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**A STUDY TO IDENTIFY THE COMPLICATIONS
OF INTRAVENOUS IMMUNOGLOBULIN AND ITS
RELATIONSHIP WITH SELECTED FACTORS
AMONG PATIENTS WITH AUTOMMUNE DISORDERS
IN NEURO MEDICAL ICU, SREE CHITHIRA THIRUNAL
INSTITUTE FOR MEDICAL SCIENCE AND TECHNOLOGY**



Project Report

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OCTOBER - 2005

CERTIFICATE

Certified that this **STUDY TO IDENTIFY THE COMPLICATTIONS OF INTRAVENOUS IMMUNOGLOBULIN AND ITS RELATIONSHIP WITH SELECTED FACTORS AMONG PATIENTS WITH AUTOIMMUNE DISORDER** is a bonafide work of **Bency Varghese** at Sree Chithira Thirunal Institute for Medical Science and Technology submitted in partial fulfillment of the requirement for the Diploma in Neuro. Nursing from the Sree Chithira Thirunal Institute for Medical Science and Technology.

Date : 04/11/2005



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CHAPTER - I

INTRODUCTION

Over the past decade knowledge about the impact of immune system dysfunction on nervous system disorders has grown substantially. Medical treatments for neurological diseases with a probable immunopathogenic etiology have reflected these advances. Intravenous immunoglobulin (IVIgG) a relatively new therapy, may have a significant role in therapeutic regimen of patients with immune mediated neurological disorders.

IVIgG has been successfully used for the treatment of primary immunodeficiency disorders and auto immune disorders. Immunoglobulin is a blood product derived from pooled plasma from a group of individuals. The major component of immunoglobulin is IgA. Immunoglobulin preparations available since 1952 is given only intramuscular. The products became commercially available in 1980's. Currently seven preparations are available.

BACKGROUND OF THE STUDY

Intravenous Immunoglobulin (IVIgG) was an effective treatment than plasma exchange. Recent clinical reports have suggested that IVIgG may have role in the treatment of neurological disorders with a possible immunopathogenic etiology. Immunoglobulins is a blood product which

contains immunoglobulins G and trace amount of immunoglobulin A, is believed to work as an immunodulating agent. IVIgG therapy has the potential to reduce or eliminate the need for treatment with drugs that have serious side effects. IVIgG is one of the only treatment for autoimmune disorders that doesn't suppress the immune system. The mechanism of action is not well understood. Immunoglobulin was given 0.4gm /kg per day for five days.

Patients receiving IVIgG requires close monitoring for potential complications and monitors over all response to treatment. The overall rate of adverse effects has been expected to be low ranging from 1 to 15% but generally less than 5%. Most of the complications occurs within 30 to 60 minutes of infusion. The complication occurs are divided into mild, moderate and severe. The patients greater risk for severe or anaphylactic reactions are those with antibodies to IgA. Severe reactions are rare with IVIgG administered but are most likely to occur soon after initial infusion has begun.

The associated factors related to complications are age, sex, diagnosis, change in vital signs, infusion rate, previous allergies, artificial ventilations and others.

NEED AND SIGNIFICANCE OF THE STUDY

The complications of IVIgG treatment are common. Patients receiving IVIgG require close monitoring to recognize the adverse effects of IVIgG. The complication occurred during therapy are mild, moderate and severe. Most of the complications occurs within 30 to 60 minutes of infusion. Various factors were associated with these complications are age, sex, diagnosis, infusion rate, previous allergies and vital signs.

Considering the above factors, the investigators felt that there is a need to assess the complications occurred during infusion and to identify the associated factors related to complications.

STATEMENT OF THE PROBLEM

A study to identify the complications of IVIgG and its relationship with selected factors among patients with autoimmune disorders.

DEFINITION OF TERMS

Complications :- In this study the investigator means complications are head ache, faintness, malaise, nausea, vomiting, renal toxicity, myalgia, chest pain, dyspnoea, hypotension, urticaria, itching, fever, chills, disorientation and others.

