blood.

**Method of analysis**

The viscerathat are sent to forensic science laboratory are analysed mainly in two steps.

1. Extraction of the poison from the viscera
2. Identification of the poison.

These two steps are briefly described here, taking example of monochrotophos (also called Azodrim), which falls founder aliphatic organophosphate poison.

**Extraction of Organophosphate compound**

Take approximately 200 mg of viscera in a big bowl and cut into small pieces. Make it acidic with 1:4 HCL acids. Add 100 ml of solvent (Hexane). Stir it and wait for 10min. Now take the solvent into separating funnel and add few mi of distilled water. Shake well for 2-3 times. Remove the lower aqueous layer and add 2% NaOH and shake it. Filter of the lower layer. Then take upper layer and wash with distilled water two times and reject the washings. Next take the upper layer and evaporate in fuming chamber. The residue is the neutral poison, which is monochrotophos in this case.

**Identification techniques**

Chromatography is the technique widely used for identification. This is process in which a mixture carried in a mobile phase (either liquid or gas) is separated as a result of differential distribution of the solutes between the mobile phase and a stationary liquid or solid phase around or over which the mobile is passing.

**Types of Chromatography**

1. Thin layer chromatography
2. Gas chromatography
3. Gas chromatography coupled with mass spectrometer (G.C.M.S)
4. High pressure thin layer chromatography (H.P.T.L.C)

Among these T.L.C is the most commonly used and most sensitive technique which can detect as little as 10 mg of poison. HPTLC is the quicker method which takes only few minutes.

**Thin layer chromatography**

TLC is one of the techniques of chromatography where the stationary phase is silica gel G coated on a glass plate and the mobile phase is the liquid**.**

**Preparation of Glass plates (Coated with silica gel G 0.25 mm thick)**

Weight about 45 gms of Silica G (GYPSUM) and take it into mortar and thistle, add 90 ml of distilled water makes slurry. Spread on the five glass plates. Allow to dry in air. Heat in oven at 80oc for 1 hr. cools it and use.

**Preparation of Glass tanks (Neutral)**

Using Hexane and acetone in the ratio of 8:2

**Visualising agents for organophosphates**

1. Mercury nitrate (5 %)
2. After 1 hr Di phenyl Cabazon (1% prepared in 100 ml ethyl alcohol)

**Procedure**

Take the evaporated neutral dish make the mass in the dish into solution with in 10 drops of acetone. Apply about 15 micro lit of the solution at the bottom of the glass plate. Also apply control sample at 2.5 cm away at same height. Put this plate in glass tank and run up to 15 cm from point of application. Then take it out of the tank, dry and spray with reagent.[1]After one hour again with reagent.[2] Compare the Rf values. If they are at the same height and of the same colour then it is sure that sample and control are of the same chemical nature.

**Histopathological Examination**

The histological examination was rather insignificant, Congestion is found in all the organs. Lungs showed pulmonary oedema and congestion. Liver showed congestion, fatty degenerating haemorrhage into the inter sinusoidal spaces, and distortion of liver lobules. Kidneys showed congestion, cloudy swelling and pigmented casts. Brain gets soften with some times leads to haemorrhage into the pons with large amount of blood in the ventricles. Haemorrhage can also be due to hypertension produced by these compounds.

**Products and solvents used**

Tik-20 (Diazenon) and parathion (Folidol) are the products commonly used. They are mixed with aromax which gives the smell of kerosene. Tik-20 is mostly used because it is commonly used in the house to kill bugs and as readily available. Among the carbamatebaygon spray (Propokur) is commonly used as household and garden insecticide.

**Routes of Administration**

In all the cases oral route was used to administer the poison. Skin contamination is not found because spraying problems are not present in the city.

**Medicolagal importance of Organophosphate compounds**

Organophosphate compounds are extensively used as pesticides in agriculture. Some of these substances are in common domestic use for the destruction of vermis and rodents.

Most of the cases are suicidal only, as the public has no difficulty in obtaining them and when the impulse to commit suicide arises, they are ready at hand. They are cheaply and easily available and it is most effective and kills the persons quickly.

A number of non-fatal, accidental cases have been recorded in persons, handling fruits sprayed with these compounds. A number of accidental deaths through contamination and leakage of these compounds to edible commodities have also been recorded (Keral food poisoning cases). Since some of the compounds in concentrated farm are intensely poisonous to human beings. Their use on large scalesin

spraying has caused a number of deaths, or by taking food or drink with contaminated hands.

