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Tackling patient complaints

H. Kumar

There has been a marked increase in litigation and medico-legal cases against doctors in India in recent times. If we go down to the roots of the problem then almost always the starting point of these complaints is a breakdown in communication and trust between the doctor and the patient. The importance of spending an adequate amount of time explaining matters to the patient and their bystanders in a way that they clearly understand, at every stage in the treatment process, cannot be over-emphasized. It is equally important to carefully and clearly document such communication, so that in the event of any future litigation all communications from the doctor's side should be clearly visible in the case notes.

Unfortunately both these aspects viz. communications skills and appropriate documentation are not given enough importance in the medical curriculum and many young doctors who are fresh graduates have to develop their own techniques for effective communication. As far as documentation of medical, surgical notes or outpatient notes are concerned, there is a general attitude of casualness among the medical fraternity in our country which may be the cause great confusion in cases of medico-legal litigation. When inadequately documented notes are scrutinized by the courts, this will create a negative impression which may be detrimental to the physician. To address these maladies it is essential to train our budding doctors in developing the two vital qualities of effective timely communication and thorough professional documentation right from their student days.
Spiritual Message

As doctors we always say that we should learn to have empathy and understand our patients and their concerns. But in the hurly-burly of modern day medical practice we frequently overlook this vital aspect of patient care i.e. empathy. Here is a parable narrated by Amma which gives us an insight into how a proper understanding of the sufferings of others will bring about a sea-change in our attitude and behaviour.

One day a young man had a very bad day at his office. He was irritated and frustrated with the way of things were going on at his work place. In order to cool his temper he went to a nearby park and sat down on a bench to relax quietly for some time. A short distance from him was another bench on which he noticed a lady sitting as if she was in a trance. Her three small children were running around and making a lot of noise which he found disturbing. Soon the noise levels of the children increased and he found the disturbance intolerable. The mother of the children was doing nothing to control or quieten the children. The young man finally lost his temper and went up to her and shouted, “Why don’t you discipline your children instead of sitting and staring into space. I came here for some peace and quiet, but your children are too noisy and irritating.”

The lady burst into tears and began to sob uncontrollably. The young man was taken aback. He sat down beside her and apologized and asked her what had happened. The lady continued to cry, and in between her sobs she said that her husband was a soldier, and she had just received news that he had been killed in an accident. She was in a state of shock after hearing this terrible news and she had just walked out of her house with her children and sat in the park trying to come to terms with what she had just heard. The young man was very upset when he heard this. He tried his best to console the lady. He then took care of the three little children. He bought them balloons and ice cream and walked the lady and her children back to their home. When he returned home later that evening he realized that he had forgotten all about his frustrations at the office.

It is only when we take the time and effort to reach out to others and put our own frustrations aside, that we can see and understand their problems and point of view. Empathy and understanding the pain of others is a great quality which will not only redeem us and help our self-control, but also provide consolation to those who are suffering.
Occupational transmission of Human Immunodeficiency Virus (HIV): Role of emergency physician in initiating post exposure prophylaxis (PEP) as a medical emergency

Bharath Prasad S, Ajith V, Kripaanjali Karunanidhi, Sreekrishnan T, P, Gireesh Kumar K, P

ABSTRACT

Human Immunodeficiency Virus (HIV) infection possess major threat for Health Care Professionals as they are exposed to body fluids during patient care everyday and there is a high chance of developing blood borne infections. Hence, it is important to prevent such events by post exposure prophylaxis. Though the basic regimen of Zidovudine with Lamivudine combination will be equally effective, the affordability and the cost effectiveness play a major concern. The Doctors who work in Emergency Department play an important role in preventing these infections and must have a proper knowledge of post exposure prophylaxis (PEP) in various infectious diseases including HIV. It is essential that a proper health education to be given to all Health Care Professionals regarding handling of used injection needles. A written protocol should be framed by all hospitals for the incidence reporting, post exposure prophylaxis for all needle stick injuries.

Key words : Healthcare personal (HCP), Human Immunodeficiency Virus (HIV), Acquired immune deficiency syndrome (AIDS), Post Exposure Prophylaxis (PEP), Emergency department (ED)

INTRODUCTION

Occupational transmission of Human Immunodeficiency Virus (HIV) to health care personnel (HCP) is extremely rare nowadays. The risk of transmission of HIV infection following accidental exposure varies depending upon the type of exposure. The risk is increased when the source has a high viral load, the volume is large, and the exposure is deep. The potential consequences of exposure to body fluids from a retrovirus infected person have prompted development of policies and procedures designed to reduce the risk in HCP. The average risk of seroconversion after a needle stick injury is about 3 per 1000 with no antiretroviral prophylaxis. The management of this risk should form part of an integrated workplace safety plan. HCPs and members of the Post Exposure Prophylaxis (PEP) practice team should be aware of the risk, how to reduce it and what to do in the event of an exposure. Every hospital should have a policy on how to manage exposures, which ensures 24-hour cover. Many health care personnel exposures occur outside of normal office hours. HCPs and Clinicians may not have access to experienced HIV consultants or Occupational health services at odd hours. Since emergency departments (ED) are a 24 hours facility, EDs can have a major role in PEP against HIV transmission.

A systematic knowledge of PEP and guidelines for its selection and administration are an integral part of Emergency physician’s responsibility. This will enable swift and accurate decisions regarding necessity of PEP for HCPs. EDs play an important role in the initial management of occupational exposures. It is reasonable for them to develop clearcut policies to define high-risk occupational exposures and how this should be treated. With this, emergency physicians should assess the risk of HIV transmission and provide appropriate care for patients who present after exposure. Expert consultation should be available from an infectious disease/HIV expert in house in case of any difficult scenarios. These practices have already been practiced in the EDs of UK and USA, where PEP kits are available in ED itself for prompt initiation of therapy.

HIV - HUMAN IMMUNODEFICIENCY VIRUS

HIV can lead to acquired immunodeficiency syndrome, or AIDS. The four recognized human retroviruses belong to two distinct groups: the human T lymphotropic viruses (HTLV)-I and HTLV-II, and two human immunodeficiency viruses. The two types of HIV are, HIV-1 and HIV-2, unless otherwise noted, the term "HIV" primarily refers to HIV-1. Both types of HIV damage a person’s body and immunity by destroying CD4 + T cells, which are crucial for maintenance of Immunity against various infectious diseases. AIDS is the late stage of HIV infection, when a person’s immune system is severely damaged and has difficulty fighting against infectious diseases (called as opportunistic infections) and certain cancers.

MODES OF HIV TRANSMISSION

- Sexual (> 75% of total incidence is by this route) - Risk is 1% - can be avoided with safe sexual practices and avoidance of sex with unknown partners
- Parenteral – Blood, blood product transfusion - Risk is > 90%
Only specific fluids (blood, semen, vaginal secretions, CSF, peritoneal/pericardial/pleural/synovial fluids, and breast milk) from an HIV-infected person can transmit HIV. These specific fluids must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream (from a needle or syringe) for transmission to possibly occur.

- Infected Blood Transfusion – 90-100%
- Mother to child - Risk can be reduced up to 0.5 to 1% with prophylactic treatment, vertical transmission accounted for about 90% of cases of HIV in children.
- Injection/IV drug use - Risk 0.2 to 0.5%
- Needle stick Injury: The overall risk of HIV infection after percutaneous exposure to HIV-infected material in the healthcare setting is 0.3% (3 HIV infections per 1,000 respective exposures).\(^1\)

**PATHOPHYSIOLOGY OF HIV INFECTION/ AIDS**

After the virus enters the body, there is a period of rapid viral replication, leading to an abundance of virus in the peripheral blood. During primary infection, the level of HIV may reach several million virus particles per milliliter of blood. This response is accompanied by a marked drop in the number of circulating CD4 T cells. This acute viremia is associated with virtually everyone with the activation of CD8 T cells, which kill HIV-infected cells, and subsequently with antibody production, or seroconversion.

Changes in CD4 Cells after HIV infection: Qualitative and Quantitative deficiency of CD4 cells (T. Helper / Inducer cells) can occur in patients with HIV infection. Reduction in CD4 count leads to low immunity. This weakens the immune system and allows opportunistic infections. T lymphocytes are essential to the immune response and without them, the body cannot fight infections. Opportunistic infections can occur when the immunity is low.

**HIV - POST EXPOSURE PROPHYLAXIS (PEP)**

Healthcare personnel (HCP) who come in contact with blood and other body fluids in their working environment risk being exposed to blood-borne diseases such as HIV. The best way to protect against exposure to blood and body fluids is to use "Universal Precautions" which encourage safe working methods. The management of HCP immediately after a significant exposure to blood or body fluids from HIV-infected patients is critically important in reducing the likelihood of transmission and in ensuring that the legal rights of the employee and the institution are upheld.

Transmission of HIV in healthcare settings: According to the current state of knowledge, there is a risk of HIV transmission, if an HIV-negative person comes into contact with the blood or body fluids of HIV-positive person. The risk of acquiring HIV through a percutaneous exposure to HIV is approximately 0.3% and after a mucous membrane exposure to blood the risk is approximately 0.09%.

**HIV Infectious Fluids:** Blood / Fluids containing blood / Semen / Vaginal Secretions, Human Breast milk, CSF / Synovial Fluid, Pleural Fluid / Peritoneal Fluid, Pericardial Fluid and Amniotic Fluid

**Transmission is possible, if HIV containing material enters the body by**

- Accidental needle stick injury or by surgical instruments
- Exposure of damaged skin or mucosal membrane
- Unprotected sexual intercourse with an HIV-infected person
- Sharing of needles by IV drug abusers
- Transfusion of HIV- contaminated blood or blood products

**Risk factors for seroconversion**\(^2\)

- Deep injury
- A device visibly contaminated with the patient's blood
- Needle placement in a vein or artery
- Terminal illness in the source patient

**Risk of exposure by profession** - Nurses have the most frequent blood and body exposures (48.6 percent), followed by physicians who are residents or fellows (7.7 percent), attending physicians (7.7 percent), non-lab technologists (4.5 percent), respiratory therapists (3.6 percent), and certified nursing assistants/home health aides (3.2 percent)\(^3\)

Risk of transmission of other blood-borne pathogens - The risk of transmission of hepatitis B virus (HBV) to unvaccinated healthcare personnel is much higher than HIV. The risk of hepatitis C virus transmission from an infected source is about six fold greater compared with HIV (1.8 versus 0.3 percent).

Documentation of the exposure - Clinical information on the source patient for the exposure and the recipient HCP should be documented from ED or by infection control department. This includes risk factors and serologic tests for HIV, and hepatitis B and C. The nature and time of the exposure should also be described.
Determining HIV status of the source - If unknown, the presence of HIV infection in the source patient should be determined with a rapid HIV test. If testing in the source patient is delayed, PEP should still be initiated while awaiting test results. If the source is found to be HIV-negative, PEP should be discontinued.

Initial actions following exposure - The initial response to any exposure of HCP to blood should be immediate cleaning of the exposed site. For skin exposures, the area should be washed with soap and water. Small wounds and punctures may be cleaned with an antiseptic such as an alcohol-based hand hygiene agent, since alcohol is virucidal to HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV). Other antiseptics such as iodophors, chloroxylenol (PCMX) and chlorhexidine (CHG) also inactivate HIV.

INITIATION OF PEP

Before starting PEP, HIV testing with informed consent and pre test and post test counseling according to hospital protocols are needed. Counseling includes details of tests and disease transmission risks, adherence to drugs, side effects, risk reduction, mental trauma and social support.

All HCP who had history of any suspected body fluid exposure must be tested for a baseline HIV ELISA test. Testing for other blood borne diseases - such as HBV and HCV is also important; depending on the nature of the risk and the local prevalence. Additional laboratory evaluations like Pregnancy testing in females, Hemoglobin (for zidovudine-containing PEP regimens) also must be done if needed.

PEP must be started as soon as possible from emergency department itself; the goal is to start within one to two hours or earlier, and maximum within first 24 hours, after exposure. ED is the best place to initiate this regimen as the department is functioning 24/7 x 365 days. All EDs must have PEP drug kits and doctors working in ED must have counseling skills and detailed knowledge about the initiation of such medications. The PEP regimen should be continued for 4 weeks.

- Zidovudine is the most effective NRTI. Zidovudine has been found to be quite effective in reducing the chances of person becoming positive (as high as 80% reduction). This is combined with another NRTI, lamivudine in the Basic HIV Post exposure Prophylaxis Regimen.
- The first dose of PEP should always be offered as soon as possible after exposure, and if necessary, without waiting for HIV testing and counseling or the HIV test results of the source person.

