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To study the price variations of Anti-Epileptic drugs available in different brands in Indian Pharmaceutical market

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Abstract

Aim: Analysis of the cost ratio & percentage cost variations in different brands of the commonly prescribed Anti-Epileptic drugs available in Indian pharmaceutical market.

Methods: The maximum and minimum price of each brand of the drug given in INR was noted by using CIMS January to April 2020 edition & Drug Today April to June 2020 Vol-1. The cost ratio and the percentage cost variation for individual drug brands was calculated. The cost of one bottle in case of 100 ml syrup & 10 tablets/capsules was calculated in case of oral drugs and the cost of one 1 vial or ampoule was noted in case of injectable drugs. At last the cost ratio and percentage cost variation of various brands was compared.

Results: After calculation of cost ratio and percentage cost variation for each brand of Anti-Epileptic drug tablet clonazepam [2mg] shows highest cost ratio & percentage cost variation as: 10.41 & 941.66, Carbamazepine [200mg SR tablet] shows lowest cost ratio & percentage cost variation as: 1.09 & 9.32

Conclusion: Epilepsy is the most common neurological disorder and Epileptic drugs are to be prescribed for prolonged period. If a costly brand is prescribed, the patients have to pay more money unnecessarily for their treatment. There is a wide difference in the cost of different brands of Anti-Epileptic drugs available in India. The clinicians prescribing these drugs should be aware of these variations in cost to reduce the cost of drug therapy.

Keywords: Anti-Epileptic drugs, Percentage cost variation, Cost ratio.

Introduction

Epilepsy is a group of neurological disorders which is characterized by seizures, loss of consciousness, muscular contraction¹. The cause of most cases of epilepsy is unknown². Some cases occur as the result of brain injury, stroke, brain tumors, infections of the brain, and birth defects through a process known as epileptogenesis². Known genetic mutations also causes some cases of epilepsy³. The diagnosis involves ruling out other conditions such as alcohol withdrawal or electrolyte problems³. Epileptic seizures are the result of excessive and abnormal neuronal activity in the cortex of the brain⁴. In 2015, about 39 million people have epilepsy⁵. Nearly 80% of cases occur in the developing world. In 2015, it resulted in 125,000 deaths up from 112,000 deaths in 1990⁶. Epilepsy is more common in older people⁷. In the developed world, onset of new cases occurs most frequently in babies and the elderly⁸. In the developing world, onset is more common in older children and young adults, due to differences in the frequency of the underlying causes⁹. The diagnosis of epilepsy is typically made based on observation of the seizure onset and the underlying cause¹⁰. An electroencephalogram (EEG) to look for abnormal patterns of brain waves and neuroimaging (CT scan or MRI) to look at the structure of the brain are also usually part of the workup. Video and EEG monitoring may be useful in difficult cases. The mainstay treatment of epilepsy is anticonvulsant medications, possibly for the person's entire life¹⁰. The choice of anticonvulsant is based on seizure type, epilepsy syndrome, other medications used, other health problems, and the person's age and lifestyle¹¹. A single

medication is recommended initially¹² If this is not effective, switching to a single other medication is recommended¹³. There are a number of medications available

including phenytoin, carbamazepine and valproate. Low-quality evidence suggests that phenytoin, carbamazepine, and valproate may be equally effective in both focal and generalized seizures.¹⁴ Controlled release carbamazepine appears to work as well as immediate release carbamazepine, and may have fewer side effects.¹⁵ Patients from poor socioeconomic background must have access to the correct drug at the nominal price. Costly drugs can lead to economic burden which results in decreased compliance or even non-compliance. Noncompliance leads to incomplete treatment which tends to increased morbidity. There is a gross variation in the cost of different brands of same generic drugs available in Indian pharmaceutical market. Increase in the patient medication cost was found to be associated with decrease adherence to prescription medication¹⁶.

Methods

(1) Price in Indian rupees (INR) of Anti-Epileptic drugs manufactured by different pharmaceutical companies in India, in the different strength were obtained from Current index of medical specialists (CIMS) January to April 2018 edition and from Drug Today April to June 2018, vol-1 as they are readily available source of drug information and are updated regularly.

(2) The cost of 10 tablets/capsules, syrup of one bottle and that of one ampoule /vial were calculated.

(3) The cost of drugs was also crosschecked at pharmacy or retail drug store.

(4) Difference in the maximum and minimum price of the same drug formulation manufactured by different pharmaceutical companies and percentage variations in prices were calculated.

(5) The cost of injectable drugs and oral drugs in forms of table, capsule & syrup should be calculated separately.

(6) The cost ratio, calculated as the ratio of the costlier brand to that of the cheapest brand of the same drug, calculated as follows:

Cost ratio= Price of the costliest brand/Price of the least costly brand

(7) The percentage cost variation of each drug should be calculated as follows:

Percentage cost variation =(Maximum cost-Minimum cost/minimum cost)x 100

(8) Maximum percentage cost variation & cost ratio of a particular drug should be noted down.