IVIgG :- Intravenous infusion of immunoglobulin

Selected factors :- Selected factors of this study include are, sex, diagnosis, previous allergies, infusion rate, vital signs and artificial ventilation.

Autoimmune disorders -: In this study the investigator means the autoimmune disorders were Myasthenia gravis, Guillain-Barre syndrome, Acute demyelinating diseases and others.

OBJECTIVES OF THE STUDY

The objectives of the study was

1. To identify the complications of IVIgG treatment among patients with autoimmune disorders
2. To find out the associated factors related to complications of IvIgG.

METHODOLOGY

This study was an observational study. The data was obtained through observation chart, patients history, medical records and laboratory values. In this study complications are observed in the beginning, 1 hr and 2 hr during the infusion. In this study total sample was 10 patients. Duration of study was from August to September.

LIMITATIONS

This study was limited to

- *Patients who were admitted in Neuro Medical ICU*
- *Patients who receiving IVIgG*
- *Beginning, 1 hr and 2 hr during infusion.*

SUMMARY

This chapter deals with introduction, background of the study, need and significance of the study, statement of the problem, definition of terms, objectives of the study, methodology and limitations.

ORGANISATION OF THE REPORT

Chapter II summary of related studies reviewed. Chapter III deals with methodology of the study, chapter IV analysis and interpretation of the findings. Chapter - V represents a summary of the study, conclusion, limitation and recommendation. The report also includes a selected bibliography and appendices.

CHAPTER II

REVIEW OF RELATED LITERATURE

INTRODUCTION

Review of related literature is an important aspect of any research project from beginning to end. It gives insight into the problem and helps in selecting methodology, tool, and analysing data. With this in view, an intensive review of literature has been done. Related literature was reviewed in depth so as to broaden the understanding of the selected problem.

The review of literature relevant to the study is presented in the following sections.

(a) Studies related to complications of intravenous immunoglobulin therapy.

Dr. Achiron and colleagues (1998) gave IVIgG to 76 patients with multiple sclerosis. Minor adverse effects occur in 4.1% of infusions. No major complications occur. More than 50% of patients experienced some adverse effects seen in young age, absence of co-morbid disease, pre-existing risk factors, differences in IgG preparations. Major side effects are identifiable risk factors. All of our patients with major side effects had identifiable risk factors. It is still a popular treatment in autoimmune disorder.

Brannagan III and colleagues (1996) gave IVIgG to 88 patients for neurologic illness. Major complications in 4 patients included congestive heart failure in a patient with polymyositis, hypotension, after a recent myocardial infarction deep vein thrombosis in a bed bound patient and acute renal failure with diabetic neuropathy. Other adverse effects include vasomotor symptoms , headache, rash, leukopenia, fever, neutropenia, proteinuria, dyspnoea, pruritis. Although adverse effects are frequent. Serious complications are rare except in patient's with heart disease and renal insufficiency.

J.A. Grillo MD (2001) study shown that the safety and efficiency of a novel method of rapid infusion of IVIgG immunoglobulin (IVIgG) were respectively reviewed in 50 patients with neuromuscular disorders. There were 89 adverse effects after 341 rapid infusions (26%), 35% of which were considered to be major (requiring hospitalization) and 66% minor. All patients recovered without sequelae 1 and there were no deaths. Fourteen of 17 patients (82%) receiving maintain therapy preferred rapid IVIgG infusion because of its convenience. Rapid infusion IVIgG can be given safely and conveniently in many patient's with neuromuscular disorder.

D. Cook MD and colleagues (1990) treated 2 patients with IgM monoclonal paraproteinemia demyelinating peripheral neuropathy (PPN) with monthly intravenous human immunoglobulin. Both patients had a steadily. Progressive course inspite of steroid and other immunosuppressive

therapy for 3 years before starting the immunoglobulin therapy. Both had a rapid clinical improvement noticeable 5 - 10 days after the 1st immunoglobulin infusion lasting on the average of 3 - 6 weeks. There were no significant adverse side effects. High dose I/v human immunoglobulin can be useful therapy in the treatment of PPN and warrants a large scale controlled therapeutic level.