### Basic HIV Post exposure Prophylaxis Regimen

<table>
<thead>
<tr>
<th>Basic Regimen</th>
<th>Alternative Basic Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zidovudine 300 mg BD</td>
<td>Tenofovir + Emtricitabine (300/200) mg once daily</td>
</tr>
<tr>
<td>+ Lamivudine 150 mg BD</td>
<td>Tenofovir + Lamivudine</td>
</tr>
<tr>
<td></td>
<td>Stavudine + Lamivudine</td>
</tr>
</tbody>
</table>

### Expanded HIV Post exposure Prophylaxis Regimens

Expanded prophylaxis regimens involve a basic two-drug regimen plus one of the following:

**Preferred regimens**

<table>
<thead>
<tr>
<th>Zidovudine + Lamivudine</th>
<th>Alternative Basic Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plus Lopinavir with a ritonavir boost 400 / 100 mg BD</td>
<td>- Tenofovir - emtricitabine with raltegravir.</td>
</tr>
<tr>
<td></td>
<td>- Zidovudine + Lamivudine plus saquinavir with a ri-ritonavir boost</td>
</tr>
<tr>
<td></td>
<td>- Tenofovir + Lamivudine plus saquinavir with a ri-ritonavir boost</td>
</tr>
<tr>
<td></td>
<td>- Stavudine + Lamivudine plus saquinavir with a ri-ritonavir boost</td>
</tr>
</tbody>
</table>

- One of the best three-drug regimens is **tenofovir - emtricitabine** \(300/200\) mg once daily **with raltegravir** \(400\) mg twice daily, but it is a costly regimen. Other equally acceptable alternatives include tenofovir-emtricitabine \(300/200\) mg once daily with ritonavir-boosted \(100\) mg once daily/atazanavir \(300\) mg once daily or ritonavir-boosted \(100\) mg once daily darunavir \(800\) mg once daily.
- Atazanavir, fosamprenavir, ritonavir-boosted saquinavir, ritonavir-boosted indinavir, and efavirenz are all considered acceptable alternatives to lopinavir/ritonavir as the third drug in the expanded regimen. But, efavirenz is contraindicated in pregnancy due to its teratogenicity.
- Criteria for recommending treatment with two NRTIs plus a boosted PI
- The source person is HIV positive, taking ART and is known to have signs of, or proven antiretroviral therapy resistance
- The source person's HIV status is unknown
- The background prevalence of resistance to ART in the community exceeds 15% (where this is known).
Post-exposure prophylaxis is not indicated:

- If the exposed person is HIV-positive from a previous exposure;
- In chronic exposure;
- If the exposure does not pose a risk of transmission, that is, after:
  - Exposure of intact skin to potentially infectious body fluids
  - Sexual intercourse using a condom that remains intact
  - Any exposure to non-infectious body fluids (such as faeces, saliva, urine and sweat)
  - Exposure to body fluids from a person known to be HIV-negative, unless this person is identified as being at high risk for recent infection and thus likely to be within the window period
- If the exposure occurred more than 72 hours previously

**Side effects of PEP**

Most side effects are mild, but about one third of patients discontinue treatment because of side effects. The most common side effects are nausea and fatigue; headache, vomiting, and diarrhea are also common. Rare, but serious, side effects include nephrolathiasis (with indinavir), hepatitis, hyperglycemia, fevers, rashes, and pancytopenia.

**Prevention of sexual transmission by PEP**

The estimated risk of acquiring HIV infection from a single episode of consensual receptive vaginal intercourse is between 0.1% (1 in 1000) and less than 1% (1 in 100) and, from a single episode of consensual receptive anal sex, is between 1% and 5% (1 to 5 in 100). Risks may be higher in the context of sexual assault, particularly when there is trauma and multiple rape. Recent study results provide strong support for the premise that treatment of the HIV-infected individual can significantly reduce sexual transmission of HIV. Lower plasma HIV RNA levels are associated with decreases in the concentration of the virus in genital secretions.

**CONCLUSION**

HIV is a major health hazard for HCPs; many HCPs are exposed to body fluids in healthcare sector every day. Sometimes, the sources can produce blood borne infections. It is important to prevent these by post exposure prophylaxis. Emergency room doctors have a significant role in preventing these infections as these departments work throughout the day. The doctor's work in ED must include a proper knowledge about PEP in various infectious diseases including HIV. The basic regimen of Zidovudine with Lamivudine combination will be equally effective where cost effectiveness/affordability is a major concern. Proper health education to all HCPs, especially regarding handling of used injection needles is essential for the prevention of needle stick injuries. All hospitals should have a written protocol for the incidence reporting, post exposure prophylaxis for all needle stick injuries.

**PEP for HIV infection: general recommendations on regimen**

<table>
<thead>
<tr>
<th>Exposure type</th>
<th>HIV positive</th>
<th>Unknown HIV status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splash: Less severe</td>
<td>Post-exposure prophylaxis is not recommended, but a two-drug regimen may be offered on request</td>
<td>Do not offer PEP</td>
</tr>
<tr>
<td>Splash: More severe</td>
<td>Offer a two-drug regimen</td>
<td>Consider population or subgroup prevalence</td>
</tr>
<tr>
<td>Sexual</td>
<td>Offer a two-drug regimen (+Third Drug)</td>
<td>Consider population or subgroup prevalence</td>
</tr>
<tr>
<td>Percutaneous: Less severe</td>
<td>Offer a two-drug regimen</td>
<td>Do not offer PEP</td>
</tr>
<tr>
<td>Percutaneous: More severe</td>
<td>Offer a two-drug regimen (+Third Drug)</td>
<td>Consider population or subgroup prevalence</td>
</tr>
</tbody>
</table>
REFERENCES


The clinical efficacy and toxicity of intravenous colistimethate against multidrug resistant bacteria in a Surgical intensive unit.


ABSTRACT

Background & Aims: Multidrug resistant (MDR) bacteremia is a significant cause of morbidity and mortality in the surgical intensive care unit (ICU). Colistimethate sodium, which had fallen out of favour in the last decade due to its toxicity, has recently received renewed interest, being one of the limited agents available for treatment of severe MDR gram negative bacterial infections. Aim of our study was to assess the clinical outcome of colistimethate sodium in a surgical ICU.

Methodology: Retrospective analysis of prospectively-collected data of 40 patients ([M:F 35:5, Median age: 40 years, Range 5-80], admitted in surgical ICU in 2013 who received Colistimethate sodium was performed. Indications for using Colistin were MDR isolate with sole sensitivity to Colistimethate (n = 16), inadequate response or failure of treatment to other sensitive antibiotics (n = 14) and Pseudomonas or Acinetobacter sepsis along with other sensitive antibiotics for synergistic effect (n = 10). The patient profile, source of infection, organism isolated, antibiotic sensitivity, clinical outcome and toxicity were analysed.

Results: Out of 40 intensive care patients, 23 (57.5%) had undergone live donor liver transplantation (LDLT), 9 (22.5%) had surgery for vascular/surgical emergencies and 7 (17.5%) had surgery for CI malignancy. Primary bloodstream infection (BSI) occurred in 9 (12.5%) while 35 (87.5%) had secondary BSI. The sites of index culture were: urinary infection in 11 (27.5%), bloodstream in 9 (22.5%), biliary tract infection in 7 (17.5%), and others 1 (2.5%). Following colistin therapy, there was clinical or bacteriological cure in 60%, bacteriological response but no clinical improvement in 35% and no bacteriological response in 5%. The study group, 15 (37.5%) patients died, 13 (86.66%) due to multiorgan dysfunction secondary to sepsis and 2 (13.3%) due to liver graft nonfunction. The primary adverse effect observed was nephrotoxicity in 12 (30%) and neurotoxicity in 2 (13.3%) patients. Nephrotoxicity was not related to dose and had no statistical significant correlation with mortality (p = 0.091).

Conclusion: The clinical and bacteriological response to Colistin was 60% and overall mortality in this group was high at 40%. Nephrotoxicity occurred in 30% of treated patients. Being a reserve drug against Gram negative MDR bacteria and often the last resort, there should be high clinical attention for its judicious use.

Keywords: Colistin, MDR, Sepsis, Outcome, Toxicity, BSI

INTRODUCTION

Antimicrobial resistance has emerged as a major threat for public health concerns in 21st century. Indeed, the World Economic Forum in its recent annual report on global risks concluded that the greatest risk to human health comes in the form of antibiotic-resistant bacteria. A super bug, also called multi resistant bacterium, carries several resistance genes. Multi drug resistant (MDR) organisms are defined as those resistant to three or more antimicrobial classes normally used for the treatment of infections1. Multi resistance in bacteria is generated by two mechanisms, either by accumulating multiple genes on resistance plasmids or by the increased expression of genes that code for multi drug efflux pumps3. MDR bacteremia is a significant cause of morbidity and mortality in the surgical intensive care unit. The emergence of multiresistance and lack of new effective antibiotics led to the revival of polymyxins; an old class of cationic, cyclic polypeptide antibiotics5,6,7.

Polymyxins consist of 5 chemically different compounds (A-E) discovered in late 1940s. Only polymyxin B and polymyxin E (Colistin) have been used in clinical practice4,5. Colistin, a common therapeutic option in 1970s, was gradually abandoned in the early 1980s due to reports of nephrotoxicity4. However, the emergence of resistant bacteria and shortage of new antimicrobial agents have recently led the clinicians to revive the use of colistin as reserve antibiotic in intensive care setting. Colistin is currently the last line therapeutic agent for the treatment of severe gram negative pathogens such as Acinetobacter baumannii, Pseudomonas aeruginosa, and Carbapenem resistant Enterobacteriaceae8.

The antimicrobial activity of colistin is by derangement of outer membrane of gram negative bacteria by electrostatic interaction between cationic polypeptide moieties in colistin and anionic lipopolysaccharide molecules in the outer
membrane. Colistin displaces magnesium and calcium which normally stabilise the lipopolysaccharide molecule leading to local disturbance of the outer membrane. Subsequently, cell death occurs due to increase in the permeability of the cell envelope and leakage of cell contents. Colistin has no action against gram positive bacteria which lack outer membrane.

Nephrotoxicity and neurotoxicity are the most common adverse effects of colistin therapy. The majority of recent studies report colistin-related nephrotoxicity rates of 10%-30%. Current approaches in antibiotics usage with colistin promise enhanced antibacterial efficacy, decreased adverse effects and less potential for emergence of resistance. Nevertheless, inappropriate or indiscriminate use of colistin can lead to emergence of bacteria with resistance even to colistin-Pan-resistant bacteria. Due to financial and regulatory reasons, there has been a collapse in the system of research and development of novel antibiotics by pharmaceutical companies. This frightening scenario of lack of fresh antibiotics against drug-resistant pathogens underscores the urgent need for optimisation of antibiotics, particularly of reserve drugs such as colistin. As health workers, it is our duty to regulate and promote appropriate use of antibiotics and to assist information sharing among all hospital personnel. The objective of this study was to analyse the clinical outcome and toxicity rate of intravenous colistin against severe multidrug resistant pathogens in critically ill patients.

AIM & OBJECTIVE

To analyse the use of colistimethate sodium in a surgical ICU, looking at patient profile, source of infection, organism isolated, antibiotic sensitivity, toxicity assessment and clinical outcome following treatment.

METHODOLOGY

Patients & Study design

This retrospective, observational study was carried out in the surgical ICU of Amrita Institute of Medical Science and Research centre (AIMS) through a review of electronic databases. We analyzed records of 40 patients who were admitted in surgical ICU in the year 2013, who had received colistimethate sodium for treatment of bacteremia.

Indications of Colistimethate sodium were:

1) MDR isolate with sole sensitivity to Colistimethate (n=16)
2) Inadequate response/failure of treatment to other sensitive antibiotics (n=14)
3) Pseudomonas or Acinetobacter sepsis where dual antibiotics are recommended for synergistic effect (n=10).

Colistin was most commonly prescribed in a loading dose of 4 million units followed by a dose of 2 million units 8 hourly. Repeat culture was sent after 5 days of antibiotic use. Variables captured from the patient chart include demographics, source of infection, organism isolated, antibiotic sensitivity, toxicity assessment and clinical outcome after 5 days of colistin use. For the assessment of the relationship between dose and toxicity, the daily dose that the patient was on when they met the criteria for nephrotoxicity was used for analysis. Statistical analysis was done using SPSS version 20.

DEFINITIONS

According to the Centre for disease control and prevention (CDC), bacteremia is defined as the presence of viable bacteria in the blood. Primary blood stream infection (BSI) is traditionally defined as a BSI associated with bacteremia for which there is no identified portal of entry or associated infected site. Secondary BSI is defined as a BSI in which there is a documented portal of bacterial entry (e.g., a skin infection, a catheter, pneumonia, or a urinary tract infection) and/or a known associated site of infection. Bacteriological cure is defined as elimination of the pre-treatment bacteria from the original site of infection or if the clinical status of the patient made a repeat culture unnecessary. Bacteriological failure is defined as growth of any gram negative bacteria during or at the end of treatment. Clinical cure was defined as reduction of majority of signs and symptoms related to the original infection. Clinical failure was defined as absence of reduction or exacerbation of original signs and symptoms, development of new symptoms or death of patient. Nephrotoxicity was defined as serum creatinine >2mg% or greater than twice the baseline value.

RESULTS

Out of 40 patients [35 male, 5 female; range 5-80; median age - 40], 23 (57.5%) were cirrhotic patients who had undergone live donor liver transplantation (LDLT), 9 (22.5%) had surgery for vascular / surgical emergencies and 7 (17.5%) had surgery for GI malignancy. Primary blood stream infection (BSI) occurred in 5 (12.5%) while 35 (87.5%) had secondary BSI. The source of sepsis was urinary infection [n = 11 (27.5%)], bloodstream [n = 9 (22.5%)], bronchoalveolar lavage [n = 8 (20%)], peritoneal drain [n = 8 (20%)] and others [n = 4 (10%)]. The most frequently isolated pathogens were MDR Klebsiella pneumonia [n = 24 (60%)], Pseudomonas aeruginosa [n = 8 (20%)], Acinetobacter baumannii [n = 4 (10%)] and E.coli [n = 4 (10%)]. Colistin was the only sensitive antibiotic in 16 (40%) patients. Although there was variation in dose of treatment, Colistimethate sodium was most commonly prescribed in a loading dose of 4 million units followed by dose of 2
million units thrice daily adjusted according to the GFR (Cockcroft Gault equation). Duration of colistin therapy was from 7-14 days. In the study group, 15 (37.5%) patients died; cause of mortality being multiorgan dysfunction secondary to septicemia \([n=13 (86.66\%)]\) or liver graft nonfunction \([n=2 (13.3\%)]\). Colistin therapy resulted in clinical or bacteriological cure in 24 (60\%), bacteriological cure but clinical failure in 14 (35\%) and bacteriological failure in 25\%. Out of 40 patients, 9 needed dosage adjustments as per renal criteria. Renal failure occurred in 12 (30\%). Amongst them, 6 patients required hemodialysis (50\%). There was no statistically significant correlation with the dose of colistin and development of renal failure. Likewise, occurrence of renal failure did not have a significant correlation with mortality \((p=0.091)\).