## Results

**Table 1:** Showing the incidence of poisoning cases among the total number of post-mortems done in the department during the year 2018.

| Cases | No of cases | Percentage |
|---|---|---|
| Total number of | 1841 | |
| Number of poisoning | 271 | 14.728% |

**Table 2:** Showing the incidence of cases poisoned with organophosphate compounds among the total number of post-mortems done

| Cases | No of cases | Percentage |
|---|---|---|
| Total number of post-mortems done | 1841 | |
| Number of organophosphate poisoning case | 183 | 10% |

**Table 3:** Showing the number of cases with organophosphate compound among the total number of poisoning cases

| Cases | No of cases | Percentage |
|---|---|---|
| Total number of poisoning cases | 271 | |
| Number of organophosphate poisoning cases | 183 | 67.5% |

**Table 4:** Showing the number of poisoning cases other than organophosphate compound during the year

| Cases | No of cases | Percentage |
|---|---|---|
| Total number of poisoning cases | 271 | |
| Number of poisoning cases other organophosphate compounds | 44 | 16.23% |

Table 1 shows that the suspected poisoning cases formed nearly 15% of total post-mortems during the year 2018. 10% of the total post-mortems or the cases poisoned with organophosphate compound.

It is clear from Table 2 & Table 3, that among the total number of suspected poisoning cases 67.5% of cases are of organophosphate compound poisoning.

Table 4 shows the incidence of cases of poisoning other than organophosphate compounds, which include alcohol and endosulfan, Diazepam, Herbal poisons and corrosive poisons during the year 2018. It is about 16%

Table 5 Shows that the incidence of poisoning with organophosphate compound is gradually increasing year o after year from 2016-18. It was 7% in the year 2016 and suddenly increased to 10 % in the year 2018.

**Table 5:** Showing the incidence of cases of organophosphate compound poisoning cases in the last 3 years

| Year | Total number of post-mortems done | No. of organophosphate compound poisoning cases | Percentage |
|---|---|---|---|
| 2016 | 1866 | 131 | 7% |
| 2017 | 1833 | 135 | 7.36% |
| 2018 | 1841 | 183 | 10% |

**Sex incidence**

**Table 6:** Showing the sex incidence of these cases

| Sex | No. Of. cases | Percentage |
|---|---|---|
| Male | 31 | 62% |
| Female | 19 | 38% |

The above table shows that 62% of cases were males and 38% of cases were females in the series of cases i have studied during the period January 2016 to December 2018. This clearly shows that the incidence in the males higher than females.

**Age incidence**

**Table 7:** Showing the Age incidence from the study group cases

| Age group | No. Of cases | Percentage |
|---|---|---|
| 0-10 yrs | --- | - |
| 11-20 yrs | 13 | 26% |
| 21-30 yrs | 20 | 40% |
| 31-40 yrs | 07 | 14% |
| 41-50 yrs | 06 | 12% |
| 51-60 yrs | 04 | 08% |
| 61 and above | - | - |

From the above table it is clear that the majority of cases are in the third decade. Number of cases is reported below 10 yrs of age and above 61 yrs of age. From the above data even though it is apparent that more suicides are committed by the younger persons, it is also striking that a large number of elder persons have also fallen victims to this evil.

**Religion incidence**

**Table 8:** Showing the religion incidence from the study group

| Religion | No. Of cases | Percentage |
|---|---|---|
| Hindu | 44 | 88% |
| Muslims | 06 | 12% |
| Christians | - | - |

The above shows that the incidence in Hindus is relatively high due to their agricultural background which is less in Muslims and Christians. Because of the agricultural background the insecticides are easily available at hand and hence more incidence among Hindus.

**Sign and symptoms**

Out of 50 cases under study 8 cases brought dead, hence no signed and symptoms could be noted. For the remaining 42 cases where the hospital records were available, the clinical data were recorded.

**Table 9:** Showing the symptoms among the cases studied

| Symptoms | No. of Cases | Percentage |
|---|---|---|
| Unconsciousness | 38 | 90.47% |
| Vomiting | 04 | 9.42% |
| Semi consciousness | 04 | 9.42% |
| Convulsions | 28 | 66.06% |
| Froth at mouth & nostrils | 26 | 61.09% |

**Table 10:** Showing the frequency of Signs among the cases studied

| Signs | No. of cases | Percentage |
|---|---|---|
| **Neurological signs** | | |
| Constricted pupils | 36 | 85.71% |
| Dilated pupils | 02 | 4.76% |
| Fasciculation | 05 | 11.9 |
| **Respiratory signs** | | |
| Signs of pulmonary oedema | 37 | 88.00% |
| Cyanosis | 15 | 11.9% |
| Consolidation | 04 | 9.52% |
| **Cirulatory signs** | | |
| Peripheral circulatory failure | 04 | 9.52% |
| Tachycardia | 32 | 76.17. |
| Hypertension | 03 | 7.14% |
| Hypotension | 12 | 28.57% |

From the above it is observed that unconsciousness, stupor (90.47%), vomiting (9.42%), convulsions (66.00%) and froth at mouth and nostrils (61.09%) were the common symptoms whereas constricted pupils (85.71%), pulmonary oedema (88.00%), Tachycardia (76.17%), hypotension (28.57%) are the common signs noted in this series of cases who were treated in the hospital and where the hospital records were available.

