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EPIDEMIC OF INHALATIONAL POISONING IN YAVATMAL SEASON-II

Pharmacology

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ABSTRACT

Background:- Inhalational organophosphorus (OP) compound poisoning was suddenly raised up to epidemic proportion in Yavatmal district in 2017. During this crop year 2018, the incidence of inhalational OP poisoning was drastically decreased below 30%. Randomized, retrospective, observational study was carried out to find the cause of this drastic change.

Methods:- Thorough study of the case papers of inhalational OP poisoning patients from the record section and HMIS of S.V.N.G.M.C. Yavatmal was done. Complete data was collected and interpreted. Analysis of data done on seven points, sprayer's bio data, insecticide used, spray pump used, seed/crop conditions, environmental conditions, treatment part and preventive measures by the Agricultural department.

Results:-Data collected from July 2018 to November 2018. Maximum number of cases were admitted in September 2018. Total 166 cases were admitted and no death reported. Majority of them were professional sprayers and at this time they had taken intra and post procedural precautions. Endosulfan was the commonly used insecticide. Large amount of Pralidoxime and small amount of Atropine was used for treatment. Environmental factors and preventive measures by Agricultural department played vital role in this drastic change.

Conclusion:-Spraying precautions given by the Agricultural department, environmental factors, control of adulteration and good work by medical staff decreased the case load in 2018.

KEYWORDS

OP, inhalation, poisoning, season-II, epidemic, spraying.

INTRODUCTION

During last crop year 2017, spraying of the crop leads to around 570 cases of inhalational organophosphorus compound poisoning. They were admitted in a tertiary care hospital, Shri Vasantrao Naik Government Medical College and Hospital, (S.V.N.G.M.C.) Yavatmal. Out of these, 13 patients were died even after full intensive care. This sudden rise was considered to be That become a national news of last crop year. The details of this epidemic was published in February 2018 issue of International Journal of Scientific Research 1. Present study is designed to find out the presentation of inhalational organophosphorus compound poisoning cases during this crop year 2018.

Generally organophosphorus compound poisoning is common in Yavatmal region. Farmer's suicide by ingestion of organ-phosphorus compound is endemic in Vidarbha region2 . But inhalational OP poisoning due to spraying of crop is uncommon. From last year the incidence of inhalational OP poisoning which occur accidentally during spray of crop was increased. Whatever sporadic cases reported in past were mild and doesn't require serious treatment. From last year inhalational OP poisoning require ICU care, ventilator support and intensive drug therapy.

During this crop year 2018, total number of inhalational OP poisoning cases admitted were 166, significantly lesser than previous years 570 cases. There was no mortality this year as compared to the 13 deaths in 2017, though 16 cases were put on ventilator. It is very interesting to know how this drastic change have occurred. So we carried out a randomized, retrospective, observational study at S. V. N. G. M. C. Yavatmal to find out the reason behind this drastic change.

MATERIAL AND METHODS

This study was conducted in the Department of Pharmacology and Medical Record Section and HMIS of S. V. N. G. M. C. Yavatmal. It is a randomized, retrospective, observational type of study carried out by thoroughly studying the case papers of inhalational poisoning patients admitted in ICU and ward no. 18 of S. V. N. G. M. C. Yavatmal during 1st June 2018 to 27th November 2018 3 .

Inclusion criteria

Only inhalational poisoning cases were included in this study. Contact poisoning due to leakages in the spray pumps, handling of OP compound while preparing the mixture of insecticidal spray and accidental contact over other body parts were included. Ingestion of OP compound orally, unintentionally while taking tobacco, pan or gutkha (different forms of tobacco) were also included as tobacco chewing is common in Vidarbha. Non-sprayer passive inhalers were also included in this study.

Exclusion criteria

Orally ingested suicidal or homicidal OP compound poisoning cases were excluded. Persons having past history of hypertension, ischemic heart diseases, congestive cardiac failure, valvular heart diseases, other form of heart diseases , diabetes mellitus, chronic obstructive pulmonary diseases, pulmonary tuberculosis were excluded from the study.

Study Points

Detail data about following points were collected. 1. Detail bio-data of the sprayer. 2. Insecticides used. 3. Spray pump used. 4. Seed and crop conditions. 5. Environmental condition. 6. Treatment received by the patients after inhalational poisoning. 7. Preventive measures taken by the agriculture department.