**DISCUSSION**

In this study comprising critically ill patients in a surgical ICU, who had sepsis due to MDR bacteria, primarily carbapenem resistant Klebsiella, colistemethate therapy had a clinical cure rate of 60\%. Nevertheless, it is worrying that 35% had clinical failure and 5% bacteriological failure. It is possible that the relatively high clinical failure rate may be due to inadequate source control or poor immunonutritional status, since all patients were critically ill patients following major surgery such as LDLT. In our initial patients, the loading dose of colistin was less than the recommended dose of 8 million. Whether this compounded the failure rate of colistin is a debatable issue. During the latter half of the study, although we attempted to use the recommended full dosage of colistin, the occurrence of renal failure forced us to reduce the dose in many patients. Nephrotoxicity occurred in 30\% of patients but did not appear to be related to initial dose and was probably a reflection of the critical state of the patient. It appeared to occur more frequently in patients following liver transplantation presumably due to combination with calcium inulin, which itself is nephrotoxic. Although in our study, the renal failure rate whilst on colistin therapy was 30\%, interestingly, it didn’t appear to correlate with mortality.

Being a retrospective non randomised trial, this study has a number of limitations. Absence of a comparator group, lack of sickness grading in the study group, heterogeneous mix of post surgical cases may all skew the data obtained. This group was certainly a high risk one, consisting of critically ill patients with long and multiple previous hospitalisations, poor nutrition and immunocompromised state. Inherent mortality in such a group is likely to be high. The high renal impairment in this study, following colistin use at dosages even lesser than what is recommended, raises the need for pharmacokinetic and pharmacodynamic studies in Indian patients to optimise the safety and efficacy of colistin therapy.

In conclusion, in the study group of critically ill surgical intensive care patients the clinical and bacteriological response to colistin against MDR pathogens was 60\% and overall mortality was high at 40\%. Nephrotoxicity occurred in 30\% of colistin treated patients. The safety and efficacy of colistin against MDR bacteria in surgical patients need to be evaluated more systematically by microbiologic and pharmacologic studies along with clinical outcome.

**REFERENCES**


Quality of life of patients with Parkinson’s disease

Jeseena Jolly*, Kanmani J.*, Anand Kumar**, Rani Naz.**

ABSTRACT

Background & Objectives: Parkinson’s disease (PD) is the most common form of a group of progressive neurodegenerative disorders. The purposes of the study were to identify the Quality of Life (QoL) of patients with PD, factors influencing QoL of patients with PD, and the association between QoL and selected variables of patients with PD.

Methods: In this non-experimental descriptive study researcher enrolled 80 subjects with PD for more than one year, by using convenience sampling technique and assessed the QoL using PDQ 39 questionnaire.

Results: Among 80 subjects 55 (68.75%) subjects had age of > 61 years, 28 (35%) subjects had history of direct exposure to pesticides, 63 (78.75%) subjects had the habit of smoking, 60 (75%) subjects were consuming well water, 37 (46.25%) subjects had poor QoL in the dimension of mobility in PDQ 39 (Score: > 66.67), 33 (41.25%) subjects had poor QoL in the dimension of activities of daily living (Score: > 66.67), in the dimension of bodily discomfort 31 (38.75%) had average QoL (Score: 33.34 – 66.66), and in the dimension of social support 71 (88.75%) subjects had good QoL. Significant association was found between QoL, mobility dimension and sex (p < 0.05), emotional well being and marital status (p < 0.05), bodily discomfort and hypertension (p < 0.05).

Conclusion: The study results shows that the main dimensions in which the PD patients had poor QoL were mobility and activities of daily living and in the dimension of bodily discomfort most of the subjects possess average QoL. Significant association was found between dimension of mobility and sex, the emotional well being and marital status and also between bodily discomfort and hypertension.

Keywords: Parkinson’s Disease, Quality of life

INTRODUCTION

Parkinson’s disease (PD) also known as paralysis agitans or primary parkinsonism is a degenerative disease affecting nuclei in the midbrain and brain stem. The motor symptoms of Parkinson’s disease result from the death of dopamine-generating cells in the substantia nigra, a region of the midbrain Parkinson’s disease was first described in 1817 by James Parkinson. Parkinson’s disease most often develops after 50 years of age. The estimated worldwide incidence of PD ranges from 4.9 to 25.6 per 100,000 population. It affects about 0.4% of people over 40 years, about 1% of people over 60 years, about 2-3% of those older than 65 and 3-4% of those older than 85 years. 50% of those older than 80, have at least two clinical signs of Parkinsonism. In India the incidence of PD is 1% in adults 65 years or older and 5% in more than 80 years and the prevalence is 328.3 per 100,000 populations. While it occurs in people throughout the world, a number of studies have found a higher incidence in developed countries, possibly because of increased exposure to pesticides or other toxins in those countries. The primary objectives of the study were to identify the Quality of Life (QoL) of patients with PD, identify the factors influencing QoL of patients with PD, find out the association between QoL and selected demographic variables of patients with PD, find out the association between QoL and selected clinical variables of patients with PD and prepare an information booklet on measures to improve the QoL.

The conceptual framework used for the study was the modified form of Health Related Quality of Life (HRQoL) conceptual model developed by Wilson and Cleary in 1995. It is important for the nurses and other health care professionals to know the outcome of patients affected with Parkinson’s disease, which will help them to provide adequate need based care and prevent further complications and improve their quality of life.

MATERIALS & METHODS

This non-experimental descriptive study was conducted at Parkinson’s clinic Amrita Institute of Medical Sciences (AIMS), Kochi. We enrolled 80 Patients with Parkinson’s disease attending Parkinson’s clinic at AIMS, Kochi, by using the convenience sampling technique. We excluded the inpatients with Parkinson’s disease, patients with altered mental status, critically ill patients, patients with severe cognitive impairment. Two tools were used in the study Tool 1- Self administered questionnaire with questions related to demographic data, and clinical
The data presented in the figure 1 reveals that 30 (37.5%) of the subjects belong to the age group of 61-70 years, 25 (31.25%) belongs to more than or equal to 70 years of age, 19 (23.75%) subjects are in the age group of 51 - 60 years and 6 (7.5%) subjects belongs to the age group of less than or equal to 50 years of age.

Analysis of distribution of subjects based on demographic variables shows that 55 (68.75%) subjects were males and 25 (31.25%) were females. Regarding educational status 29 (36.25%) subjects studied up to secondary school. While considering the marital status most of the subjects 67 (83.75%) were married. Regarding the occupational category 39 (48.75%) subjects have unskilled job, and current occupational status showed that 35 (43.75%) subjects were retired. 31 (38.75%) subjects had monthly income between Rs/- 5001 – 10000.

Analysis of distribution of subjects based on clinical variables shows that 52 (65%) subjects were diagnosed to have Parkinson's disease for the last 1-5 years and majority of the subjects 69 (86.25%) had no family history of Parkinson's Disease. With regards to head trauma 66 (82.5%) subjects had no history of head trauma, and 76 (95%) subjects had no history of brain infection. In the case of stroke 71 (88.75%) subjects had no history of stroke. While considering the treatment adopted before coming to AIMS, most of the them 50 (62.5%) subjects underwent for allopathic treatments in other hospitals. Regarding the history of smoking and alcoholism 63 (78.75%) subjects had no habit of smoking, and 69 (86.25%) subjects had no habit of alcohol consumption. Most of the subjects 70 (87.5%) were under regular treatment for Parkinson's Disease. With regard to the comorbidities 25 (31.25%) sample have Diabetes Mellitus, 35 (43.75%) sample have Hypertension and most of the subjects 66 (82.5%) have no Dyslipidemia. 28 (35%) subjects have history of direct exposure to pesticides.
Data presented in the Figure 2 shows that 11 (13.75%) subjects have family history of Parkinson's disease and the remaining 69 (86.25%) have no family history of Parkinson's disease.

![Pie diagram showing the history of smoking among the subjects.](image)

The data presented in the Figure 3 shows that 17 (21.25%) of the subjects have history of smoking and the other 63 (78.75%) of the subjects have no history of smoking.

![Pie diagram showing the type of drinking water.](image)

The data presented in Figure 4 reveals that 60 (75%) subjects consumes well water and only 20 (25%) subjects consumes water from public water supply.

Analysis of distribution of subjects based on the factors influencing quality of life shows that in the dimension of mobility most of the subjects 37 (46.28%) have poor quality of life. Regarding the dimension of activities of daily living 33 (41.25%) have poor quality of life. In the dimension of emotional wellbeing 45 (56.25%) have good quality of life. With regards to stigma 67 (83.75%) have good quality of life. While considering the dimension of social support most of the subjects 71 (88.75%) have good quality of life. In the dimension of cognitive impairment 38 (47.5%) subjects have good quality of life. With regards to communication 56 (70%) subjects have good quality of life. In the dimension of bodily discomfort 31 (38.75%) have average quality of life.

<table>
<thead>
<tr>
<th>Sl no.</th>
<th>Dimensions</th>
<th>df</th>
<th>x² value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobility and sex</td>
<td>2</td>
<td>6.924</td>
<td>0.031</td>
</tr>
<tr>
<td>2</td>
<td>Emotional wellbeing and marital status</td>
<td>1</td>
<td>8.361</td>
<td>0.004</td>
</tr>
<tr>
<td>3</td>
<td>Bodily discomfort and hypertension</td>
<td>2</td>
<td>6.240</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Table 1 depicts that there is significant association between quality of life mobility dimension and sex at level of significance p < 0.05. Thus it can be interpreted that the quality of life of subjects depends on the sex, also there is significant association between dimension of emotional well being and marital status of subjects and dimension of bodily discomfort and hypertension at level of significance p < 0.05

DISCUSSION

In the present study the quality of life of patients with Parkinson's disease was assessed by using a standardized questionnaire named Parkinson's Disease Questionnaire 39 (PDQ 39) which assess quality of life of subjects in 8 dimensions.

In the dimension of mobility in PDQ 39, 37 (46.25%) subjects had poor quality of life. So problems with mobility like difficulty to do leisure time activities, performing household activities, difficult to carry bags, problems with walking, difficulty to get around in public places, need for assistance to go out of house, fear of fall, etc. can be considered as main factors that influencing the quality of life of patients with Parkinson's disease. Regarding the activities of daily living dimension 33 (41.25%) subjects had poor quality of life, so the problems with activities of daily living like difficulty to take bath without assistance, difficulty if dressing and grooming, difficult to write clearly, cutting up of food and disability in drinking water from glass without spilling also can be consider as a factor which affect the quality of life of patients with Parkinson's disease.

In a recent study by Stéphane Chapuis et al., find out that dimensions of mobility, activities of daily living, stigma, and communication were the most strongly affected dimensions of quality of life in patients with PD. Motor complications, especially nocturnal akinesia and biphasic dyskinesias worsened the QoL of PD patients.

The present study reveals that there was no significant association between quality of life mobility dimension and age at level of significance p < 0.05, but there was significant association between quality of life mobility dimension and sex at level of significance p < 0.05, and also between quality of life emotional
well being dimension and marital status of subjects at level of significance p < 0.05.

The present study reveals that there was significant association between quality of life bodily discomfort dimension and hypertension at level of significance p < 0.05.

Among 80 subjects 28 (35%) of the subjects had history of direct exposure to pesticides remaining 42 (65%) subjects had no history of direct pesticide exposure. But in the case of well water consumption 60 (75%) subjects were consuming well water. The study conducted by Nicole M Gatto et al in rural California during the time period of 2001 to 2007 states that, as the well water contains dissolved pesticides in it, the consumption of well water also can be considered as exposure to pesticide. The study hypothesized that the consumption of well water plays a role in the development of Parkinson’s disease. It was a population based case control study about well water consumption and Parkinson’s disease among 368 subjects. The study results shows that cases were more likely to have consumed private well water and to have consumed it on average 4.3 years longer than controls (p = 0.02), resulted in approximately 70–90% increases in relative risk of PD.

Among 80 subjects 63 (78.75%) subjects had no history of smoking. The following study supports the present study finding. Harvey, et al conducted a case-control study in western Washington State in 1992–2000 on Parkinson’s Disease risks associated with cigarette smoking among 210 incident PD cases and 347 controls. The results shows that a reduced risk for Parkinson’s disease (PD) among cigarette smokers has been observed consistently during the past 30 years.

Among 80 subjects 55 (68.7%) were males and 68.75% subjects had age > 61 years. This results shows higher incidence of PD among males and in the elderly people. In a longitudinal study conducted by M. Baldereschi, The authors found 68 incident cases of Parkinsonism. Incidence rates for both parkinsonism and PD increased with age in both men and women; men had higher rates in every age group. Age-adjusted relative risk in men compared with women was 1.66 (95% CI, 1.02 to 2.70) for Parkinsonism and 2.13 (95% CI, 1.11 to 4.11) for PD. Incidence of Parkinsonism and PD increased with age, 12this study supports the findings of the present study.

Among 80 subjects only 14 (17.5%) had history of head trauma remaining 66 (82.5%) subjects had no history. In contradiction to the present study finding the results of a population based case-control study conducted by M Anne Harris, et al in Canada stats that the head injury is a risk factor for Parkinson’s disease.

CONCLUSIONS

Based on the finding of the study the researcher came into the conclusion that the main dimensions in which the Parkinson’s disease patients had poor quality of life are mobility and activities of daily living and in the dimension of bodily discomfort most of the subjects possess average quality of life. There was significant association between quality of life mobility dimension and sex, the quality of life emotional well being dimension and marital status of subjects also between quality of life bodily discomfort dimension and hypertension.

REFERENCES

Effectiveness of oral ephedrine in prevention of hypotension following spinal anaesthesia

Sunil Rajan, Divya Devapal, Lakshmi Kumar

ABSTRACT

Background: Ephedrine has been extensively used in the treatment of spinal hypotension which occurs despite preloading. Though the intravenous route is commonly used, ephedrine is equally effective via the oral route.

Aims: To assess the efficacy of prophylactic oral ephedrine in preventing hypotension following spinal anaesthesia in patients undergoing lower abdominal surgeries.

Settings and Design: Prospective, double blinded, randomised controlled trial.