A. Achiron MD (1995) reporting that 59% of patients given intravenous immunoglobulin (IVIgG) for a neurologic illness experienced some adverse effects ; 4.5% suffered a major complication and 6% had asymptomatic laboratory abnormalities. Minor adverse effects occurred in 4.1% of the 1262 infusion administered. There included fatigue, headache, rash and low - grade fever.

Vas Der Meche FGA and colleagues (1992) IVIgG compound to plasma exchange has important practical advantages as it, freely available, can be administered without delay. It is safe and well tolerated and there is no risk of disease transmission. The relative efficiency of plasma exchange and IVF for the treatment of GBS has been compared in many studies. In the dutch study in 150 patients after treatment complications are less when compound to PLEX group.

Patients receiving IVIgG requires close monitoring to recognize adverse effects of IVIgG . The overall rate of adverse effects has been

reported to be relatively low ranging from 1-15%. The patients at greatest risk for severe as anaphylactic reactions over those with antibodies to IgA. The complications occur within 30-60 minutes during infusion. The common complications are head ache, chills, fever vomiting, nausea and malaise.

Mayra-vera-Ramirez MD and Colleagues (1992) gave IVIgG for the treatment of many autoimmune diseases including chronic inflammatory demyelinating poly radiculo neuropathy (CIDP) contributing to a sense of euphoria concerning its widespread perception that adverse reactions are rare. However computer based search of the literature unearthed over 300 references to possible adverse affects, some of them life threatening. These include major anaphylactic reactions particularly in individuals with IgA deficiency, haemolysis, hepatitis and thrombotic events including cerebral infarction. One of the most common side effect is head ache. We now report a patient - who developed headache due to aseptic meningitis following each of two courses of IVIgG treatment for CIDP.

Bril V BSc MD FRCPC (1996), We compared IVIgG and plasma exchange (PLEX) the treatment of 50 patients with Guillain - Barre Syndrom (GBS). The complication rate was higher in the PLEX treated group. 19 complications were found in the PLEX treated group and 5 in the IVIgG treated group. The complications observed during and after treatment included hypotension, cardiac arrhythmia, pneumonia, line

sepsis, local phlebitis and urinary tract infection.

The other prepared modality in the treatment of GBS is IVIgG. The complications noted with IVIgG are very few including headache, chills, myalgia, chest discomfort, nausea, vomiting, skin reactions like urticaria, pruritis etc. Severe anaphylaxis can occur in patient with deficient IgA. Other complications to be anticipated is hyper viscosity and thromboembolic event especially in bed bound patients with deep vein thrombosis (DVT). Acute tubular necrosis can occur in patient with pre existing renal function.

SUMMARY

The review of literature on the above areas helped the investigator to gain deeper knowledge about complications of IVIgG, which in turn helped in construction of the tools.

The literature review also helped in design of the study, development of tool, information about the sample, data collection procedure and plan of analysis.

CHAPTER - III

METHODOLOGY

INTRODUCTION

Methodology is way of systematically solve the problem. It may be understood as a science of studying how research scientifically is doing C.R. Kothari (1990). This chapter provides a brief description of different steps taken to conduct this study. It included research approach, setting the sample and sampling techniques, development of tool, description of tool, pilot study, data collection procedure and plan of analysis.

RESEARCH APPROACH

The observation study was selected as the objectives of the study were (i) to identify the complications of IVIgG treatment among patient with autoimmune disorders (ii) to find out the associated factors related to complications of IVIgG.

SETTING

The study was conducted in Sree Chitira Thirunal Institute for Medical Science and Technology, Tvm.

The rationale for selecting SCTIMST for study was the investigator was most familiar with this institution.

POPULATION

The population for the study was the patients who received IVIgG in Neuro Medical ICU in SCTIMST.

SAMPLE AND SAMPLING TECHNIQUES

Convenient sampling techniques was used to select the samples for this study. Two stage random sampling was used for the present study. In the first stage two samples were selected for the pilot study. In the second stage 10 patients were selected for this study.