(9) Minimum percentage cost variation & cost ratio of a particular drug should be noted down.

Inclusion criteria-

- (a) Drugs belong to group of Anti-Epileptic only should be included.
- (b) Doses form of Anti-Epileptic drugs will be capsule/tablet, syrup, ampoule/vial.
- (c) Drugs belong to branded manufacturing companies should be included.
- (d) Drugs belong to same & different strength should be included.

Exclusion criteria-

- (a) Anti-Epileptic drugs in combinations with other drugs should be excluded.
- (b) Drugs belong to bogus manufacturing companies should be excluded.

Results

Tablet clonazepam [2mg] shows highest cost ratio & percentage cost variation as: 10.41 & 941.66, Tablet carbamazepine [200mg SR tablet] shows lowest cost ratio & percentage cost variation as: 1.09 & 9.32 We can prefer those drugs who possess cost ratio less than 2 and percentage cost variation less than 100

Table 1: Cost ratio and percentage cost variation of Anti-Epileptic drugs available in Indian pharmaceutical Market.

Drug	Dose	No. of brands	Maximum price [Rs]	Minimum price [Rs]	Price ratio	% Price variation
1. Carbamazepine	200mg CR tablet	3	21.40	14.30	1.49	49.65
	200mg ER tablet	2	23.50	15.79	1.48	48.82
	200mg SR tablet	2	15	13.72	1.09	9.32
	200mg tablet	20	21.40	11	1.94	94.54
	400mg CR tablet	2	41.70	26.50	1.57	57.35
	400mg ER tablet	2	45.75	31.02	1.47	47.48
	400mg tablet	8	41.70	24.24	1.72	72.02
	100mg tablet	11	11.21	6.50	1.72	72.46
2. Sodium Valproate	200mg tablet	14	42	21.85	1.92	92.21
	200mg/5ml syrup	5	65	47.50	1.36	36.84
	250mg tablet	4	64	45	1.42	42.22
	500mg tablet	13	90	46.81	1.92	92.26
	500mg ER tablet	5	118	58	2.03	103.44
	500mg CR tablet	6	90	32	2.81	181.25
3. Phenytoin	50mg tablet	4	13.50	7.26	1.85	85.95
	100mg tablet	10	21.1	5.71	3.69	269.52
	300mg ER tab/cap	3	59	50.19	1.17	17.55
	Inj 50mg/ml	4	120.90	58	2.08	108.44

	[2ml ampoule]					
4.Pregabalin	75mg capsule	21	97	54.89	1.76	76.71
	150mg capsule	13	159	115	1.38	38.26
5.Clonazepam	0.25 mg tablet	24	22	9.10	2.41	141.75
	0.5mg tablet	44	36	9.90	3.63	263.63
	1mg tablet	25	43	18.29	2.35	678.29
	2mg tablet	31	75	7.20	10.41	941.66
6.Lamotrigine	25mg tablet	9	58	21	2.76	176.19
	50mg tablet	9	90	39	2.30	130.76
	100mg tablet	8	157	69	2.27	127.53
7.Gabapentin	100mg tab/cap	5	47.50	42	1.13	13.09
	300mg tab/cap	12	312.87	69.90	4.47	347.59
8.Levetiracetam	250mg tablet	9	82	44	1.86	86.36
	500 mg tablet	17	164	75	2.18	118.66
	Inj 100mg/ml	6	147	40	3.67	267.5
9.Topiramate	25mg tablet	4	56	30	1.86	86.66
	50mg tablet	6	87	58	1.5	50
	100mg tablet	3	15	108	1.42	42.59

Discussion

The Indian market has over 100,000 formulations and there is no system of registration of Medicines. More than one company sells a particular drug under different brand names apart from the innovator company. This situation has led to greater price variation among drugs marketed. These wide variations in the prices of different formulations of the same drug have severe economic implications in India. Unlike developed countries, people in developing countries pay the cost of medicines out-of-pocket. Many poor people frequently face a choice between buying medicines or buying food or other necessities due to limited resources and high pricing of drug. So, medicine prices do matter. In India more than 80% health financing is borne by patients¹⁷. Studies have shown that providing a manual of comparative drug prices annotated with prescribing advice to physicians reduced their patients drug expense especially in a disease like hypertension which needs long term treatment¹⁸. Costs of drugs are controlled by the drug cost control order 2013(DPCO)¹⁹. Hence, it was need to draw attention to the prices of various drug formulation brands available to reduce the cost of therapy²⁰. The treating physician should be made aware of the cheapest drug available among the various brands so that the patient bears lesser burden of treatment cost²¹.

Conclusions

In now days prices of few drugs are under government control through DPCO [Drug price control order]. The physician should always remember that he should not avoid treating the patients with a particular drug because it is expensive and should rather balance his therapeutic decisions in prescribing a particular drug by considering the patients socioeconomic status. There is a strong need to create awareness about this huge price variation among the general public, health care providers, health care payers, government agencies, policy makers, pharmacists for appropriate intervention to reduce economic burden on patients as well as the healthcare system.

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