Material and Methods: 80 patients of ASA I or II were randomly allotted equally into study (E) and control (C) groups. 30 min before subarachnoid block, Group E received oral ephedrine 30mg, while group C received a placebo.

Statistical analysis used: Chi square and student's t tests using SPSS software.

Results: Group E patients had a significantly higher systolic, diastolic and mean arterial pressures compared to group C throughout the period of study. Incidence of hypotension was significantly more in group C compared to group E (30% vs. 10%). Vasopressor requirement was also significantly higher in group C. There was no hypertension or tachycardia in the group E.

Conclusions: Prophylactic administration of oral ephedrine 30 mg, half an hour before administering spinal anaesthesia is effective in preventing hypotension without causing untoward side effects.

Keywords: Spinal, Anaesthesia, Ephedrine

INTRODUCTION

Spinal anaesthesia is the most popular anaesthetic technique for lower abdominal surgeries. The onset of action is rapid, quality of the block is reliable and the technique is simple to perform. One of the most common side effects is hypotension, which can be very often troublesome. Though intravenous ephedrine has been extensively used to treat spinal hypotension, this route is often associated with untoward side effects like tachycardia and hypertension. Ephedrine has been found to be equally effective via the oral route also.

The present study aims to assess the effectiveness of oral ephedrine in preventing hypotension following subarachnoid block in patients undergoing lower abdominal surgeries.

SUBJECTS AND METHODS

Based on percentage of patients with hypotension in the two treatment groups observed in published papers, 1,2 with 95% confidence and 80% power, the minimum sample size came to 40 in each group. This prospective, randomized double blinded study was conducted during the period December 2011 to October 2013 in 80 consenting patients after obtaining approval from hospital ethical committee. ASA I and II patients undergoing elective lower abdominal surgeries, aged 20 to 60 years were included. Patients of ASA III or above, those with history of hypertension, ischemic episodes, hyperthyroidism, arrhythmias or glaucoma were excluded. The patients were randomised equally into study group denoted as group E and control as group C.

All patients were orally premedicated with ranitidine 150 mg, metoclopramide 10 mg and alprazolam 0.5 mg on night before surgery and repeated on morning of surgery. In the premedication room, a large bore intravenous (iv) cannula was put under local anaesthesia and midazolam 1 mg iv was given. Group E patients received ephedrine solution 1 ml (30 mg) diluted with 4 ml distilled water, 30 min before subarachnoid block. Group C patients were given a placebo, 5 ml distilled water at the same time. The heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and oxygen saturation (SpO2) were recorded every 5 min for 30 min. In the theatre, all the patients were preloaded with 10 ml/kg of Ringer lactate solution 10 min before subarachnoid block, which was performed in lateral position at L3-4 or L2-3 space. Bupivacaine 0.5% heavy 2.5 ml (for patients with
height < 150 cm, or 3 ml (if height > 150 cm) was administered intrathecally at a rate of 0.5 ml/sec. Height of block was assessed with ice cold saline at the end of 10 min and documented.

Intraoperatively, SBP, DBP and MAP were recorded every 3 min in the first 15 min, then every 5 min till 30 min and every 10 min till one hour. Hypotension was defined as decrease in SBP < 30% from baseline value and was initially treated with rapid infusion of 100-200 ml normal saline. If not responding, IV ephedrine rescue bolus of 3 mg was given, which was repeated every 3 min to attain 70% of baseline SBP. If not corrected with 3 bolus of intravenous ephedrine, hypotension was managed with phenylephrine 50 micrograms iv. Total dose of intravenous fluids, IV ephedrine and phenylephrine administered were recorded. Nausea, vomiting, dryness of oral cavity, if any, were also recorded.

Data was analysed using SPSS software. For analysing statistical significance of the difference in percentage of patients with hypotension between the two groups, chi square test was used. Student's t test was used to assess the difference in mean changes in various parameters from pre-induction values. The level of statistical significance was 'p' value < 0.05.

Table 1: Comparison of level of block among groups

<table>
<thead>
<tr>
<th>Level of block</th>
<th>Group C</th>
<th>Group E</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (%)</td>
<td>27 (77.2)</td>
<td>21 (60.6)</td>
<td>0.854</td>
</tr>
<tr>
<td>0 (%)</td>
<td>4 (10.0)</td>
<td>3 (8.6)</td>
<td></td>
</tr>
</tbody>
</table>

RESULTS

Distribution of age, sex, height, weight, ASA physical status and type of surgery were comparable among groups. Comparison of height of block was also statistically comparable (p value 0.854) as majority of patients in both group had block up to T6 (Table: 1).

All baseline parameters like SBP, DBP, MAP, HR and SpO2 were comparable in both the groups (Table: 2). The difference of mean HR from baseline at all times showed that Group E had a significantly higher HR throughout the procedure except at 30, 50 and 60 min (p < 0.05, Table 3, Figure1). While comparing the difference in mean MAP at various time intervals from the baseline mean values, it was observed that the difference was significantly high in group C compared to group E (Table: 4). The mean SBP, DBP and MAP at all time intervals showed a higher value in group E (Figures 2-4).

Occurrence of hypotension and requirement of rescue IV boluses of ephedrine were more in group C compared to group E (30 vs. 10%) and this difference was significant (p 0.048, Table: 5). Likewise, nausea and/or vomiting were more in group C (15 vs. 2%) which was statistically significant (p 0.036, Table: 6).

Table 2: Comparison of baseline variables among groups

<table>
<thead>
<tr>
<th>Baseline variables</th>
<th>Group C Mean</th>
<th>Group E Mean</th>
<th>SD</th>
<th>SD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBP</td>
<td>127.00</td>
<td>128.18</td>
<td>6.08</td>
<td>8.04</td>
<td>0.404</td>
</tr>
<tr>
<td>DBP</td>
<td>73.38</td>
<td>75.85</td>
<td>3.12</td>
<td>3.70</td>
<td>0.054</td>
</tr>
<tr>
<td>MAP</td>
<td>94.50</td>
<td>93.25</td>
<td>4.82</td>
<td>3.22</td>
<td>0.145</td>
</tr>
<tr>
<td>HR</td>
<td>75.00</td>
<td>76.45</td>
<td>4.94</td>
<td>4.06</td>
<td>0.155</td>
</tr>
<tr>
<td>SPO2</td>
<td>99.06</td>
<td>99.10</td>
<td>0.88</td>
<td>0.84</td>
<td>0.896</td>
</tr>
</tbody>
</table>

Table 3: Comparison of difference in mean HR from baseline HR

<table>
<thead>
<tr>
<th>Time interval</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before spinal</td>
<td>-2.23</td>
<td>3.00</td>
<td>-4.85</td>
<td>1.63</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>3 Minutes</td>
<td>1.16</td>
<td>3.85</td>
<td>-1.90</td>
<td>2.50</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>6 Minutes</td>
<td>3.70</td>
<td>4.85</td>
<td>-0.30</td>
<td>2.55</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>9 Minutes</td>
<td>0.13</td>
<td>6.27</td>
<td>3.08</td>
<td>5.23</td>
<td>&lt; 0.012</td>
</tr>
<tr>
<td>12 Minutes</td>
<td>0.05</td>
<td>6.99</td>
<td>3.70</td>
<td>5.58</td>
<td>&lt; 0.030</td>
</tr>
<tr>
<td>15 Minutes</td>
<td>0.13</td>
<td>6.27</td>
<td>2.93</td>
<td>5.31</td>
<td>&lt; 0.009</td>
</tr>
<tr>
<td>20 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>3.70</td>
<td>5.58</td>
<td>&lt; 0.030</td>
</tr>
<tr>
<td>25 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>2.93</td>
<td>5.43</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>30 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>3.70</td>
<td>5.58</td>
<td>&lt; 0.054</td>
</tr>
<tr>
<td>40 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>2.93</td>
<td>5.43</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>50 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>3.70</td>
<td>5.58</td>
<td>&lt; 0.054</td>
</tr>
<tr>
<td>60 Minutes</td>
<td>0.76</td>
<td>6.99</td>
<td>2.93</td>
<td>5.43</td>
<td>&lt; 0.005</td>
</tr>
</tbody>
</table>

Table 4: Comparison of difference in mean MAP from baseline MAP

<table>
<thead>
<tr>
<th>Time interval</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before spinal</td>
<td>0.25</td>
<td>2.04</td>
<td>-6.25</td>
<td>4.74</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>3 Minutes</td>
<td>15.88</td>
<td>10.51</td>
<td>4.00</td>
<td>8.80</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>6 Minutes</td>
<td>17.10</td>
<td>11.42</td>
<td>6.38</td>
<td>10.56</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>9 Minutes</td>
<td>12.90</td>
<td>9.02</td>
<td>3.80</td>
<td>5.41</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>12 Minutes</td>
<td>10.68</td>
<td>6.72</td>
<td>2.35</td>
<td>4.28</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>15 Minutes</td>
<td>10.15</td>
<td>6.43</td>
<td>1.88</td>
<td>4.33</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>20 Minutes</td>
<td>9.15</td>
<td>6.43</td>
<td>1.58</td>
<td>3.98</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>25 Minutes</td>
<td>10.15</td>
<td>6.43</td>
<td>1.50</td>
<td>3.80</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>30 Minutes</td>
<td>10.06</td>
<td>6.67</td>
<td>0.85</td>
<td>3.43</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>40 Minutes</td>
<td>7.43</td>
<td>8.36</td>
<td>0.85</td>
<td>3.43</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>50 Minutes</td>
<td>7.63</td>
<td>8.43</td>
<td>-0.80</td>
<td>3.68</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>60 Minutes</td>
<td>7.28</td>
<td>8.24</td>
<td>-1.55</td>
<td>3.56</td>
<td>&lt; 0.001</td>
</tr>
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</table>
Table 5: Comparison of number of patients who required iv ephedrine

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>No (%)</th>
<th>Yes (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of patients (%)</td>
<td></td>
<td>No of patients (%)</td>
<td></td>
</tr>
<tr>
<td>Group C</td>
<td>39 (70.0)</td>
<td>12 (30.0)</td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>Group E</td>
<td>38 (90.0)</td>
<td>4 (10.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Comparison of patients with nausea and vomiting

<table>
<thead>
<tr>
<th>Group</th>
<th>Nausea &amp; vomiting</th>
<th>No (%)</th>
<th>Yes (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of patients (%)</td>
<td></td>
<td>No of patients (%)</td>
<td></td>
</tr>
<tr>
<td>Group C</td>
<td>34 (85.0)</td>
<td>6 (15.0)</td>
<td>0.034</td>
<td></td>
</tr>
<tr>
<td>Group E</td>
<td>38.2 (98.0)</td>
<td>0.8 (2.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Changes in mean diastolic BP

Changes in mean MAP

Changes in mean heart rate

Changes in mean systolic BP

DISCUSSION

Hypotension is typically associated with neuraxial blocks and is proportional to the level of block. If severe and not effectively managed, it can cause cerebral and myocardial hypoperfusion. The primary cause for this hypotension is sympathetic nervous system block which results in decrease in systemic vascular resistance. This leads to venous pooling with a subsequent reduction in venous return and cardiac output.

Earlier studies have reported the incidence of hypotension to be 50% to 83%, but in our study it was only 30%. This lower incidence of hypotension might be attributed to lower level of sensory block in our study as well as due to exclusion of ASA III patients like hypertensives.

Various measures had been attempted to prevent development of hypotension following spinal anaesthesia. Fluid preloading, Trendelenberg position and leg wrapping proved to be not very effective in this regard, though can reduce it to some extent. Likewise, crystalloids are needed in greater volumes to decrease the incidence of hypotension, which can have detrimental effects. Hence, it seems appropriate to administer a pro-
phylactic dose of vasopressor, than preloading alone, to prevent post spinal hypotension.3,5

Traditionally, ephedrine has been recommended in this role, as it is more ideal to correct the non-cardiac circulatory sequelae associated with spinal anaesthesia than using a pure or adrenergic agonist.6 Ephedrine, an indirectly acting sympathomimetic, through its alpha action increases systemic vascular resistance and with its beta effect, increases myocardial contractility. In pregnant patients undergoing caesarean section, although ephedrine was found to be more effective than phenylephrine in the prevention of hypotension,9 the latter had shown a lesser risk of fetal acidosis compared to ephedrine.10-13, and hence is considered the first line drug now.14-16.

Though usually given intravenously, ephedrine is equally effective orally as it is resistant to metabolism in the gastrointestinal tract and is absorbed well into the circulation. Prophylactic intramuscular ephedrine has been shown to reduce nausea and vomiting, particularly secondary to improved cerebral circulation.

Despite non-availability of ephedrine tablets nowadays, the drug for oral use can be very easily prepared by diluting the intravenous preparation, which is freely available. Though a drug solution will favour rapid absorption following oral administration compared to tablets, we did not come across any overtly dangerous hypotension or tachycardia during our study period.

Even though the diluted drug in polypropylene syringes were found to be stable for up to 60 days at ambient temperature and at 4°C, sterility of the solution cannot be guaranteed and hence prolonged storage is not advocated following dilution. Prevention of postspinal hypotension with prophylactic oral ephedrine may become handy for single handed anaesthetists working in rural locations with limited resources. So this simple, easy and effective method should not be ignored.

CONCLUSION

The prophylactic administration of oral ephedrine 30 mg, half an hour before administering spinal anaesthesia, in patients undergoing lower abdominal surgeries, is effective in preventing hypotension without causing untoward side effects.

REFERENCES


11. Prakash S, Pramanik V, Chellani H, Sallan S, Gogia A R. Maternal and neonatal effects of bolus administration of ephedrine and phenylephrine during spinal anaesthesia for


Physical And Psychological Effects of Patients with Dengue Fever

Gifty Joy*, Kanmani J **, R.N. Sharma***

ABSTRACT

Context: Dengue fever or break bone fever is associated with not only physical problems but also significant psychological ones.

Objectives: To identify the physical and psychological problems associated with dengue fever, and to find correlation between their effects in the acute stage of the illness.

