

**Summer Training at
Blue Berry Pharma Advisory**

**Evaluation of Short Coming of Currently Marketed Diclofenac Sodium
Injections Potential for Indian Market**

Data Bank for Some Therapeutic Segments

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**Under the guidance of
Dr. Nirmal Gurbani**

**Post Graduate Diploma in Pharmaceutical Management
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**Institute of Health Management Research,
Jaipur
2012**

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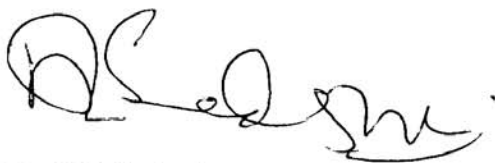
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Certificate

This is to certify that Mr. Hitesh Jain from Institute of Health Management Research, Jaipur has undergone Summer Training at Blue Berry Pharma Advisory, Mumbai from 03rd May, 2012 to 06th June, 2012.

The candidate himself carried out the project. His approach to the study has been sincere, scientific and analytical. This summer training is partial fulfillment of the course requirement is recommended for the award of post graduate diploma in pharmaceutical management.

I wish him success in all his future endeavors.



Dr. P.R. Sodani
Dean (Academic and Students Affairs)
IHMR, Jaipur



Dr. Nirmal Kumar Gurbani
Associate Dean (PG Pharma)
IHMR, Jaipur

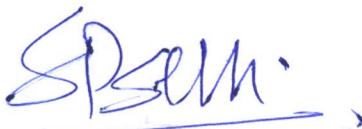
Blue Berry Pharma Advisory

June 7, 2012

This is to certify that Mr. Hitesh Jain has undergone summer training for a period May 3 to June 6, 2012 at Blue Berry Pharma Advisory.

Hitesh completed the project with all sincerity and best of his abilities. He took lots of initiative to learn during the above period. His project title **"Evaluation of short coming of currently marketed Diclofenac Sodium Injections and potential of the product and preparing data bank for certain therapeutic segments "**.

I wish Hitesh all the success in his future endeavor.



Subhash Seth

CEO

Blue Berry Pharma Advisory

ACKNOWLEDGEMENT

I take immense pleasure in thanking Subhash Seth, CEO, BLUE BERRY PHARMA ADVISORY for permitted me to carry out this project work & sharing his experience of working with me which help me to prepare this report.

My sincere thank to my mentor Mr. Nirmal K Gurbani for providing me support whenever I required & guiding me throughout summer training duration.

Last but not the least I would like to thank to all my friends whose ideas, critical in sights and suggestions have been valuable in the preparation of this project.

Hitesh Jain
PGDPM

PREFACE

This report documents the work done during the summer internship at Blue Berry Pharma Advisory, Mumbai under the supervision of Subhash Seth, CEO Blue Berry Pharma Advisory. The report first shall give an overview of the Diclofenac, than tasks completed during the period of internship with technical details. Then the results obtained shall be interpreted and analyzed.

Report shall also elaborate on the future works which can be persuaded as an advancement of the current work.

I have tried my best to keep report simple yet technically correct. I hope I succeed in my attempt.

Hitesh Jain
PGDPM

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1. OBJECTIVE

1. EVALUATION OF SHORT COMING OF CURRENTLY MARKETING DICLOFENAC SODIUM INJECTIONS POTENTIAL FOR IN INDIAN MARKET.

SUB-OBJECTIVE

- I. To find out top 10 diclofenac injection brands according to sales value 2011.**
- II. To find out top 10 diclofenac injection brands according to volume wise 2011.**
- III. To find salt wise market size of various diclofenac Inj. preparation.**

2. INTRODUCTION

DICLOFENAC SALT

GENERIC NAME: Diclofenac

BRAND NAMES: Voltaren, Cataflam, Voltaren-XR (GLOBALLY)
Voveran, Dynapar-AQ. (Indian)

DRUG CLASS AND MECHANISM: Diclofenac belongs to a class of drugs called non-steroidal anti-inflammatory drugs (NSAIDs) that are used for the treatment of mild to moderate pain, fever, and inflammation. NSAIDs work by reducing the production of prostaglandins, chemicals that cause pain, fever and inflammation. NSAIDs block the enzyme that makes prostaglandins (cyclooxygenase), resulting in lower production of prostaglandins. As a consequence, inflammation, pain and fever are reduced. Since the response to different NSAIDs varies from patient to patient, it is not unusual for a doctor to try different NSAIDs for any given condition. The FDA approved diclofenac in July 1998.