Bio-data of the sprayer:- Name, age, sex, caste, residential address, etc. were recorded. Personal history of tobacco, pan or gutkha chewing/cigaratte or bidi smoking as well as socioeconomic history was also taken. Occupational history of professional sprayer or a new comer or owner of the farm was collected. Personal precautions like protective clothing, mask wearing, hand gloves using, direction of wind before spraying, etc. taken or not. How many hours/day spraying was done regularly? Before admitted how many days of spraying was done continuously? Whether tobacco, pan, gutkha were taken during spray? Whether bath was taken after spraying was over? Date of admission and date of discharge from the hospital.

Insecticides used:- Proprietary and non-proprietary names of insecticides used for spraying. New changes made during this crop year. Steps taken by the government and the non government organizations for preventing highly toxic or adulterer OP compounds.

Spray pump used:- Type of spray pump used (manual / battery operated / petrol or diesel operated). Whether the same spray pump was used last year? Proper training of spray pump handling taken or not ? Spraying capacity of the pump (agricultural land sprayed per day). Type of aerosol produced by the spray pump. Whether the spray pump have any leakages ?

Seed and crop conditions:- Type of crop on which spraying was done (cotton, soya bean, Bengal gram, other crops). Height of the crop at the time of spraying (below knee, up to the height of the sprayer, or more than the height of the sprayer). Whether any

new type of seeds were used this time (2BT or 3BT) ?

Environmental condition:- Whether the raining occurred was adequate / inadequate / more than sufficient in the affected areas ? Was the raining came at appropriate time ? Whether raining affected the frequency of spraying ?

Treatment received by the patients after inhalational poisoning:- After how many hours initial symptoms develop ? Whether PHC / RURAL Hospital treatment taken as a primary measure ? Within how many hours patient admitted in S. V. N. G. M. C. Yavatmal after OP compound spraying ? How many injections of pralidoxime were utilized for treating the patients ? Any new change made in the treatment schedule ? Whether patient put on ventilator, if yes then for how many days ? How many days patient remain admitted in ICU, ward ? What was the outcome of the patient (cured and discharged / refer to higher centers / discharged against medical advice / absconded / died) ?

Preventive measures taken by the agriculture department:- What preventive measures were taken by the agriculture department to minimize OP poisoning at farmer and sprayer level ? Whether spraying compound was changed or adulterated ? What measures were taken against the culprit of adulteration ?

Observations

Inhalational OP poisoning data was collected right from the first patient admitted in medicine department on 4th August 2018 up to 11th November 2018. No case was admitted after 11th November 2018. Total 166 cases were admitted during August to November 2018. There was no inhalational poisoning case admitted in the month of June and July 2018. There were 134 cases admitted in New ICU and Poison Ward directly. Out of these only 16 cases were very critical and show absent neck holding. These 16 cases were put on ventilator and started intensive dosing of Injection Pralidoxime 1 gm /hour. Rest 34 cases were mild type of poisoning and directly admitted in Ward no.12. (table no. 1). Largest number of cases were admitted during the month of September 2018.

Age of inhalational OP poisoning cases ranges from 20 yrs to 45 yrs. Duration of spraying was ranges from one day to one week. Total duration of hospital stay of patients ranges from one day to more than one month. Patients put on ventilators were remain admitted for longer duration than the mild cases. History of exposure to inhalational fumes of OP compound was from one day to one week of daily spraying.

Majority of the sprayers were professional sprayers. Nearly all professional sprayers were of low socio-economic state and farm worker by occupation. During this crop year 2018, majority of them have taken "spraying precautions" as the demonstrations given by the agriculture department staff. Most commonly used insecticide was endosulfan.

It was also observed that majority of the cases were come from Kalamb tehsil. After thorough search by the Police department unregistered, invalid OP insecticidal spray manufacturing unit was found. As soon as it was sealed the OP inhalational poisoning cases were drastically decreased.

Majority of the sprayers used either battery or petrol / diesel operated pumps. Most of them sprayed cotton crops whose height was around 3 foot to 5 foot. During this rainy season heavy raining was occurred in June, July and August months. Continuous raining destroyed the crops and decreased the frequency of spraying.

During this time two training CME of toxicology were arranged by S. V. N. G. M. C. Yavatmal, for all junior and senior doctors. National and international faculties of toxicology department guided the local doctors and treatment shifted from intensive use of atropine to intensive use of pralidoxime therapy4,5 .