Materials and Method: The study population was 55 patients with dengue fever admitted in the Medical ward of Amrita Institute of Medical Sciences between June 2014 and October 2014. Non experimental Cross-sectional design with a Non probability purposive sampling technique was selected for the study.

Results: Of the 55 patients, physical health status was poor in 43.64%, average in 40% and good in 16.36%. Regarding psychological issues, 60% developed Thanatophobia (fear of death). 38.18%, 41.82% and 18.18% developed severe, moderate and mild level of anxiety respectively and 1.81% subjects were normal. 7.23%, 50.91% and 38.36% showed severe, moderate and mild degree of depression respectively, while 5.45% subjects were normal. Regarding panic attack, 40%, 29%, 23.6% and 3.6% of subjects were borderline, slightly ill, moderate, and markedly ill. There was significant correlation between physical problems and anxiety (r = 0.339, p = 0.011), physical problems and panic attack (r = 0.301, p = 0.025), and anxiety and panic attack (r = 0.355, p = 0.008). Conclusion: Dengue fever is associated with both physical and psychological problems. Attention needs to be paid towards the mental health of the patients suffering from dengue fever in addition to their physical health.

Keywords: Dengue fever, Physical problems, Psychological problems, Patients

INTRODUCTION

Neglected Tropical Diseases blight the lives of a billion people worldwide and threaten the health of millions more. Dengue fever, also known as break bone fever, is one amongst them. It causes a wide spectrum of illnesses ranging from mild asymptomatic status to severe fatal dengue haemorrhagic fever. Dengue virus belongs to the family Flaviviridae having four serotypes that spread by the bite of infected Aedes mosquitoes. Dengue disease presents highly complex pathophysiological, economical and ecological problems. Typical symptoms include headache, muscle cramps, joint pains, vomiting, restlessness and petechial rash. Shock and haemorrhage occurs in less than 5% cases. Seizure may also occur.

It is commonly thought that people with dengue have only fever and fall in platelet count. But it is time to think again. There's a mental health hazard associated with this affliction, enough to make the health professionals and government sit up and take notice. A substantial number of dengue patients also suffer from major psychological conditions like phobias, especially Thanatophobia, in addition to anxiety, depression and Panic attack.

40% patients of the world's population is at risk from Dengue. The world health day 2014-WHO has highlighted the seriousness of increasing threat of vector-borne diseases with the slogan of “Small bite, Big threat.” Poor surveillance system in India makes it difficult to know the exact incidence of epidemic in the country. In 2001-02, nearly 8000 cases of dengue fever were reported. In Kerala, in 2003, 3546 cases were reported, with 68 deaths. Ernakulam district had the 4th highest incidence of dengue fever, with 319 confirmed cases. (ICMR bulletin 2006 April-May, Volume 36-page no: 4,5). The purpose of this study was to assess the extent of physical and psychological effects in patients with Dengue fever admitted to a selected Tertiary hospital in Ernakulam.

MATERIALS AND METHODS

Non experimental Cross Sectional design was adopted to conduct this study. The study was carried out in the medical wards of AIMS, Kochi. The study duration was 5 months; June to October 2014. A semi-structured interview schedule with 16 items was used to collect socio-demographic and clinical data. Physical problems were assessed in terms of issues with mobility, self care, usual activities (work, study, housework, family, or leisure activities, pain / discomfort) by using Euro Qol visual analogue.
scale developed by Rosalind Rabin and Frank de Charro in 1987. Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression consisting of seven statements each for assessing anxiety and depression (Zigmond and Snaith 1983). Panic Disorder Severity Scale was used to assess the panic attack and Thanatophobia consisting of seven statements.

The subjects for this study were recruited according to a predefined inclusion and exclusion criteria. The lower age limit was set at 18 years with no gender discrimination. Patients with a clear evidence of past history of psychiatric disorder were excluded from the study in order to exclude bias. Pilot study was done with five patients before starting the main study. Out of 60 patients, four were found to be out of the predefined age range and one subject had suffered from a psychiatric disorder in the past. Hence, 55 subjects were finally recruited for the study. Data collection was done after getting permission from the Institutional Ethical Committee and HOD of General Medicine of the Hospital.

Data was analyzed using SPSS 20.0 software. Qualitative variables expressed as percentages and qualitative variables expressed as mean and standard deviation.

RESULTS

Figure 1: Physical problems associated with dengue fever

Figure 2: Level of anxiety among subjects

The above figure shows that 18.18% subjects have mild, 41.82% have moderate and 38.18% have severe level of anxiety. 1.81% of subjects are normal.

Figure 3: Level of depression among the subjects

Among the subjects 7.27%, 50.91%, 36.36% showed severe, moderate and mild degree of depression respectively. 5.45% subjects were normal.
Table 1. Level of panic attack among the subjects

<table>
<thead>
<tr>
<th>Panic attack</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>Border line</td>
<td>22</td>
<td>40</td>
</tr>
<tr>
<td>Slightly ill</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td>Moderately ill</td>
<td>13</td>
<td>23.6</td>
</tr>
<tr>
<td>Markedly ill</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 3 shows that 40%, 29%, 23.7%, and 3.6% of subjects were borderline, slightly ill, moderate, and markedly ill. 3.7% subjects were normal.

Table 2 depicts that 60% of subjects were having Thanatophobia and 40% of subjects were not having Thanatophobia.

<table>
<thead>
<tr>
<th>Thanatophobia</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>22</td>
<td>40.0</td>
</tr>
<tr>
<td>Present</td>
<td>35</td>
<td>60.0</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Correlation between physical problems and psychological problems

Of the 55 patients there was a significant correlation between physical problems and anxiety ($r = 0.339, p = 0.011$) physical problems and panic attack ($r = 0.303$, $p = 0.025$) anxiety and panic attack ($r = 0.355$, $p = 0.008$)

SAMPLE CHARACTERISTICS

In the present study majority of the subjects (32.7%) were in the age group of 18-30 years and most of the subjects were males (69.1%). With regard to education majority of subjects were graduate and most of the subjects 30.9% belongs to private employees. Majority of subjects (38.2%) belongs to the family income of 10,000-20,000. Of the subjects 80% residing in rural area and 20% residing in urban area. 27.3% of respondents are having past history of dengue fever. 10.9% subjects are having the family history of mental illness and 89.1% of subjects were having no history of mental illness. Among the subjects 87.3% are having the history of communicable diseases and 12.7% are not having the history of communicable diseases. 60% of subjects are having the history of co-morbid illness and 40% of subjects were not having the history of associated co-morbid illness.

DISCUSSION

Mental health and physical health are fundamentally linked. People living with a mental illness are at greater risk of experiencing a wide range of physical health problems. The reverse relationship is also true as people living with chronic physical health conditions experience depression and anxiety at twice the rate of general population.

In the present study, most of the patients suffered from both psychological and physical problems. The main psychological problems associated with dengue fever are thanatophobia, anxiety, depression and panic attack.

As per the study conducted by Anurag Jhanjee et al. (2013), regarding psychiatric symptomatology in dengue fever, 90.3% of patients exhibited thanatophobia. Over 80% of the subjects exhibited clinically significant anxiety and associated symptoms. Around one fifth of the subjects had panic attack with nearly 15% needing short course of anxiolytics.

Another study conducted by Khalid Umar Gill regarding the psychological effects of dengue fever showed that above 90% of patients developed thanatophobia. Due to this phobia, about 60% developed severe anxiety and panic attack. About 5% of the whole group developed a clear-cut episode of depressive illness which was most likely induced by stress caused by other psychological symptoms like death phobia.

Unfortunately, there is a strong possibility that dengue fever might erupt in the form of an epidemic every year. So, health care professionals should keep an eye on the mental health, along with the physical health, of their patients.

The present study shows that there is a significant positive correlation between physical problems and anxiety, physical problems and panic attack, anxiety and panic attack. There is significant association between thanatophobia and physical problems (chi square = 7.74, p value = .0213). There is no association between physical problems with selected socio demographic variables. There is a significant association between anxiety and age (chi square value is 5.96 and p value is .015); as
age advances, anxiety increases. There is significant association between educational qualification and anxiety (chi square 12.77, p value = 0.001). (chi square 12.77, p value = 0). There is significant association between thanatophobia and physical problems (chi square 7.74, p value = 0.0213).

**CONCLUSION**

The results of our study show that dengue fever causes significant psychological distress along with physical problems. There is a significant positive correlation between physical problems and anxiety, physical problems and panic attack, anxiety and panic attack. Attention needs to be paid towards the mental health of the patients suffering from dengue fever in addition to their physical health. There is an urgent need to sensitize the media to report deaths occurring due to dengue fever in a responsible fashion such that the lay public becomes aware and not frightened by the dreaded illness.

**ACKNOWLEDGEMENT**

We acknowledge the help received from Miss. Nimita Paul, Bio statistician, Department of Community Medicine, AIIMS. Kochi.

**REFERENCES**

Prevalence of hyponatremia in adult patients presenting with altered sensorium to the emergency department of a tertiary care centre


ABSTRACT

Background and Objective: Altered sensorium is a common presentation among patients in the emergency room. Hyponatremia is a major and important electrolyte abnormality causing altered sensorium. Objective of this study is to find out the prevalence of hyponatremia in adult patients presenting with altered sensorium to the emergency department of a tertiary care centre and its correlation with treatment.

Study design and Methodology: A total of 100 patients were included in the study after fulfilling the inclusion and exclusion criteria. The sensorium of patients was assessed on their presentation to the Emergency Room using Glasgow Coma Scale. The measurement of serum electrolytes were also done on admission. These patients were reassessed after 48 hours using the same parameters and the subsequent data was analyzed.

Results: The mean sodium concentration among those patients was 122.30 ± 8.73 and mean GCS on admission to emergency room was 11.78 ± 1.61. Male:female ratio was 1.88:1. In our study, prevalence of hyponatremia in adult patients presenting with altered sensorium to our emergency department was 94% after the exclusion criteria were satisfied. We found that there is a statistically significant relationship between the severity of hyponatremia and altered sensorium. We could also draw a correlation between the correction of hyponatremia and the improvement of sensorium completely. There is a statistical significant relationship (p < 0.001) between urine sodium and degree of altered sensorium.

Discussion and Conclusion: Prevalence of hyponatremia in patients with altered sensorium presenting to ED is very high. There is very good correlation between severity of hyponatremia and the level of sensorium. Hence, we suggest that all patients with hyponatremia irrespective of its cause should be treated from ED itself even if it is mild hyponatremia. There is statistically significant relationship between urine sodium and degree of hyponatremia and also between urine sodium and degree of altered sensorium. We suggest treating all patients with elevated urine sodium with vasopressin antagonist.

Key words: ED: Emergency Department, GCS: Glasgow Coma Scale,

INTRODUCTION

Neurological assessment is a method of obtaining specific data in relation to the function of a patient's nervous system. The Glasgow Coma Scale (GCS) was published in 1974 by Graham Teasdale and Bryan J. Bennett which is a bedside assessment for impairment of conscious level, the clinical hallmark of acute brain injury/insult. It is widely used for quantifying neurological impairment. Kanich et al in his study showed that 4-10% of Emergency Room visits are of patients with altered level of consciousness1. Major cause for such visits are for alcohol intoxication, hypoglycaemia, illicit drugs, post-ictal states and trauma2.

Hyponatremia is an important electrolyte abnormality with the potential for significant morbidity, mortality and prolonged hospital stay. It accounts for 15-20% of emergency room admissions3,4. The clinical presentation has a wide spectrum, varying from asymptomatic patients to ones having seizures and coma5. Mortality rates from hyponatremia are as high as 17.9 percent6. The prognostic implications are grave and far reaching if it isn’t addressed meticulously from the beginning7. Management includes instituting immediate treatment in patients with acute symptomatic hyponatremia.

In an acute setting like the emergency room, often, prompt treatment has to be initiated before a confirmatory diagnosis is made or results of supportive biochemical investigations are available. Both over-correction and under-treatment can produce devastating effects on cerebral function8. As a result, many physicians are reluctant to treat it.

We conducted a retrospective study to find out the prevalence of hyponatremia in patients with altered sensorium in emergency room and correlation of the latter with treatment.

OBJECTIVE:

- To find out the prevalence of hyponatremia in adult patients presenting with altered sensorium to the emergency department of a tertiary care centre.
- To compare patients with profound hyponatremia with degree of altered sensorium.
- To assess the correlation between the correction of hyponatremia and the level of sensorium.

*Dept. of Emergency Medicine, AIMS, Kochi,
** Dept. of Biostatistics, AIMS, Kochi
MATERIAL & METHODS

A retrospective study was conducted on 100 patients who came to the department of Emergency Medicine; in a tertiary care hospital in Kochi from 2009 April to 2011 March with altered sensorium, after getting an authorization from the ethical committee.

The sensorium of patients was assessed on their presentation to the Emergency Room using Glasgow Coma Scale (GCS). Altered Level of consciousness (Altered Sensorium) defined as a GCS less than 14 (Normal GCS: 15).

For purposes of analysis, we further subdivided the abnormal GCS group into:

- Mild brain insult: GCS 13-14
- Moderate brain insult: GCS 9-12
- Severe brain insult: GCS less than 8

This is for finding out the associations and trends between severity of altered sensorium and hyponatremia. This classification scheme is common to other studies involving abnormal GCS.

Serum level of sodium of all patients presenting to emergency room with altered sensorium were measured and analysed.

Hyponatraemia is defined as a serum sodium concentration <135mmol/l. This was further divided into:

- Mild hyponatraemia: 130 – 134 mmol/l
- Moderate hyponatraemia: 125 – 129 mmol/l
- Profound hyponatraemia: <125mmol/l

Based on the available figures on the prevalence of electrolyte abnormalities in patients presenting with altered sensorium (3), a minimum sample size with 95% confidence and 20% allowable error was computed as about 100. Therefore, a sample size not less than 100 patients were included in the study and the data compiled at the end of the study was analysed statistically using the statistical analysis using software SPSS.