Other members of this class

Include Ibuprofen (Motrin), Indomethacin (Indocin), Nabumetone (Relafen), naproxen (Aleve) and several others.

PRESCRIPTION: Yes

GENERIC AVAILABLE: Yes

STORAGE: Diclofenac should not be stored above 30°C (86°F) and should be protected from moisture.

PRESCRIBED FOR: Diclofenac is used primarily for the treatment of inflammation and pain caused by conditions such as arthritis, osteoarthritis, and ankylosing spondylitis. It is also effective in treating soft tissue inflammations due to tendinitis and bursitis, and treating dysmenorrhoea (menstrual cramps).

DOSING: Diclofenac should be taken with food to reduce stomach upset. The recommended dose for most conditions is 100-200 mg daily. Dosing intervals depend on the diclofenac formulation used and the condition being treated.

DRUG INTERACTIONS: Diclofenac, like other NSAIDs is associated with several suspected or probable interactions that affect the action of other drugs. Some examples are discussed below. Diclofenac may increase the blood levels of lithium (Eskalith) by reducing the excretion of lithium by the kidneys. Increased levels of lithium may lead to lithium toxicity. Diclofenac may reduce the blood pressure lowering effects of blood pressure medications. This may occur because prostaglandins play a role in the regulation of blood pressure.

When diclofenac is used in combination with aminoglycosides antibiotics [For example, gentamicin (Garamycin)] the blood levels of the aminoglycoside may increase, presumably because the elimination of aminoglycosides from the body is reduced. This may lead to more aminoglycoside-related side effects.

Individuals taking oral blood thinners or anticoagulants [for example, warfarin (Coumadin)] should avoid diclofenac because diclofenac also thins the blood, and excessive blood thinning may lead to bleeding.

Combining NSAIDs with methotrexate (Rheumatrex, Trexall) may reduce the elimination of methotrexate from the body and result in increased side effects from methotrexate.

PREGNANCY: Like other NSAIDs, diclofenac is generally avoided during pregnancy because it may affect the cardiovascular system of the foetus.

NURSING MOTHERS: It is not known whether diclofenac is excreted in breast.

SIDE EFFECTS: The most common side effects of diclofenac involve the gastrointestinal system. It can cause ulcerations, abdominal burning,

pain, cramping, nausea, gastritis, and even serious gastrointestinal bleeding and liver toxicity. Sometimes, stomach ulceration and bleeding can occur without any abdominal pain. Black tarry stools, weakness, and dizziness upon standing may be the only signs of internal bleeding. Rash, kidney impairment, ringing in the ears, and light-headedness are also seen. People who are allergic to other NSAIDs should not use diclofenac. NSAIDs reduce the flow of blood to the kidneys and impair function of the kidneys. The impairment is most likely to occur in patients with already reduced kidney function or congestive heart failure, and use of NSAIDs in these patients should be done cautiously. Individuals with asthma are more likely to experience allergic reactions to diclofenac and other NSAIDs. Fluid retention, blood clots, heart attacks, hypertension and heart failure have also been associated with the use of NSAIDs.

ADVERSE DRUG REACTIONS

GI disturbances; headache, dizziness, rash; GI bleeding, peptic ulceration; abnormalities of kidney function. Pain and tissue damage at Inj site (IM); local irritation (rectal); transient burning and stinging (ophthalmic).

POTENTIALLY FATAL: Stevens-Johnson syndrome, exfoliative dermatitis, toxic epidermal necrolysis.