Constricted pupils are the most important signs. However, it may not be seen in every case. In this series two cases were studied who had dilated pupils. This is probably due to excessive amount of alcohol taken along with poisoning in these cases.

**Fatal doses**

Fatal dose varied from half a spoon to one ounce. It could not be given in mg. In most cases as the poison is not found at the scene of offence and the individual may not be in a position to give the correct figure

**Fatal period**

**Table 11:** Showing the fatal period in study group cases

| Fatal period in hours | No. of. Cases | Percentage |
|---|---|---|
| Within half an hour | 2 | 4% |
| 1/2-1hr | 16 | 32% |
| 1-2 hrs | 08 | 16% |
| 2-4 hrs | 06 | 12% |
| 4-8 hrs | 02 | 4% |
| 12-24 hrs | 03 | 6% |
| 1-2 days | 03 | 6% |
| 3 days and above | 02 | 4% |
| Could not be ascertained(brought dead) | 08 | 16% |

From the above table it is evident that most patients died between half to 1 hour. 64% cases died within 4 hours. The acute effects in nonfatal cases last for 6-30hrs, fading during the next 48-72hrs or sometimes persist for as long as 3 weeks.

**Treatment**

Several cases survived from the poisoning effects with the treatment given at Gandhi hospital. Few however did not respond to the treatment and succumbed to death. Atropine is the sheet anchor in these cases. Maximum doses of atrophine are given with relief in many cases. But unlike with organophosphate poisoning, large doses of atropine are not usually needed and atropinisation may be necessary for only 6-12hrs for majority of the patients in carbamatepoisioning cases.

In organaophosphate poisoning cases it is given for at least 24hrs.

Cholin esterase reactivators i.e., PAM is given as an initial dose of 1 gm or 25-30 mg/kg to children, of 15-30

minutes in poisoning by both organophosphate and carbamante compound cases.

Truly speaking it is not indicated in the patient with pure reversible and readily dissociates. But in the cases i have studied it is given when a patient presents with symptoms typical of choline esterase inhibition and the insecticide either un known or not definately known, the other indication for its use is when the patients suffers from concomitant organophosphate and carbamate insecticide poisoning. Early studies reported that parlidoxime reduced the antidotaleffects of atropine in the management of carbamate poisoning especially with carbaryl.

Gastric lavage is done in all cases taking usual precautions with tap water with or without potassium permanganate to remove the ingested material. Suction was done where large amounts of recreations have collected.

Decadron is given in majority of the patients which is supposed to help in treatment particularly in patients with circulatory collapse.

I.V fluids have been given to all the cases as required. Antibiotics are given to prevent and control the secondary infections.

In very serious and complicated cases cardio pulmonary resuscitation was done along with administration of intra cardiac adrenaline and even the D.C. shock was given to save the case.

**Post-mortem appearances**

**Table 12:** Showing the appearances among the study group cases

| Post-mortem appearances | Percentages |
|---|---|
| **I External** | |
| Bluish nails & lips | 93% |
| Dilated pupils | 91% |
| Froth at mouth & Nostrils | 75% |
| Kerosene like at froth | 15% |
| Relaxed sphincters | 16% |
| | |
| **II Internal** | |
| Congestion of brain and meninges | 75% |
| Congested respiratory passages filled with froth | 55% |
| Oedema & congestion of lungs | 98% |
| Right side of heart filled with blood | 50% |
| Smell of kerosene in body cavities | 37% |
| Cogestion of stomach | 76% |
| Smell of kerosene in stomach contents | 78% |
| Kerosene like smell in small intestine | 42% |

Post-mortem appearances were almost similar in both organophosphate and carbamate compound poisoning cases. No specific anatomic changes are found in acute poisoning. The changes are suggestive of asphyxia. The appearances are external or internal.

Post-mortem staining was found on the more dependent parts of back and was purple in colour. Nails and lips were blue. Pupils are dilated or normal in size, rarely it was constricted. Conjunctive was found congested. White serous froth was found at nostrils and mouth in 75% of cases sometimes stained with blood. Kerosene like smell was present in the froth in about 15% of cases. Sphincters were relaxed and in 16% of cases the clothes were stained with faecal matter. Brain and meninges were congested (75%). The respiratory passages were congested and contained froth (55%). Lungs showed massive oedema and congestion in every case. The lungs were voluminous, cut sections exuded frothy blood. Right side of the heart contained dark blood and is full (.50%). The patecheal haemorrhages were not noted in any case. The body cavities gave the smell of kerosene (37%). Stomach was found to be congested (76%). It contained food (16%). Smell of kerosene is found in the stomach contents (78%). Small intestine is very important in that it gave smell of kerosene in (42%) of cases where there is no smell in the stomach, probably due to stomach wash. The kerosene like smell is due to the solvent aromax which is used to dilute the poison. All abdominal viscera were congested.