In this study approximately 100 population is included out of this investigator look 10 sample from August 2005 - September 2005.

CRITERIA FOR SAMPLE COLLECTION

Inclusion Criteria

- Patients who received IVIgG
- Patients who were willing to participated in the study
- Patients who were conscious, oriented and co-operated

Exclusion Criteria

- Unconscious patients were avoided

DEVELOPMENT OF TOOL

An extensive review and study of the literature helped in preparing items for the tool. The tool examines and content validity was tested by the experts of SCTIMST. An observation chart is prepared based on the literature. After obtaining permission from the authorities the study was conducted.

The steps taken for the development of tool are presented below :-

Step - I - An observation chart of 10 patients was used for identifying the complications and find out the associated factors related to complications was made based on the literature.

Step - II - The tool was pilot test on a sample of two patients. The completion of the test varied from beginning, half hour, one hour, two hour during infusion.

Step - III - The pilot study gave information regarding feasibility and effectiveness of the study. The study was then continued with this tool.

DESCRIPTION OF TOOL

The tool used in the present study consisting of two parts

Part - I - The comprised of observation chart for identifying complications included were headache, faintness, malaise, nausea,

vomiting, myalgia, chest pain, dyspnoea, urticaria, itching, renal toxicity, fever, chills, change in vital signs (hypotension), disorientation and others.

Part - II - It consist of observation chart finding associated factors related complications included were age, sex, diagnosis, previous allergies, infusion rate, vital signs, artificial ventilation and others.

PILOT STUDY

After obtaining permission from authorities study started on 01-08-2005. The purpose of this study was to modify the original tools. With necessary modification the tool was pilot tested on a convenient sample of two patients initially. The pilot study gave information regarding the feasibility and effectiveness of the study. The pilot study participants were excluded from the main study and then study was continued.

DATA COLLECTION

The data were collected from Neuro Medical ICU, SCTIMST. Period of data collection was 1st August to 30th September 2005.

The investigator was introduced to patients about the purpose of the study and confidentiality of their responses were assured. The time taken for completion of the test was beginning, half hour, one hour and two hour during infusion of IVIgG.

PLAN OF ANALYSIS

A plan for data analysis was developed by the investigator after the pilot study. The data obtained from observation chart would be analysed by descriptive statistics. Percentages would be used in describing samples. Both Pie and bar diagram would be utilized to represent the distribution of total scores and sub scores in the different content areas.

SUMMARY

This chapter presented the research approach used for the study, setting of the study, sample and sampling techniques, development of description of tools, pilot study, data collection procedure and plan of analysis.

APPENDICES

- (a). Tools - Observation chart for identifying the complications of IVIgG.
- (b). Observation chart for finding associated factors related to complications of IVIgG.

OBSERVATION CHART

A. *Complications of IVIgG Therapy*

Complications of IVIgG	Beginning	30 minutes during infusion	1 hr during infusion	2 hr during infusion
Head ache				
Malaise				
Faintness				
Nausea				
Vomiting				
Myalgia				
Chest pain				
Dyspnoea				
Hypotension <i>(BP less than 20mm of Hg base line)</i>				
Renal toxicity <i>(Urine output less than 50ml/hr)</i>				
Urticaria				
Itching				
Fever				
Chills				
Disorientation				
Others				

B. Observation chart finding associated factors related to complications of IVIgG

OBSERVATION CHART

Associated Factors Related to Complications

1.	Age	>50 yrs, < 50 yrs
2.	Sex	Female / Male
3.	Diagnosis	GBS / MG / ADEM / Others
4.	Previous Allergies	Yes / No
5.	Infusion Rate	Slow (<50ml/hr) High (>50ml/Hr)
6.	Vital Signs	Stable HR<100/Mt Unstable HR>100/Mt BP<120mm of HG BP>120mm of HG
7.	Artificial Ventilation	Yes / No
8.	Any other	

CHAPTER - IV

ANALYSIS AND INTERPRETATION

This Chapter analyses and interprets the data obtained from observation chart of 10 patients who received IVIgG in Neuro Medical ICU, SCTIMST.