RESEARCH METHDOLOGY

Type of research – secondary research

Data collection – data provided by IMSHEALTH

Data analysis – MS Excel

Limitations- Since the study is conducted only based on data provided by IMSHEALTH. For getting a face with current diclofenac market profile there is need of primary research.

DICLOFENAC MARKET PROFILE

CURRENT MARKET (Asia & Europe) SCHINERIO OF DICLOFENAC SALT

- Global (Asia & Europe) current market is around 1.48 billion us \$.
- Indian market is around 260 million us \$ which is 17 % of total market.
- Total Parenteral market is around 100 million us \$.
- Indian Parenteral market is around 20 million us \$ which is 20% of total market.
- There are nearly 120 players in India which produce diclofenac sodium Inj.

CURRENT MARKET (EUROPE & ASIA) FOR DICLOFENAC PREPARATION

PREPARATION	Sales 2010 Dollar US	SU_Mat 2010	Kg in 2010	Sales 2011 Dollar US	SU_Mat_ 2011	Kg in 2011
PARAENTRAL	100,107,855	419,513,697	38,930.62	106,702,699	448,878,282	42,116.24
ORAL & OTHERS	1,425,668,718	17,349,712,593	645,794.51	1,473,000,483	1,812,393,9726	659,181.15
TOTAL	1,525,776,573	17,769,226,290	684,725.13	1,579,703,182	18,572,818,008	701,297.39
% Parenteral	6.56	2.36	5.69	6.75	2.42	6.01

INDIAN MARKET CAPTURING GLOBAL MARKET FOR DICLOFENAC PREPARATION

DICLOFENAC MARKET	Sales 2010 Dollar US	SU_Mat 2010	Kg in 2010	Sales 2011 Dollar US	SU_Mat_201 1	Kg in 2011
GLOBAL (Europe & Asia)	1,525,776,573	17,769,226,290	684,725.1	1,579,703,182	1,580,387,907	701,297.4
INDIAN	259,451,709	6,253,786,206	268,738	299,039,689	6,756,867,825	283,693.1
INDIAN Market (%)	17.00	35.19	39.25	18.93	36.38	40.45

INDIAN PARAENTRAL MARKET V/S GLOBAL PARAENTRAL MARKET

PARENTERAL	Sales 2010 Dollar US	SU_Mat 2010	Kg in 2010	Sales 2011 Dollar US	SU_Mat_2011	Kg in 2011
GLOBAL (Europe & Asia)	100,107,855	419,513,697	38,930.62	106,702,699	448,878,282	42,116.24
INDIAN	25,861,323	155,094,029	18,581.53	27,616,128	159,163,566	19,967.03
INDIAN Market (%)	25.83	36.97	47.73	25.88	35.46	47.41

INDIAN MARKET FOR DICLOFENAC PREPARATION

PREPARA- TION	Sales 2010 Dollar US	SU_Mat 2010	Kg in 2010	Sales 2011 Dollar US	SU_Mat 2011	Kg in 2011
PARAENTRAL	25,861,323	155,094,029	18,581.53	27,616,128	159,163,566	19,967.03
ORAL & OTHERS	233,590,386	6,098,69177	250,156.43	271,423,561	6,597,704,259	263,726.03
TOTAL	259,451,709	6,253,786,206	268,738	299,039,689	6,756,867,825	283,693.1
PARAENTRAL MARKET	9.97	2.48	6.91	9.23	2.36	7.04

DICLOFENAC INJECTION SALT WISE SEGREGATION **INDIAN MARKET**

DICLOFENAC SALT NAME	SALES 2010 (US dollars)	kg in 2010	SALES IN 2011 (US dollars)	kg in 2011	% CONTRIBUTION IN 2011 SALES
DIMETHYLAMINOETHANOL SALT OR ESTER	62,631	5.97	9,370	2.09	0.0002
DEANOL	9,245,184	717.19	8,914,081	652.76	0.2212
BASE	65,391,492	7,593.42	61,311,132	9,291.15	1.5214
RESIN COMPLEX	65,391,492	35,973.76	69,182,431	36,259.01	1.7167
EPOLAMINE	237,516,798	15,223.22	232,890,912	15,440	5.7791
POTASSIUM SALT	377,718,675	93,808.94	444,486,668	109,405.18	11.0299
DIETHYLAMINE	552,321,077	125,331.53	612,082,178	127,273.12	15.1887
SODIUM SALT	2,419,185,355	768,358.86	2,600,973,280	803,570.89	64.5427
TOTAL	3,726,832,704	1,047,012.89	4029850052	1101894.2	100