Written informed consent was not relevant, as the study did not involve any intervention other than the routine medical management protocol.

All the patients with hyponatremia and altered sensorium were corrected either orally or with intravenous correction with normal saline or 3% saline, or fluid restriction. We also assessed the GCS of the patients and their sodium level after 48 hrs to look for the improvement of the GCS and serum sodium level.

INCLUSION CRITERIA:

- Patients presenting with altered sensorium (GCS < 15) to Emergency Room.

- Age more than 18 yrs

EXCLUSION CRITERIA:

- Patients presenting with altered sensorium having history of following conditions in the past 48 hrs.

- History of (H/o) Head injury / Trauma
- H/o Ethanol use
- H/o Psychiatric illness
- H/o Hypoglycemia
- H/o Uremic encephalopathy
- H/o Sepsis

STATISTICAL ANALYSIS

All analysis was conducted using SPSS version 20. Categorical variables were compared using the chi square test. Effectiveness of treatment was checked with paired t test. Cut off value was identified using ROC curve.

RESULTS

The mean age of patients with altered sensorium in our study population was 66.13 ± 14.98. The mean sodium concentration among those patients was 122.30 ± 8.736 and mean GCS on admission to emergency room was 11.78 ± 1.612. The study group was composed of 58 (58%) male and 42 (42%) females, Male: female ratio was 1.38:1. Majority of patients were in > 65 yrs age group, among which 34 patients were male and 23 patients were female. (Figure 1)

![Figure 1 - Age wise distribution of altered sensorium](image)

In our study, the prevalence of hyponatremia in adult patients presenting with altered sensorium to our emergency department was 94% after the exclusion criteria were satisfied (Figure 2). The frequency of patients with altered sensorium was 38%, 61% and 1% respectively which falls in mild, moderate and severe brain insult category (Figure 3).
Prevalence of hyponatremia in adult patients presenting with altered sensorium to the emergency department of a tertiary care centre

Percentage of cases in moderate/severe group of altered sensorium was 71.76% in the moderate/profound hyponatremia category, compared to 11.1% in mild sodium level category. This is statically significant (Table 1, 2).

<table>
<thead>
<tr>
<th>Table 1 - Sodium Level in ER and GCS IN ER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Level in ER</td>
</tr>
<tr>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Mild Hyponatremia</td>
</tr>
<tr>
<td>Moderate Hyponatremia</td>
</tr>
<tr>
<td>Profound Hyponatremia</td>
</tr>
</tbody>
</table>

Percentages are given in the bracket.

<table>
<thead>
<tr>
<th>Table 2 - Sodium Level in ER and altered sensorium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Level in ER</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Mild Hyponatremia</td>
</tr>
<tr>
<td>Moderate/Severe Hyponatremia</td>
</tr>
</tbody>
</table>

Percentages are given in the bracket.

<table>
<thead>
<tr>
<th>Table 3 - Profound hyponatremia in ER and Moderate brain insult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Level in ER</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Mild/moderate hyponatremia</td>
</tr>
<tr>
<td>Profound Hyponatremia</td>
</tr>
</tbody>
</table>

Percentages are given in the bracket.

<table>
<thead>
<tr>
<th>Table 4 - Profound hyponatremia in ER and Moderate brain insult</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Level in ER</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Mild Hyponatremia</td>
</tr>
<tr>
<td>Moderate Hyponatremia</td>
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</table>

Percentages are given in the bracket.

In our study, 92.8% of patients with profound hyponatremia had moderate brain insult (according to GCS score), compared to 26.3% in the mild/moderate hyponatremia category. This is statistically significant \((p < 0.001)\) (Table 3, 4).

We also found out that there is a statistical significant relationship between \((p = 0.021)\) between age and severity of hyponatremia.

There was no statistical significant association between gender and the severity of hyponatremia, even though majority of female patients (57.9%) and male patient (60.7%) had profound hyponatremia.

All the patients with hyponatremia were treated with either fluid restriction, 0.9% saline or 3% saline and their sodium level and GCS was evaluated after 48 hrs. We tried to find out whether treating any case of hyponatremia irrespective of its cause with the above
mentioned treatment would improve the sensorium of the patients completely.

The mean of sodium and GCS on admission to ER was 122.30 ± 8.736 and 11.78 ± 1.612 respectively and the mean of sodium and GCS after 48hrs of sodium correction was 136.58 ± 4.316 and 14.80 ± 0.512. The difference was a statistical significant (p < 0.001).

![ROC Curve](image)

**Figure 5 - ROC Curve**

Fetal segments are produced by lines

<table>
<thead>
<tr>
<th>TABLE 5 - Comparison of Urinary sodium excretion with Serum sodium level in Emergency Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Sodium Level in Emergency Room</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Urinary Sodium concentration (mEq/L)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Percentages are given in the bracket

<table>
<thead>
<tr>
<th>TABLE 6 - Comparison of Urinary sodium excretion with Serum sodium level in Emergency Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Sodium Level in Emergency Room</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Urinary Sodium concentration (mEq/L)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Percentages are given in the bracket

<table>
<thead>
<tr>
<th>TABLE 7 - Comparison of Urinary sodium excretion with altered sensorium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Sodium Level with altered sensorium</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Urinary Sodium concentration (mEq/L)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Percentages are given in the bracket

The mean urine sodium concentration was 61.45 ± 36.10. A cut-off value for urine sodium concentration was determined with the help of ROC curve as 44 (sensitivity 71.6% and specificity 72.7 %, Figure 5). There is statistical significant association between urine sodium and degree of hyponatremia (table 5, 6) and also there is a statistically significant relationship (p < 0.001) between urine sodium and degree of altered sensorium (table 7).

**DISCUSSION**

Altered sensorium is a common complaint among patients in emergency department. The term ‘altered sensorium’ is vague and has several synonyms like altered behaviour, generalised weakness, lethargy, agitation, psychosis, disorientation, inappropriate behaviour, inattention, confusion, hallucination and so on. There is no standardized terminology for it. This hinders the assessment and subsequent appropriate management. Acute changes are more concerning as they have adverse effects and are potentially life threatening. To make this assessment simpler in emergency room, we tried to follow GCS for assessing all the patients who presented with altered sensorium.

GCS was published in 1974 by Graham Teasdale and Bryan J. Bennett which is a bedside assessment of impairment of conscious level, the clinical hallmark of acute brain injury/insult. It is widely used for quantifying neurological impairment. Kanich et al in his study showed that, 4-10% of Emergency Room visits are of patients with altered level of consciousness. In our study, we included only the patients with altered sensorium which was defined as GCS < 15, irrespective of the aetiology of the disease.

Acute altered sensorium is rarely caused by psychiatric illness such as depression or schizophrenia, and in elderly patients, these should be diagnosis of exclusion. Acute brain dysfunction (delirium, stupor, and coma) and their underlying aetiology should be ruled out prior to considering any psychiatric diagnosis, especially in patients without a previous history of psychiatric illness.

The ED plays a critical role in the evaluation and management of patients with altered mental status.

Hyponatremia is an important electrolyte abnormality with the potential for significant morbidity, mortality and prolonged hospital stay. It accounts for 15–20% of emergency room admissions. Since it is very significant, we tried to study the prevalence of hyponatremia in patients with altered sensorium. We found from our retrospective study, the prevalence of hyponatremia in patients with altered sensorium is 94%, which is significant. Since the prevalence of hyponatremia is high in patients with low GCS, we suggested treating all the patients. Aetiology of hyponatremia can be numerous. Mild hyponatremia is associated with numerous complications, but at times it can be so subtle that it may be unrecognized. In addition, other studies have demonstrated that even small decreases in serum sodium are independently associated with adverse outcome in critically ill patients.
When sodium level in blood becomes very low, water enters the brain cells, resulting in their swelling up. This increases the intracranial pressure and causes hyponatraemic encephalopathy. Further increase leads to brain herniation. This can lead to nausea, vomiting, headache, confusion, seizures, respiratory arrest and pulmonary edema.

All the patients with hyponatraemia were treated with either fluid restriction, 0.9% saline or 3% saline and their sodium level and GCS was evaluated after 48 hrs. We tried to find out whether treating any case of hyponatraemia irrespective of its cause from the ED itself with the above mentioned treatment would improve the sensorium of the patients completely. We could also draw a correlation between the correction of hyponatraemia and the improvement of sensorium completely.

This shows that any case of hyponatraemia irrespective of its cause should be corrected from the ED itself.

Bennani et al in his study showed that profound hyponatraemia (\(\text{Na} < 125\text{mmol/l}\)) was independently associated with an increase in mortality (17). We also found out that there is a statistically significant relationship between \(p = 0.021\) between age and severity of hyponatraemia. We found that in patients with age > 65 yrs, there was more chance of developing moderate and profound hyponatraemia with significant drop in sensorium. Hence, we stress on treating even mild hyponatraemia from ED itself, especially when the urine sodium is elevated, as there is high possibility of these patients developing profound hyponatraemia at a later stage.

In our study, we found that 57% of patients had elevated urine sodium (>44 mEq/L) on admission to ED, out of which 35.4% of patients who had urine sodium more than 44 mEq/L developed profound and refractory hyponatraemia after 48 hrs even after correction. We also found that there is a statistically significant relationship \(p < 0.001\) between urine sodium and degree of altered sensorium. We also found that as the age increases, urinary sodium loss increases.

Newer agents such as the arginine vasopressin receptor antagonists have shown promising results (18). Recently, conivaptan, a V1A/V2-receptor antagonist, was approved for treating hospitalized patients with euvoletic hyponatraemia. As most hyponatraemia is caused by the non-osmotic release of vasopressin, the availability of vasopressin antagonists is exciting and may change the management of hyponatraemia completely. Ghali et al reported the efficacy and safety of 5-day conivaptan therapy (40 or 80 mg/day) for euvoletic or hypervolemic hyponatraemia (19). Robert et al in his study showed that both in euvoletic or hypervolemic hyponatreemic patients, Tab. Tolvaptan, an oral vasopressin V2-receptor antagonist, was effective in increasing serum sodium concentrations (20,21). In that study, it showed patients assigned to Tab. Tolvaptan had normal serum sodium concentrations on day 4 compared to placebo. In view of this, vasopressin antagonists maybe useful in these type of patients, to prevent urinary loss of sodium. Hence, we suggest that all the patients having elevated urine sodium have to be treated with vasopressin antagonist. Further studies are needed.

CONCLUSION

Prevalence of hyponatraemia in patients with altered sensorium presenting to ED is very high and the severity of hyponatraemia and the level of sensorium has very good correlation. Hence, we suggest that all patients with hyponatraemia, irrespective of its cause or severity, should be treated from ED itself. There is statistically significant relationship between urine sodium and degree of hyponatraemia and also between urine sodium and degree of altered sensorium. We suggest treating all patients with elevated urine sodium with vasopressin antagonist.

REFERENCES


Post Steroid panniculitis

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ABSTRACT

The term "panniculitis" refers to a group of inflammatory disorders in which the primary site of inflammation is in the subcutaneous fat. Panniculitis is a relatively uncommon condition that usually presents with inflammatory nodules or plaques. Post steroid panniculitis is a rare lobular panniculitis characterized by firm subcutaneous nodules, seen in children after rapid withdrawal of steroids. It was first described in 1956 by Smith and Good. Since then a few isolated cases of post steroid panniculitis have been reported in literature. Affected children develop erythematous nodules 1 to 10 days after glucocorticoid withdrawal. The cheeks, arms and trunk are the common sites of involvement. We report a case of childhood onset nephrotic syndrome who presented with panniculitis after reduction in dose of steroids to alternate day therapy.

Keywords: Nephrotic syndrome, steroid withdrawal, subcutaneous nodules, panniculitis

INTRODUCTION

Panniculitis (inflammation of the subcutaneous fat) is a relatively uncommon condition in children that presents with cutaneous nodules or plaques. Several subtypes of panniculitis exist, including panniculitides related to infection, external insults, malignancy and inflammatory diseases. Most common form of panniculitis is erythema nodosum. Other forms of panniculitis are extremely uncommon. The diagnosis of panniculitis can be challenging because different forms of panniculitis may present with similar clinical findings and most types of panniculitis are rare. A careful clinical assessment including an evaluation of patient's risk factors, distribution of lesions and clinical findings such as ulceration, sclerosis, atrophy can provide valuable clues for diagnosis.

Although histopathologic examination of the affected area can be helpful, interpretation of the biopsy findings must be done carefully. In the absence of careful clinical correlation and a careful consideration of the clinical and pathologic differential diagnoses, an incorrect diagnosis may be made. Panniculitis in children may be seen in a number of systemic infections, vasculitic disorders and following intake of medications. The occurrence of nodular panniculitis following reduction in dose or withdrawal of therapy with corticosteroids is extremely rare, with only twenty cases described in medical literature.

CASE REPORT

A twelve year old girl with nephrotic syndrome (frequent relapsing), who had an onset of nephrotic syndrome at three years of age, was on regular follow up. Kidney biopsy showed Focal Segmental Glomerulosclerosis. She had received multiple courses of steroids and later Cyclophosphamide. She presented with a relapse and was given Prednisolone 60 mg/m2/day for 6 weeks; as she achieved remission, Prednisolone was reduced to 40 mg/m2 on alternate days. A week after reducing the steroids to alternate days, she developed firm, nodular, red painful lesions on the chest, neck and back (Fig 1). A skin biopsy was done and it showed panniculitis (Fig 2a & 2b). The dose of Prednisolone was increased to 60 mg/m2/day and the lesions disappeared over next two weeks. However, when the steroid dose was tapered, the lesions reappeared. As she developed a relapse of nephrotic syndrome, she was started on Tacrolimus along with Predni-
pear on cheeks, arms and trunk (areas prone to the greatest accumulation of fat during steroid treatment). Visceral lesions are very uncommon. The disorders for which steroid therapy was given could be nephrotic syndrome, brain tumors and hematopoietic malignancies. On skin biopsy, lesions resemble subcutaneous fat necrosis of newborn, with infiltration by lymphocytes, foamy histiocytes, distributed among adipocytes of fat lobule. Needle shaped clefs are often seen within cytoplasm of histiocytes and adipocytes. The pathogenesis is poorly understood. Glucocorticoids increase caloric and dietary fat intake and increase hydrolysis of circulating triglycerides by increasing lipoprotein lipase activity. This increases the amount of fatty acids in circulation which are then available for ectopic fat distribution (liver, muscle and central adipocytes). Glucocorticoids also increase de novo lipid production in hepatocytes through increased expression of fatty acid synthase. Glucocorticoids promote preadipocyte conversion to mature adipocytes, causing hyperplasia of the adipose tissue. It is hypothesized that the withdrawal of systemic corticosteroid therapy leads to abnormal lipid metabolism, resulting in the elevation of saturated to unsaturated fatty acid ratio leading to crystal formation in adipocytes and subsequent inflammation.