The purpose of present study to identify the complications of IVIgG and find out the associated factors related to complications.

The analysis of data were presented in two sections.

- I. Data on patients with complications of IVIgG therapy in all contents.*
 - II. Data on patient with associated factors related to complications of IVIgG.*
1. Data on patient with complications of IVIgG therapy in all contents.

Sample of 10 patients are selected for the study. The demographic data of complications included were headache, faintness, malaise, nausea, vomiting, myalgia, chest pain, dyspnoea, urticaria, itching, renal toxicity, fever, chills, hypotension, disorientation and others.

- II. Data on patients with associated factors related to complications of IVIgG.

TABLE - I

Distribution of Complication of IVIgG therapy among patients.

N = 10

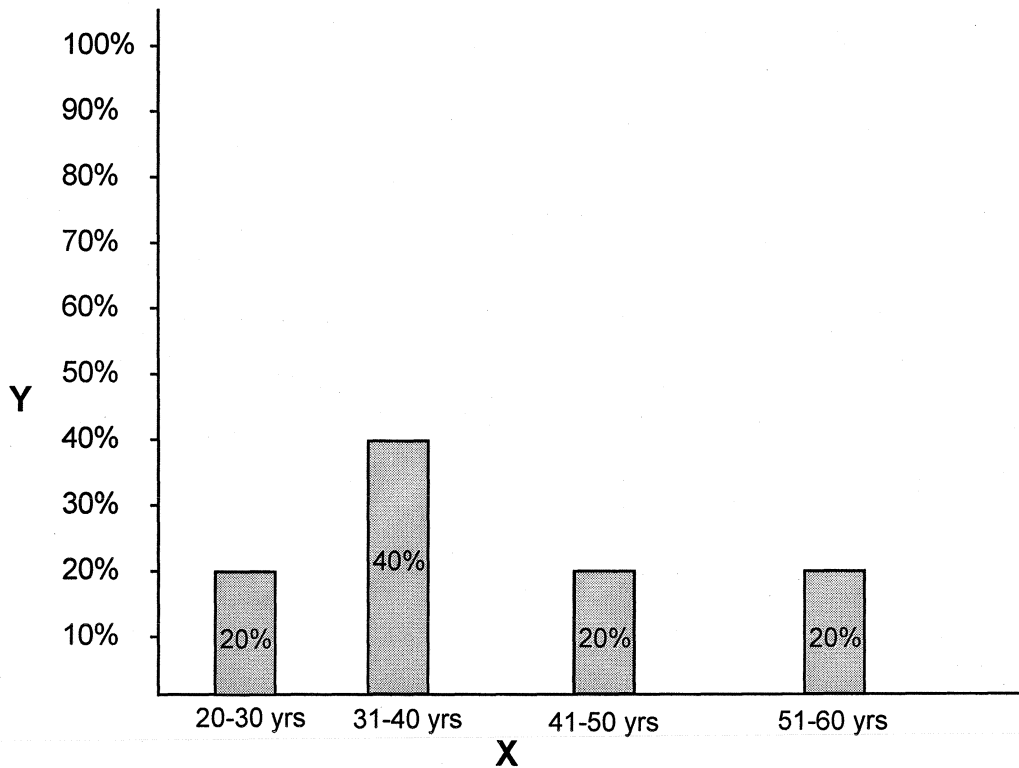
Demographic data	Total No.	Percentage
Head ache	6	60%
Malase	6	60%
Faintness	0	--
Nausea	2	20%
Vomiting	0	--
Renal toxicity (Creatin normal) (Urine output less than 50ml/hr)	0	--
Hypotension (BP less than 20mm of Hg than base line)	4	40%
Urticaria	0	--
Itching	0	--
Fever	0	--
Chills	4	40%
Disorientation	0	--
Others - Anxiety	4	40%

Findings -: The complications occurred are head ache (60%), malaise (60%), Nausea (20%), Myalgia (80%), hypotension (40%), chills (40%) and anxiety (40%)

This part of analysis show the distribution of total sample 10 patients who received IVIgG therapy. The associated factors included were age, sex, diagnosis, previous allergies, infusion rate, vital signs, artificial ventilation and others. Datas were shown in both pie and bar diagrams.

