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Study of Antiepileptic Drug use Patterns in Epilepsy Patients at the Neurology Polyclinic of Dr. M. Djamil Hospital, Padang

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Abstract:- Epilepsy is a neurological disorder with high prevalence worldwide. It is characterized by recurrent seizures due to abnormal electrical activity in the brain. Treatment involves the use of antiepileptic drugs (AEDs) to control seizures. Suboptimal use of AEDs can have negative impacts on seizure management in patients. This study aims to identify the most frequently used AEDs, the patterns of monotherapy and polytherapy use, and the factors influencing AED selection. This study is a descriptive research with prospective data collection. The data used are medical records of epilepsy patients at the Neurology Polyclinic of Dr. M. Djamil Hospital Padang. The research sample was obtained using the consecutive sampling technique. Data analysis was conducted descriptively and presented in the form of descriptions and percentages from the collected medical record data regarding the use of antiepileptic drugs. In this study, 24 out of a total of 45 patients (53.3%) received single-agent antiepileptic therapy (monotherapy), while 21 other patients (46.7%) received combination antiepileptic therapy. The most common single-agent therapy was phenytoin, used by 17 patients, followed by carbamazepine used by 4 patients, and phenobarbital used by 3 patients. As for combination therapy, 14 patients received a combination of phenytoin and phenobarbital, 6 patients received a combination of carbamazepine and phenobarbital, and 1 patient received a combination of valproic acid and phenobarbital.

Keywords:- *Epilepsy; Antiepileptic Drug; Drug use Patterns; Monotherapy; Polytherapy.*

I. INTRODUCTION

Epilepsy is a chronic neurological disorder with a high prevalence worldwide. In Indonesia, the prevalence of epilepsy is approximately 7.1 per 1,000 people, or around 1.9 million individuals [1]. This condition is characterized by recurrent seizures caused by abnormal electrical activity in the brain. The goal of epilepsy treatment is to control seizures and improve patients' quality of life, with the use of antiepileptic drugs (AEDs) being one of the primary approaches [2].

AEDs have various mechanisms of action and side effect profiles that influence clinical decisions in therapy selection. The choice of AEDs is affected by factors such as the type of seizures experienced by the patient, age, general health condition, and individual response to the drug. The use of AEDs may also change over time, depending on the patient's response and adjustments to the treatment regimen [3] [4].

In Indonesia, epilepsy treatment is often provided in various healthcare centers, including neurology clinics in hospitals. Studying the patterns of AED use in epilepsy patients is important to understand the clinical practices performed by doctors and the factors influencing therapeutic decisions [3] [5].

Dr. M. Djamil Hospital in Padang is one of the main healthcare centers in West Sumatra with a neurology polyclinic that routinely serves epilepsy patients. In this hospital, various types of AEDs are available for treating epilepsy patients, including phenytoin, carbamazepine, phenobarbital, and valproic acid, as well as combinations of these drugs.

Although various AED therapy options are available, their use may vary depending on factors such as the type and severity of epilepsy, patient characteristics, response to treatment, and tolerance to side effects. Suboptimal use of AEDs can negatively impact seizure control and patients' quality of life [5] [6]. This study aims to identify the most frequently used AEDs, the patterns of monotherapy and polytherapy use, and the factors influencing AED selection. The results of this study are expected to contribute to the development of health policies and clinical practices in epilepsy management in Indonesia.

II. METHODOLOGY

This study is a descriptive non-experimental research with prospective data collection. The data used are medical records of epilepsy patients at the Neurology polyclinic of Dr. M. Djamil Hospital Padang. The research sample was obtained using the consecutive sampling technique, which involves selecting all patients encountered during the study period who meet the inclusion criteria. The inclusion criteria are epilepsy patients who were treated at the neurology

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polyclinic of Dr. M. Djamil Hospital Padang from March to May 2016, received antiepileptic drug therapy, and had complete medical records, including patient identity, diagnosis, and drug data (name, dosage, and frequency). The data collected from the medical records were then transferred to data collection sheets for further processing. Data analysis was conducted descriptively and presented in the form of descriptions and percentages from the collected medical record data regarding the use of antiepileptic drugs.

III. RESULTS AND DISCUSSION

This study involved 45 patients who met the inclusion criteria, consisting of 23 males (51.1%) and 22 females (48.9%). The results revealed two main patterns in the use of antiepileptic therapy (AED) at the Neurology polyclinic of Dr. M. Djamil Hospital Padang during March to May 2016. The first pattern was the use of single antiepileptic therapy (monotherapy) by 24 patients, which accounted for 53.3% of the total patients. The second pattern was the use of a combination of two or more antiepileptic drugs (combination therapy) by 21 patients, or 46.7% of the total patients (see in Table 1).