An area of skin involved with panniculitis feels thickened and woody to touch. It may or may not demonstrate discolouration of the overlying skin. The area is often tender. When the inflammation has settled, localised lipodystrophy sets in. A close differential diagnosis is erythema nodosum which predominantly involves extensor surface of lower extremities and on histology is septal panniculitis. Treatment includes treating the underlying cause, elevating the affected area, compression hosiery, pain relief using anti-inflammatory medications and systemic steroids. The lesions usually resolve over weeks to months without residual scarring. Although treatment will hasten resolution, lesions may regress without treatment. Prognosis is excellent and complications are unusual. In our patient the lesions did not reappear after starting calcineurin inhibitors; this has not been reported in literature.

CONCLUSION

It is imperative that Nephrologists are aware of this rare complication, which may occur following rapid tapering or stopping systemic corticosteroids. It has to be clinically differentiated from other causes of childhood erythema especially erythema nodosum.

REFERENCES:
Neurenteric Cyst: A Rare Cause of Respiratory Distress In The Newborn

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ABSTRACT

Respiratory distress in full term newborns may occur from a variety of causes, including disorders of the central nervous system, cardiac, pulmonary, gastrointestinal, hematological or the musculoskeletal systems. Sepsis, metabolic disorders and congenital anomalies also can give rise to this condition. We describe a rare cause of respiratory distress in the newborn due to a developmental abnormality, which gave rise to a neurenteric cyst in the thorax with infradiaphragmatic extension.

Keywords: Neurenteric cyst, respiratory distress, neonate

CASE REPORT

A male infant was born at term to a 17-year-old gravida 3, para 2 woman by Caesarian section secondary to fetal distress. Maternal prenatal laboratory tests were: blood type O positive, rubella immune, hepatitis B surface antigen negative, VDRL non-reactive, and group B streptococcus screen positive. APGAR scores were 8 and 8 at 1 and 5 minutes, respectively. The infant was asymptomatic and had an uneventful hospital course and was discharged home with instructions to follow-up with his Pediatrician. On the 10th day of life, the infant developed respiratory distress with vomiting, which prompted his parents to seek medical care. The infant was hospitalized for further evaluation and was noted to be tachypneic with a respiratory rate of at least 80 breaths per minute. A chest x-ray revealed a large cystic area in the right thorax (Figure 1). The infant was transferred to a tertiary care center for further investigation.

Computerized tomography (CT) of the chest demonstrated a 15cm x 15cm x 6cm cystic mass with a fluid level in the right chest (Figure 2). An upper gastrointestinal (UGI) contrast study was done to rule-out esophageal duplication. As the contrast material passed through the duodenum, a communication was seen as a small tract through the first part of the duodenum at the posterior diaphragmatic hiatus leading into the cyst. This was thought to be a bronchopulmonary foregut malformation of the right hemithorax, most likely a duodenal duplication cyst.

The infant was taken to surgery with the presumptive diagnosis of duodenal duplication cyst. The findings at surgery included: a large, extrapleural enteric cyst filling the entire right posterior hemithorax, with extension from the thoracic inlet down through the diaphragm. There was segmental blood supply from the intercostal arteries and descending aorta to it. There was approximately two to three centimeters communication between the cyst and midpart of duodenum. The cyst was dissected with some difficulty at the top portion and removed. It contained barium and bowel contents. The pathology report of the excised cyst was consistent with a duodenal duplication cyst.

However, the patient later developed left upper extremity hypotonia and ptosis of the left eye. Magnetic resonance imaging (MRI) of the brain showed a structurally normal brain and cervical spine dysraphism (Figure 3). An enhanced CT of the cervical spine (C-spine) showed “multiple cervical segmentation anomalies with all posterior arches being un-united throughout the cervical spine and also some partial duplication of some vertebral body ossification centers in the mid and lower C-spine”. Barium,
DISCUSSION

Duodenal duplication is a rare form of alimentary tract duplication that has been reported in the literature. Previous reports of transdiaphragmatic duodenal duplication have been associated with spinal abnormalities ranging from significant spinal dysraphism to connective tissue attachment without spinal abnormalities. This case report describes a transdiaphragmatic duplication cyst that presented with respiratory compromise with significant spinal cord findings. The relevant pathological features, differential diagnosis, and management are briefly reviewed.

Neurenteric cyst is a rare congenital developmental abnormality presenting with symptoms in the newborn period. There are fewer than 60 reported cases in the literature. It is known by different names: endogenous cyst, endodermal cyst, enterogenous cyst, gastrocytoma, and intestinoma. It is a form of split notochord syndrome. It arises during the notochord development due to an endodermal-ectodermal adhesion resulting in the persistence of the neurenteric canal during the third to fourth week of embryonic life. Most of the cysts are intradural and extramedullary, and are located at the lower cervical or upper thoracic levels. Only a very few cases (10%) have been reported as intracranial cysts. They are also known to occur in the posterior mediastinum and abdomen and may occur in multiple sites. Histologically, there are three forms, and the lining mucosa may have features of esophagus, stomach, or small intestine. Type 1 cysts are thin-walled and lined with a layer of stratified or pseudostratified cuboidal or columnar epithelium. Type 2 cysts have additional mesodermal elements such as smooth muscle and fat. Type 3 cysts are also lined by ependymal or glial tissue. Occasionally, teratomas may mimic neurenteric cysts as these cysts may be lined by ciliated epithelium. They also show reactivity for cytokeratins and epithelial membrane antigen (EMA) but not for S-100 (a multigenic family of non-ubiquitous calcium modulated proteins) demonstrating an endodermal origin. They may also stain positively for carcinoembryonic antigen (CEA) as gastrointestinal epithelial cells contain CEA during early fetal life. Most of these lesions are accompanied by anterior spina bifida. In fact, the mere presence of anterior spina bifida should raise the suspicion of a connection between the spinal cord or the meninges with the alimentary tract. Other vertebral anomalies may be present. These include: circumscribed vertebral defects, fusion of bodies, scoliosis, kyphosis, hemivertebrae, or widened pedicles. The cyst may contain fluid, which is milky, mucinous or CSF-like. The cyst can penetrate the diaphragm and communicate with small bowel as was seen in our patient. Clinically, nearly two-thirds of these cases present in males and about 50% of them are diagnosed by 15 years of age. Most cases are asymptomatic in the newborn period.
and symptoms are usually due to the space occupying nature of the lesion. Respiratory symptoms such as tachypnea, dyspnea, or cough are related to the size of the thoracic mass. Rarely, the presence of gastric mucosa can give rise to peptic ulceration and can present as hematemesis or hemoptysis from perforation into the esophageal or tracheo-bronchial tree. Neurological deficits include: weakness, sensory loss, pain, sphincter disturbances or meningism depending on the location of the cyst. Symptoms are generally progressive but can be intermittent in nature. Recurrent meningitis, either bacterial or aseptic, has been reported and may be due to infection or chemical irritation from fluid leakage. Because of the nonspecific nature of neurological symptoms, one case was diagnosed as psychogenic disorder in a seven-year-old girl. The differential diagnosis should include bronchogenic cyst, enteric duplication cyst, cystic adenomatoid malformation, and congenital diaphragmatic hernia. There are three known cystic intrathoracic derivatives of the foregut: bronchogenic cyst, esophageal duplication and neurenteric cyst. The clinical triad of respiratory distress, vertebral anomalies detected on X-ray and a posterior mediastinal mass should raise the suspicion of a neurenteric cyst in an infant. The most useful diagnostic procedure is MRI. Prenatal diagnosis of fetal neurenteric cysts has been reported with MRI and ultrasound.

The treatment of choice is total surgical excision and the prognosis is generally good. In our patient, the portion of the cyst in the cervical spinal canal was not removed at the time of surgery primarily because it was not diagnosed. Further, the infant was asymptomatic, so removal was planned for a later date unless the infant developed neurological symptoms, which would prompt earlier removal. Pressure effects of the cyst on the spinal cord may give rise to neurological symptoms in later life; hence, total removal of the cyst must be done whenever feasible.

In summary, we have reported a case of a large thoracic neurenteric cyst, which initially was misdiagnosed as duodenal duplication. This cyst communicated between the cervical spinal canal and the duodenum, giving rise to respiratory distress in the newborn infant.

REFERENCES


Strange Murder

Anu Sasidharan*, Biju James**, Aravind Ajid*

ABSTRACT

Unusual attempts to murder an individual are not uncommon. Most of them are done without proper preparations or reasonable foresight. Due to such unexpected situations leading to homicide of an individual, very often the investigating officer or the judiciary is left clueless as to the manner of death. It is a cumbersome task to pin-point the manner of death to be homicidal in such suspicious deaths. As far as a forensic surgeon is considered, such cases are both time-consuming and brain-storming like joining pieces of a puzzle to decipher the manner of death scientifically and accurately. There can be even more demanding scenarios when a forensic surgeon utilises his utmost skills so as to reach a conclusion regarding manner of death as well as to reconstruct the events that had taken prior to the death of an individual. We hereby present such a case report.

Keywords: Axillary injury, homicide, manner of death, neck violence, stab wound

INTRODUCTION

Homicides with stab injuries are very common1,2,3,4. The chest or upper portion of trunk is one of the most preferred and accessible sight chosen by assailants to commit homicide by stabbing5. This is because of the understanding amongst common man that most of the vital organs are situated in the above mentioned body parts. Stab injuries to the limbs or lower portion of the trunk are not seen in isolation. They may be seen along with fatal injuries to the vital organs of the chest / upper trunk. Medico-legal autopsy of such homicides are very straight forward for providing an opinion as to the cause and manner of death when compared to sudden natural deaths or when the body is extremely putrefied. But sometimes the manner of death can be puzzling even when the cause of death is evident. Though a forensic surgeon is not legally bound, his services are valuable to the investigating officer and judiciary in determining the manner or circumstances that led to death of an individual.

CASE IN BRIEF

An elderly man was found dead in the veranda of his house at about 9pm. He was a chronic alcoholic and used to live with his wife. He used to consume alcohol every day and come home to sleep undisturbed on the veranda. Later, in the late evening, his wife would wake him up, serve dinner and he would return to sleep. He was a daily wages worker. There has been past history of small scuffles with his co-workers following consumption of alcohol. None of them were significant enough to cause him any bodily injuries. But on this fateful day, he was seen in the veranda bathed in a pool of blood. His wife had given a statement to the investigating officer that he was unresponsive when she had found him. Though he was rushed to a nearby hospital, he was declared dead on arrival.

The body was brought for autopsy at noon next day to the Office of the District Police Surgeon and Dept. of Forensic Medicine, Ernakulam District Hospital. He was lean and thinly built. All body orifices were normal and postmortem changes were suggestive of death between 6 pm and 9 pm on the previous day. Dried blood stains were seen on the back aspect of entire right upper limb, outer aspect of right side of trunk and on the outer aspect of right feet. The streaks of the stains were directed downwards.

Following injuries were noted:

1. Incised stab wound (Fig. 1) 10 cms, gaping and muscle deep, was seen obliquely placed at the right axilla. The upper outer end was placed 5 cms below tip of the shoulder. Margins were regular and muscles underneath were severed. Axillary artery was also cleanly cut.

2. Abrasion 1 cm x 0.5 cm (Fig. 2.1) was seen on the right side of the neck, 6 cms below angle of jaw. Flap dissection of neck was done under bloodless field. Underneath, corresponding to the external injury (abrasion), the sternocleidomastoid muscle showed a contusion 5 cms x 4 cms (Fig. 2.2). Other muscles and bony structures of neck were intact and normal.
Internal examination was normal except for pale appearance of all organs. Stomach was empty; mucosa was normal. Blood was sent for alcohol estimation to Chemical Examiner's Laboratory, Kakkanad presuming alcohol was absorbed from gastrointestinal tract leaving stomach and intestines empty. Opinion as to the cause was given as death which had occurred due to cut injury to right axillary region leading to haemorrhage. Police was provided a detailed statement regarding the involvement of neck violence and the possible manner of death.

DISCUSSION

In this case, even a common man can opine on the cause of death. However, a doctor's knowledge is required to comment upon the fatality of this injury due to the involvement of axillary artery (a major blood vessel). But the skills and experience of a medico-legal expert only can guide the investigating officers for the possible manner of death. Scolan and associates have concluded in their 10 year study that existence of vertical wounds in victims implied homicide. This holds good for the current case report which had a vertical wound with slight obliquity. The crime scene examination in this case was not much fruitful. Other than the pool of blood in the veranda of house, there were no trails of blood stains either leading to the place where the body of the deceased was found or away from the scene. This could only substantiate the fact that the crime had taken place at the veranda of house (primary scene and only scene of occurrence). There were no footprints of either the deceased or the assailant/s at or around the crime scene. This could support the fact that the assailant/s had left the scene of crime prior to the blood that had pooled from the deceased. Further, the deceased himself could not have been in a position to walk after blood loss had occurred. This was further confirmed from the finding that during autopsy dried blood stains were not seen on either sole of his feet. They were only seen on the outer aspect of right foot with the dried blood streaks directed downwards. This proved that he was standing in an erect posture when he received the injury to axilla because the blood had fallen from axilla downwards to feet resulting in that direction and location of blood stains. The dried blood stains on the other sites of the body also supported the same theory. For example, outer aspect of right upper limb was a site for dried blood stains because the blood had trickled along this surface as he was in a standing posture. The victim was tried to be killed at his house veranda itself. Considering this fact, we had alerted the investigating officer that it could be someone close to the victim or someone the victim knows very well. The investigating officer had already found out that the deceased had frequent quarrels even with his siblings. Hence, they had started the investigation in that direction. Research works done by scientists earlier reported that in many of the homicidal deaths, the body of the victim would be frequently found at the victim's residence.