(a). Figure - 1

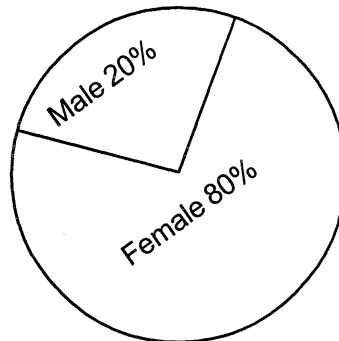
Distribution of complications among their age group. Data shown in figure -1 a bar diagram. X axis represents age group of patients. Y Axis represents percentage of complications.



Findings :- 40% of complications were occurred in 31-40 years of age group. Other age groups are affected same percentage (20%).

b). Figure - 2

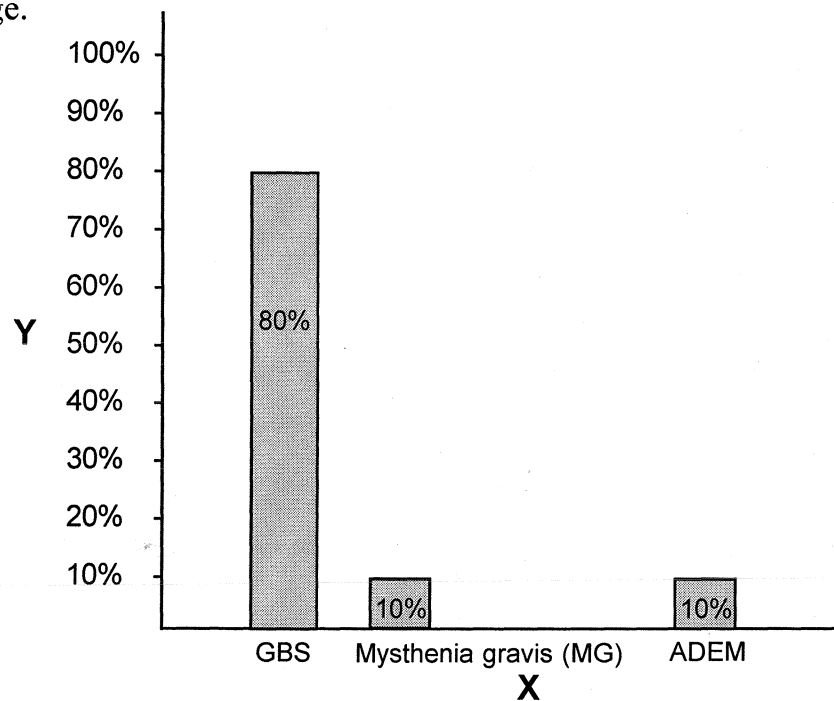
Distribution of complications according to their sex. Data shown in figure -2 as pie diagram



Findings :- 80% of complications were occurred among females and 20 % males.

c). Figure - 3

Distribution of complications according to their diagnosis. Data shown as bar diagram. X axis represents diagnosis and Y axis represents percentage.



Findings :- 80% of complications were in GBS patients and 10% in both myasthenia gravis and Acute Demyelinating Encephalo Myopathy (ADEM).

d). Distribution of complications according to their previous allergies.

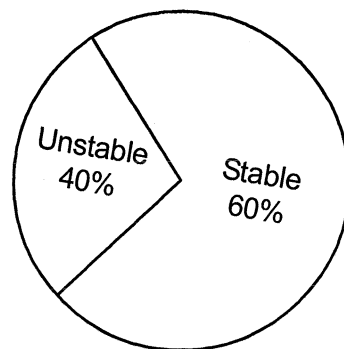
Findings :- No history of previous allergies among 10 patients who received IVIgG.

e). Distribution of complications according to the infusion rate.