In one case, the heart was enlarged and dilated. Right side of the heart is filled with dark coloured blood. Peripheral oedema was present over the feet suggestive of congestive heart failure (P.M.E.N. 1572/2018). Here it is concluded that the poison is the cause of death in this case and not the heart disease as the later was there for quite a long time and because the poison kills person immediately. In another case tuberculosis was an associated finding.

**Histopathological Examination**

The findings are not much significant, following are the findings noted:

1. Congestion in the brain
2. Congestion, Oedema, consolidation and distension of the alveoli in the lungs.
3. Congestion of the stomach
4. Congestion, Fatty degeneration, haemorrhages into the intersinusoidal aqueous and distorted lobules in the layer.
5. Congestion and cloudy swelling in renal tubules and pigmented casts in some cases.

## Discussion

The incidence of cases of poisoning with organophosphate is on the increase. Poisoning hereby organohosphate compound is most commonly from diazenon and parathion. These insecticides are easily available, cheap most effective and kill the person in a short time. Therefore the study of poisoning by organophosphate compound is thought necessary and an attempt is made here.[3]

In the present study, the incidence of organophosphate compound poisoning cases is found to be 10% and 1.15% respectively of all total post-mortem done 67% of all the poisoning cases. The incidence is found to be on the increase.

**Sex Incidence**
Incidence among the males is more than the females.[3]

**Age incidence**
Most of the cases occurred in the third decade. No case is reported below 10yrs and above 61 years of age.[4]

**Race incidense**
More number of cases has been reported among the Hindus than the Muslims.[3]

**Products commonly used**
Tik -20, (Diazenon) and Follidol, are commonly used among the organophosphate group, they are mixed with aromax which gives the smell of kerosene.

**Route of administration**
In the entire cases oral route was used.

**Signs and symptoms**
Unconsciousness (90%), vomiting (9.4%), and convulsions are the common symptoms. Whereas constricted pupils (85%), pulmonary oedema (88%), Tachycardia (76%) and hypotension are the common sigs.[5,6]

**Fatal dose**
Varied from half spoon to one ounce.

**Fatal period**
Most patients died between ½ -2 hr. 64% of cases died within 4 hours.

**Treatment**
Atropine sulphate is the sheet anchor of the treatment, in organophosphate insecticide compounds. Large doses are tolerated. Cholinesterase reactivations are most useful and lifesaving and are now easily available in India. Several prophylactic and supportive measures studied.

**Post-mortem appearances**
No specific anatomic changes are found in acute poisoning. The changes are suggestive of asphyxia.

**Chemical analysis**
Chemical analysis revealed the presence of organophosphate compounds. The poisons are found invariably in stomach, intestine, liver, kidney and blood. Sometimes alcohol is found along with organophosphate compound.

**Histopahological examination**
The findings are not significant. Histopathological examination of tissue revealed usually congestion of brain, oedema and congestion of lungs and fatty degeneration in liver and in some cases cloudy swelling and tubular necrosis in kidneys.[7,8]

**Medicolagal importance of Organophosphate compounds**
Organophosphate compounds are extensively used as pesticides in agriculture. Some of these substances are in common domestic use for the destruction of worms and rodents.
Most of the cases are suicidal only, as the public has no difficulty in obtaining them and when the impulse to commit suicide arises, they are ready at hand. They are cheaply and easily available and it is most effective and kills the persons quickly.
Anumber of non-fatal, accidental cases have been recorded in persons, handling fruits spryed with these compounds. A number of accidental deaths through contamination and leakage of these compounds to edible commodities have also been recorded (Keral food poisoning cases). Since some of the compounds in concentrated farm are intensily poisonous to human beings. Their use on large scales in spraying has caused a number of deaths, or by taking food or drink with contaminated hands.

## Conclusion
As agricultural industries are growing, OP poisons are widely used as insecticides. For diagnosis, we require detailed history and clinical examination, with the support of laboratory investigations such as AchE level. Maximum incidence of poisoning is found in younger age group. Patients are presented with muscarinic and nicotinic signs and symptoms. Among complications, ARDS is more dangerous. Chances of survival are high among patients who reached hospital earlier and received immediate treatment in intensive care unit. Injections Atropine and PAM are very helpful to treat the patients.

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