Table 1 The Pattern of Antiepileptic Drug usage at the Neurology Polyclinic of Dr. M. Djamil Hospital Padang (n=45)

Type of Antiepileptic Therapy	Number of patient	Percentage (%)
Monotherapy AED	24	53.3
Phenytoin	17	70.83
Carbamazepine	4	16.67
Phenobarbital	3	12.5
Combination therapy AED	21	46.7
Phenytoin-Phenobarbital	14	66.67
Carbamazepine-Phenobarbital	6	28.57
Valproic Acid-Phenobarbital	1	4.76

Monotherapy was the primary choice for more than half of the epilepsy patients in this study. The decision to use monotherapy was likely based on several clinical considerations. Monotherapy often serves as the initial choice in epilepsy management because it allows for clearer evaluation of the effectiveness and tolerance of a specific drug without interactions with other medications. Monotherapy can also reduce the risk of side effects, which tend to increase with the use of multiple drugs. Furthermore, monotherapy is typically simpler in terms of dosage management and patient adherence, ultimately enhancing overall therapeutic outcomes [7] [8].

Although monotherapy was more prevalent in this study, nearly half of the patients received combination therapy. The use of a combination of two or more antiepileptic drugs may be considered when monotherapy is insufficient in controlling seizures. Polytherapy helps manage seizures that are difficult to control with a single drug because medications with different mechanisms of action can provide better seizure control [9]. However, polytherapy also presents its own challenges such as increased risk of side effects, drug interactions, and complexity in dosage management and patient adherence. The choice between monotherapy and polytherapy should be tailored to each patient's needs. Factors such as the type and frequency of seizures, age, general health condition, and response to previous therapies should be considered. Doctors need to evaluate the benefits and risks of both approaches with the primary goal of achieving optimal seizure control and improving patient quality of life [10] [11].

Based on the findings of this study (see in Table 1), the most commonly used single therapy was phenytoin by 17 patients, followed by carbamazepine by 4 patients, and phenobarbital by 3 patients. As for combination therapy, the combination of phenytoin with phenobarbital was predominantly used by 14 patients, followed by the combination of carbamazepine with phenobarbital by 6 patients, and the combination of valproic acid with phenobarbital by 1 patient.

Phenytoin is an antiepileptic drug that has been widely used and proven effective for various types of seizures, especially tonic-clonic and focal seizures. It works by stabilizing neuronal membranes and reducing excessive neuronal activity through the inhibition of sodium channels. As monotherapy, phenytoin has a good efficacy profile. However, its use needs to consider potential side effects such as gingival hyperplasia, peripheral neuropathy, and the risk of osteopenia with long-term use [12] [13].

Carbamazepine is a primary choice for focal seizures with a mechanism of action similar to phenytoin, involving the inhibition of sodium channels. Although used by a small number of patients in this study (4 individuals), carbamazepine is effective in controlling focal seizures and also has mood stabilizing effects, which benefit patients with additional mood disorders. Its main side effects include dizziness, blurred vision, and the risk of aplastic anemia [11] [14].

Fenobarbital is one of the oldest antiepileptic drugs still in use. It works by enhancing the inhibitory effect of the neurotransmitter GABA, thus reducing excessive neuronal activity. Only three patients used fenobarbital as monotherapy in this study, reflecting its more limited use possibly due to undesirable side effects such as sedation, the risk of dependence, and cognitive impairments [15] [16].

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The majority of patients in the combination therapy group use a combination of phenytoin and phenobarbital. This combination may be selected for its synergistic effects in seizure control. Phenytoin stabilizes neuronal membranes, while phenobarbital provides additional inhibition through the GABA mechanism. However, this combination also increases the cumulative risk of side effects, including greater sedation, cognitive impairment, and complications associated with phenytoin [7] [17]. Another commonly used combination is carbamazepine and phenobarbital. Carbamazepine effectively controls focal seizures, while phenobarbital offers additional benefits for tonic-clonic seizure control. Despite their effectiveness, this combination also has the potential for complex side effects, including an increased risk of sedation and mood disturbances [15] [18].

The combination of valproic acid and phenobarbital is the least frequently used in this study. Valproic acid is a broad-spectrum antiepileptic drug effective against various seizure types, including absence, myoclonic, and tonic-clonic seizures. When combined with phenobarbital, additional effects in inhibiting neuronal activity may be achieved. However, valproic acid has potential side effects such as liver disorders, pancreatitis, and weight gain, which may limit its use in this combination [7] [11] [5].

IV. CONCLUSION

In this study, 24 out of a total of 45 patients (53.3%) received single-agent antiepileptic therapy (monotherapy), while 21 other patients (46.7%) received combination antiepileptic therapy. The most common single-agent therapy was phenytoin, used by 17 patients, followed by carbamazepine used by 4 patients, and phenobarbital used by 3 patients. As for combination therapy, 14 patients received a combination of phenytoin and phenobarbital, 6 patients received a combination of carbamazepine and phenobarbital, and 1 patient received a combination of valproic acid and phenobarbital.

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