Findings :- Infusion rate 10 patients who received IVIgG are same (60ml/hr)

f). **Figure - 4**

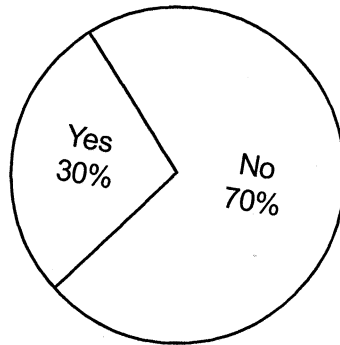
Distribution of complications according to their vital signs. Data shown as pie diagram.



Findings :- Vital signs were stable in 60% of patients and 40% were unstable.

g). Figure - 5

Distribution of complications according to artificial ventillation.



Findings :- Patients with artificial ventilation were 30%.

SUMMARY

This chapter dealt with analysis and interpretation of data collected from 10 patients. Descriptive statistics was used for the analysis. Bar diagrams and pie diagrams used to describe associated factors related to complications of IVIgG.

CHAPTER - V

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

This Chapter gives a brief account of the present study including conclusions drawn from the findings and possible applications of the result. Recommendations for future results and suggestions for improving the present study are also presented.

SUMMARY

This study was undertaken to identify the complications of IVIgG and to find out the associated factors related to complications in Neuro Medical ICU, SCTIMST, TVM.

The specific objectives of the study were

1. To identify the complications of IVIgG therapy among patients with auto immune disorders.
2. To find out the associated factors related to complications.

Need of the study was to assess the complications of IVIgG and find out the factors related to complications of IVIgG. The assessment was the first step in any successful education programmes.

The review of related literature helped the investigator in understanding the complications of IVIgG and developing the tool and prepared an observation chart for the study.

The study was conducted in Sree Chithira Thirubal Institute of Medical Science and Technology in Neuro Medical ICU, TVM, Kerala in August - September 2005.

The data obtained were analysed by using descriptive statistics. Both bar and pie diagrams were utilized to represent the distribution of associated factors related to complication of IVIgG.

Major findings of the study were

- The complications occurred during IVIgG therapy were head ache (60%), Malaise (60%), Nausea (20%), Myalgia (80%), Hypotension (40%), Chills (40%), Anxiety (40%).
- The factors related to complications of IVIgG were
 - a. *Age - 40% of complications occurred in 31 - 40 years of age.*
 - b. *Sex - 80% of patients were females*
 - c. *Diagnosis - 80% of patients were GBS patients.*
 - d. *Vital signs - 40% of patients were unstable vital signs*
 - e. *Artificial ventilation - 30% of patients were in mechanical ventilators*

History of previous allergies and infusion rate were not related to complications in this study.

LIMITATION

The limitation in this study were

1. The tool has been developed by the investigator as no standardised tool was available.
2. Study was limited to NMICU, SCTIMST, TVM.

CONCLUSION

Based on these findings of the study the following conclusions were drawn

1. The complications occurred during IVIgG therapy were head ache (60%), Malaise (60%), Nausea (20%), Myalgia (80%), Hypotension (40%), Chills (40%), Anxiety (40%). In this study shown that most common complication were head ache, Malaise and Myalgia.
2. The factors related to complications of IVIgG were
 - a. Age - 40% of complications occurred in 31 - 40 years of age.
 - b. Sex - 80% of patients were females
 - c. Diagnosis - 80% of patients were GBS patients.

- d. Vital signs - 40% of patients were unstable vital signs
- e. Artificial ventilation - 30% of patients were in mechanical ventilators

In this study infusion rate and history of previous allergies have not related to complication.

RECOMMENDATION

The following recommendation are made on the basis of present study.

- A similar study can be conducted in other health care institutions.