After thorough interview with agriculture department, it was observed that they had done a tremendous job during this crop year 2018. The agricultural officers and other technical and non-technical staff members had given extensive demonstrations about correct and scientific method of spraying to majority of professional sprayer. They had given information about using proper insecticides, doing proper mixing of OP compounds, avoiding highly poisonous, illegal and dangerous compounds. They strongly implemented the GR of Maharashtra Government that "it is the responsibility of the owner of the field, if any OP poisoning occurs during spraying". So the owner of the farm has taken utmost preventive care of sprayers.

DISCUSSION

During this rainy season right from June up to September 2018, raining was more than sufficient. Due to heavy and continuous rain the frequency of spraying was decreased. Heavy rain leads to loss of crop as well as decreased yield. Crop attained normal or less than normal height. Sprayer's height was more than the crop height. So the nozzle of spray pump pointed towards ground level. This decreases the inhalation of aerosol of OP compound. This may be one of the factor which decreased inhalational OP compound poisoning this crop year.

As the raining was continuous, chances of crop disease was decreased as the disease agents are washed away by rain drops. Generally cotton crop require three to five rounds of insecticidal spraying. As the spraying can't be done during raining, ultimately the frequency of spraying was reduced to two to three rounds. Due to that the exposure to OP compound inhalation was reduced and poisoning cases may be reduced.

As per the information given by the agricultural department of Yavatmal, around 40,000 professional sprayers are present in Yavatmal district. These are low socio-economic, young (age range 25 to 35 years) and hard working peoples. They try to earn more money during the crop season of four to five months. By using manual spray pump they could spray only 1 to 1.5 acres of land and earn only 500-750 rupees per day. By using battery / petrol or diesel operated pumps about 5 to 7 acres of land could be sprayed and earn 2500 to 3500 rupees per day.

It was observed that during this crop year large number of cases were come from Kalamb Tehsil. There was an industrial area called Dewali. After thorough search, an illegal production of more poisonous insecticides was found In the industrial area. This doubtful compound was found to be adulterated with OP compound, for earning more money. Once the insecticide industry sealed, number of OP poisoning cases were drastically decreased. Unauthorized, more poisonous compound spray or adulteration of these compound with endosulfan might lead to chemical interaction and inhalational OP compound poisoning.

The professional sprayers had experience of last year's inhalational poisoning episode. They had undergone the proper training about preventive measures i.e. pre-procedural (finding direction of wind, discarding leakage pumps), intra-procedural (wearing protective clothing, mask, caps, hand gloves, etc. Thoroughly washing hands before taking tobacco by poison covered hands) and post-procedural (taking bath immediately after spraying) by the Agricultural Department. The officers of Agricultural Department had forcefully implemented the GR of Maharashtra Government that it is the solemn responsibility of the owner of the field if any inhalation poisoning occurs during spray of insecticides. So the owners forcefully insisted the use of mask, cap and protective clothing for all their sprayers. This was the major factor responsible for decreasing the incidence of OP inhalational poisoning during this crop year.

There was no mortality during this episode of inhalational poisoning, Otherwise total 13 deaths were reported last year. Total credit of this nil mortality goes to the medicine department as well as dean of S. V. N. G. M. C. Yavatmal. They had taken lot of efforts like separate ICU unit for inhalational OP poisoning cases, full availability of all necessary medicines (specially injection pralidoxime) and instruments (mainly ventilators) and excessive untiring work of all staff. Dean S. V. N. G. M. C. Yavatmal had arranged two CME on toxicology to update the knowledge of resident doctors about treatment of OP inhalational poisoning. Due to up gradation of knowledge, treatment scenario totally changed. Last year injection atropine was the main treatment and injection Pralidoxime was given 1 gm. twice or thrice per day. Now injection Pralidoxime was the main treatment

and given 500mg-1 gm./hour. This intensive treatment definitely stop mortality4,5.

As compared to previous crop year only 30% inhalational OP compound cases were admitted during this crop year. This drastic decrease may be due to increased awareness of the professional sprayer about inhalational poisoning. Scientific method of spraying, using preventive precautions seriously and use of safe OP compound and last but not the least untiring effort of S. V. N. G. M. C. Yavatmal staff are the factor which profoundly decreased the inhalational OP compound poisoning this crop year 2018.

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