The second injury on neck further helped us to reconstruct the sequence of events that could have resulted in an unusual stab at the axilla. That injury was antemortem (produced when victim was alive) because of the contusion that was seen beneath the abrasion. Postmortem external injuries do not produce such internal contusions. So, it was produced within the time span of victim receiving the stab wound. This was also true when the colour changes of both the external abrasion and internal contusion (recent origin) were accounted for. Usually, such injuries on neck are produced during manual strangulation. When a right handed assailant tries to manually strangle his victim, his thumb will produce a single injury on right side of neck and three/four smaller injuries on the left side of the neck. In addition to this, there will be damage to the midline structures of the neck too due to compr-
sion from both sides. But in this case, the left side of neck was found to be completely normal and devoid of injuries even after deep exploration. Similarly, the midline structures of neck were also intact. Considering the fact that the right hand of the assailant had held a sharp weapon for stabbing, he probably could have used his left hand to produce neck injury. Since the single large abrasion was on the right side of the neck, this could have been produced by the thumb of the left hand of the assailant. If the assailant had placed his left hand to hold the neck of his victim, with the thumb producing a large injury on the right side of neck, then the four fingers should have been pressed to the back aspect of neck. Detection of such minor injuries at the back aspect is not possible due to absence of small neck muscles and absence of delicate midline structures such as thyroid cartilage etc., at the back aspect of the neck. Injuries to these structures throw light upon the fact that violence was used on neck.

If the hand of the assailant was placed in the said manner, thereby holding back the victim and preparing to stab his chest then most probably the victim (who was alive then) would be struggling to escape the hold on his neck. The victim would at least raise his right arm thereby holding the left arm of the assailant to loosen the grip on his neck. Further, since he was an elderly man, he could have used both his hands to get himself free of the hold on the neck. Meanwhile, when the assailant was trying to stab his chest amidst the scuffle with victim, it accidentally could have ended in stabbing of the right axilla. Di Maio had commented that most stab wounds of the upper extremities are sustained when victims try to protect themselves from assailants. The grip on the neck of the victim by the assailant could have prevented him from crying for help even in the veranda of his own house. There was no more alternative to the crime scene reconstruction. The assailant might have wanted to threaten him with a weapon which, accidentally due to the scuffle, ended in a stab wound at an unusual site. Following the stab injury, the victim might have fallen on the floor unconscious and bled to death. There are several research works quoting the fatality of axillary artery injuries. Before blood had pooled out of the axilla of the victim, the assailant in panic might have fled from the scene with the weapon.

CONCLUSION

Scientific interpretation and detailed examination is required to get to the bottom of such suspicious and strange homicides. Only the eyes of a trained forensic pathologist/forensic surgeon can interpret such cases flawlessly. As per section 174 of Criminal Procedure Code, any registered modern medicine practitioner is bound by law to do a medicolegal autopsy in Government establishments. The investigating officer seldom values the importance of a medicolegal autopsy to be done by a forensic surgeon. This is because they prefer to get the autopsy done by the nearest registered medical practitioner thereby completing their responsibility. This can lead to an increase in the number of cases misinterpreted and misguided for the investigating officers and judiciary. Thereby justice delayed will be justice denied for the common man.

REFERENCES

Acute Mania in a patient with Post Thyroidectomy hypocalcemia
Praveen Arathi, Dinesh Narayanan

ABSTRACT
Thyroidectomy surgery has been associated with various endocrinological disturbances in the immediate post-operative period. There have been only few case reports of mania due to hypocalcemia. We report a case of acute mania in a post-Thyroidectomy patient having various electrolyte abnormalities. Our patient symptoms remitted after correction of electrolyte abnormalities and treatment with mood stabilizer/antipsychotic drugs. This case shows how psychiatric conditions may be a complex biopsychosocial response to the endocrine disorder.

Keywords: Hypocalcemia, Thyroidectomy, Mania

INTRODUCTION
Disruption of electrolyte balance is invariably secondary to other processes, whether iatrogenic or due to impairment of the organic function that regulates the particular electrolyte homeostasis. Extracellular calcium is held within a tight physiological range by the interactions of parathyroid hormone, Vitamin D, calcitonin, magnesium, phosphate and calcium. The ionized fraction of calcium exerts the biological action. The neuropsychiatric manifestations of abnormal calcium homeostasis depend on the severity and the rapidity of progression of the calcium imbalance. Severe hypocalcemia has been occasionally found to be associated with mania, psychosis and seizures, and Post-Thyroidectomy psychosis has been documented in several cases and has been mostly considered to be caused due to sudden hypothyroidism. The following case presents a scenario where multiple factors were associated with the mania.

CASE REPORT
Mrs. O., a 54-year-old married female from a suburban area with multinodular goitre was referred from the Endocrinology department for evaluation of anxiety. On psychiatric evaluation, she was found to be having 5 years history of obsessive thoughts of a blasphemous nature and had compulsive mental rituals for the same. FNAC from the thyroid had indicated that it was colloid nodules and lab investigations had shown TSH, T4, anti TPO and calcium was within normal limits. There was no past history of any other psychiatric disorder; family history of depression in her elder sister was present and premorbidly, she was well-adjusted. It was considered that she had obsessive compulsive disorder mixed type and she was started on fluoxetine 40 mg. 18 days later, she developed 2 episodes of generalized tonic clonic seizure in a span of 12 hours. She was brought back the next day to hospital and lab investigations indicated patient had low serum sodium (120 mmol/L), low serum potassium (3.2 mmol/L). She underwent evaluation for ruling out other causes for seizure including EEG, MRI brain and no other cause was found. It was considered that seizure was secondary to hyponatremia which was probably fluoxetine induced and so fluoxetine was stopped and oral sodium correction was done. 10 days later, as part of pre-op investigations for the total Thyroidectomy, lab investigations were repeated and except for slightly low serum sodium (132.6 mmol/L), rest all were normal. It was decided to start treatment for the obsessive compulsive disorder after surgery. She underwent surgery 2 days later and it was found that the thyroid nodule was a benign growth on histopathological examination. 2 days post-surgery, patient started to develop insomnia, increased talk, increased psychomotor activity, cheerfulness, grandiose delusion, irritability, increased libido and no symptoms of obsessive compulsive disorder. Lab investigations showed low serum calcium (7.9 mg/dl) with normal PTH (33.1 pg/ml) and T4 (0.79 ng/dl) she was started on intravenous correction with calcium gluconate and later continued correction using oral calcium. She was started on Olanzapine 15 mg and Divalproate 500 mg for managing it. 5 days later, repeat investigations showed slightly low T4 (0.64 ng/dl) and elevated TSH (27.79 uIU/ml). So, she was started on additional oral thyroxine 100 mcg. She started to show improvement gradually but 10 days later she developed delirium and on repeat lab investigations, she was found to have persisting low serum calcium (7.8 mg/dl), low serum sodium (129.4 mmol/L) and low blood osmolality (260mOsm/kg) and it was considered that was due to olanzapine and so it was stopped. Gradually, by around further 10 days, the affective symptoms remitted com-
completely and had almost normal serum Calcium (8.1 mg/dl), serum sodium (133.6 mmol/l) and T4 (1.18 ng/dl). On follow-up 3 months later, no affective symptoms present and divalproate was tapered and stopped. Also, no OCD symptoms were reported.

DISCUSSION

Electrolyte disturbances are increasingly common with the use of antidepressants and antipsychotics, especially hyponatremia. Hyponatremic encephalopathy is commonly due to iatrogenic causes, especially drug-related syndrome of inappropriate antidiuretic hormone. Frequency of selective serotonin reuptake inhibitor drugs induced mania switch has been estimated to be 3.7 to 33% in various studies with most patients being on adequate dose and time duration. But this patient was off fluoxetine for almost 10 days before she developed symptoms of mania making this unlikely to be drug induced. Literature exists about acute mania in cases of primary hypothyroidism; Hashimoto’s thyroiditis has been considered to be a cause for the hypothyroidism in some of these cases. But, in this patient, preoperatively there was no evidence of hypothyroidism or antithyroid antibodies so it was unlikely to be the cause. Transient hypocalcemia remains the most frequent complication after total Thyroidectomy surgery with an incidence ranging from 1.6 to 50%. Direct or indirect damage to the parathyroid glands is the most common cause of hypocalcemia and the damage appears to be in most cases, temporary. The presence of hypocalcemia as detected by lab investigations would need to be considered significant as protein and albumin levels were normal so chances of any discrepancy in ionic calcium levels were minimal. Review of literature does indicate that generally, hypocalcemia, when mild, is associated with anxiety and insomnia and only occasionally severe cases have been found to be associated with seizures, tetany and occasionally affective psychosis.

CONCLUSION

Identification of cause and immediate management of mania become more urgent in post-surgical state considering its affect on patient morbidity and hospital stay. Severe hypocalcemia is a life threatening complication and immediate correction is required. Further research is required to understand causal linkages and mechanisms of how endocrine states manifest as psychiatric conditions.

REFERENCES

3. Chakrabarti S, Thyroid functions and Bipolar Affective Disorder, J Thyroid Res 2011; 306367.
Common Condition - A Rare Presentation

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ABSTRACT

We present the case of a 55 year old gentleman, long standing diabetic with neuropathy, retinopathy and nephropathy, who presented to us with complaints of increased fatigability of 2 weeks duration, and altered sensorium of 4 days duration.

Details of relevant investigations and differential diagnoses are discussed. The final diagnosis was TB lymphadenitis, which is a very common condition, but with the very rare presentation of hypercalcemia. Hence, we report this case to highlight its unusual nature.

Key Words: Hypercalcemia, Low PTH, Granulomatous Disorders, TB Lymphadenitis

CASE REPORT

A 55 year old gentleman presented to us with complaints of fever and increased fatigability of 2 weeks duration and cough, breathlessness with altered sensorium of 4 days duration. He had multiple co-morbidities, including diabetes mellitus for over 10 years with associated neuropathy, nephropathy and retinopathy, hypertension for over 5 years, and Vitamin D deficiency for over 1 year. He was undergoing treatment for all of these.

Systemic examination revealed that he was markedly dehydrated and tachypnoeic with respiratory distress. He needed oxygen to maintain saturation on room air. Respiratory system examination revealed the presence of bilateral basal crepitations. CNS-wise, he was drowsy but arousable and disorientated, but without any focal neurological deficits.

Investigations revealed the presence of neutrophilic leucocytosis, elevated ESR and CRP, AVG reversal and deranged renal function tests (serum creatinine 3.59 from a baseline of 2). He also had hypercalcemia (calcium levels of 16, corrected calcium levels of 16.6), hyperphosphatemia and hyperkalemia. ABG done revealed the presence of a normal anion gap metabolic acidosis with type 1 respiratory failure. X-Ray chest showed bilateral lower zone haziness. ECG showed sinus bradycardia with short QT interval.

Based on the clinical picture and laboratory investigations, he was provisionally diagnosed as a case of acute on chronic kidney disease with hypercalcemia, hyperkalemia and hyperphosphatemia, and atypical/aspiration pneumonia.

He was started on correction measures for hypercalcemia (IV fluids and Lasix). Calcitonin was added the next day with which his calcium levels came down and his sensorium improved, with mild improvement in his renal functions. Work-up was sent for hypercalcemia which showed a low PTH; serum 25 OH vitamin D levels were sent which came as low. Other possible causes of hypercalcemia were ruled out history of prolonged immobilization, use of lithium and thiazide diuretics; thyroid function test and serum cortisol levels were normal. This left us with the possibility of a possible PTHrP related/Calcitriol mediated hypercalcemia. Differential diagnoses considered at that point were a possible malignancy related (solid organ vs haematological)/Granulomatous diseases. Multiple myeloma work-up was sent for. Bone marrow studies, serum electrophoresis and kappa lambda free light chain assay which all came as negative. A Whole body PET CT scan was done. This showed the presence of multiple deep seated right axillary lymph nodes (highest SUV for this group of lymph nodes at 11.3) and multiple supra and infra diaphragmatic lymph nodes. Initial impression given was a high possibility of a lymphoma vs the possibility of nodal metastasis. The report con-

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confirmed that there were no sites of primary malignancy.

We went ahead with a USG scan-guided FNAC of the right axillary lymph nodes which revealed the presence of a granulomatous inflammation. The next step was an excision biopsy of the lymph node group and a USG-guided core biopsy of the lymph nodes. The histopathological examination revealed multiple granulomas composed of epithelioid cells along with a few scattered lymphocytes.

Based on the biopsy report, we diagnosed him as a case of tuberculous lymphadenitis and initiated him on antituberculous therapy. (Isoniazid, Pyrazinamide, Rifampicin and Ofloxacin). He was also started on steroids (Prednisolone 40 mg OD) for hypercalcemia. The patient was followed up after 3 weeks. The symptoms of fever and fatiguability had resolved and calcium levels had come down to 9.1.

DISCUSSION

Tuberculosis is an extremely common condition and is probably one of the first differentials to be considered in any case of generalized lymphadenopathy, especially in our country. However, a case of tuberculous lymphadenitis presenting as hypercalcemia is very rare and this particular case was diagnosed based on laboratory investigation findings. Another important aspect was the administration of steroids in such cases since they are one of the mainstays of treatment of hypercalcemia secondary to granulomatous disease. They act by inhibiting the activated macrophages which are responsible for the excess production of calcitriol responsible for causing hypercalcemia.

REFERENCES


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