REFERENCES

1. Chipps Esther, "Intravenous Immunoglobulin: Implication for use in the Neurological patient", Journal of Neuroscience Nursing, 26 (1) : 8-14, February 1994.
2. Bril. V, BSc, MD, FRCPC, "Pilot trial of immunoglobulin versus plasma exchange in patients with Guillain - Barre syndrome", Journal of Neurology, 42 : 100-102, January 1996.
3. Grillo. J.A., MD, "Rapid infusion of intravenous immunoglobulin in patients with neuromuscular disorders", Journal of Neurology, 57 : 1699-1700, November 2001.
4. Achiron. A, MD, "Intravenous immunoglobulin treatment in multiple sclerosis", Journal of American Academy of Neurology 50 : 398-401, February 1998.
5. Berkman. S.A., LeeML, Gale RP, "Clinical uses of immunoglobulins", Senin Hematol 25 : 140-158, 1988.
6. Edan G, L and graf F, "Experience with intravenous immunoglobulin mysthenia gravis;" a review, Journal of Neuro of Neurosurg Psychiatry 57 : 55-56, 1994.
7. Cook SD, Troiano R, "Intravenous gamma globulin in progressive MS", Acta Neurol 86 : 171-175, 1992.
8. Van Engelen BG, "Improved vision after intravenous immunoglobulin in stable demylinating optin neuritis", Ann Neurol 32 : 834-835, 1992.

9. Noseworthy JH, "IVIg treatment in multiple sclerosis", Ann Neurol A: 325, 1994.
10. Achiron A, Pras E, "Open controlled therapeutic trial of high-dose intravenous immunoglobulins in relapsing remitting multiple sclerosis", Arch Neurol 49 : 1233-1236, 1992.
11. Achiron A, Gilad R, "Intravenous gammaglobulin treatment in multiple sclerosis, and experiment at autoimmune diseases", Journal of Neurol Neurosurg Psychiatry 57 : 57-61, 1994.
12. Achiron A, Barak Y, "Intravenous immunoglobulin in multiple sclerosis", clin Exp Immunol 104 : 67-70, 1996.
13. Fazekar F, "Randomised placebo - controlled trial of monthly intravenous immunoglobulin therapy relapsing - remitting multiple sclerosis", Lancet 349 : 589-593, 1997.
14. Abe. Y, Horiuchi A, Anti - Cytokine nature of natural human immunoglobulin ; one possible mechanism of the clinical effect of intravenous immunoglobulin therapy", immunol Rev : 139, 5-19, 1994.
15. Rodriguez. M. Lennon VA, "Immunoglobulins promote remyelination in the central nervous system", Ann Neurol 27 : 12-17, 1990.
16. Achiron A, Rotstein Z, "Intravenous immunoglobulin treatment in the prevention of child birth - associated acute exacerbations in multiple sclerosis - a pilot study", Journal Neurol 243 : 25-28, 1996.
17. Cook. D, MD, "High - dose intravenous immunoglobulin in the treatment of demyelinating neuropathy associated with monoclonal gammopathy", Journal of Neurology 40 : 212-214, 1990.

18. Vera - Ramirez Mayra, "Recurrent-aseptic meningitis complicating IVIgG therapy for chronic inflammatory demyelinating - poly radiculo neuropathy", Journal of neuropathy 42 : 1636-1637, 1992.
19. Filippe Massimo, "European study on IVIgG in multiple sclerosis", Journal of ARCH Neurology 61 : 1409-1411, 2004.
20. Brannagan III. H. Thomas, "Complications of IVIgG treatment in neurologic disease", American Academy of Neurology 47 : 84-88, 1996.
21. Brannagan III.H. Thomas MD, "Complications of IVIgG in neurologic disease", Journal of Neurology 49 : 899-900, 1997.
22. Kleywid. R.P, FGA Vander Meche, "Treatment related flutuations in GBS after high dose immunoglobulin or plasma exchange", Archives of Neurology 45 : 314-15, 1988.
23. Thornton CA, "Plasma exchange and IVIgG treatment in neuromuscular disease", Annals of Neurology 35 : 260-68, 1994.
24. Scheltens. P, "IVIgG : A treatment for Alzheimess disease?", Journal of Neurology and Neurosurgery Psychiatry 75 : 1374-1375, 2004.
25. Hickg. V. Joane, "Neuro degenerative diseases", The Clinical Practice of Neurological and Neurosurgical Nursing, 5th edition, 664-689.