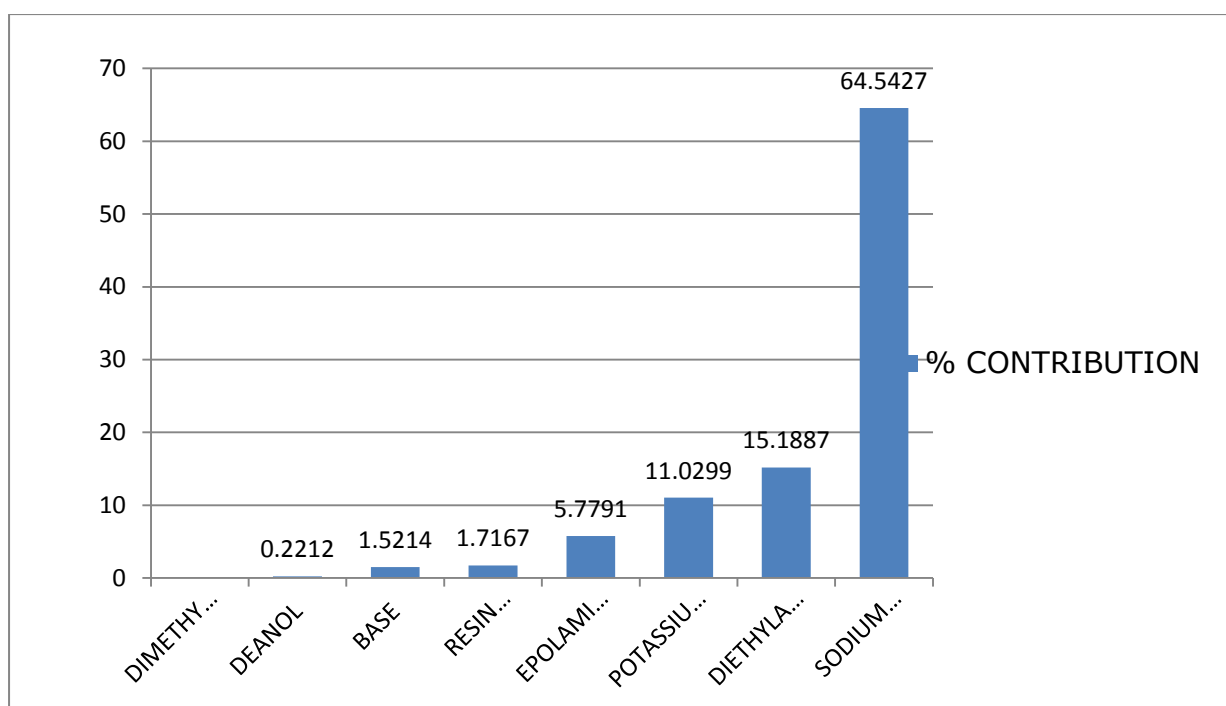


Fig DICLOFENAC INJECTION SALT WISE SEGREGATION

TOP 10 DICLOFENAC INJECTION BRANDS ACCORDING TO SALES VALUE 2011.

	TOTAL MARKET OF DICLOFENAC INJECTABLES		1,14,82,18,880	100			
S.N	BRAND NAME	COMPANY NAME	VALUE IN INR	VALUES (%)	PACKING	PRICE (INR)	25mg/ml PRICE INR
1.	VOVERAN *	NOVARTIS	48,95,16,884	42.63	75 mg x 3 ml	15.44	1.72
2.	DYNAPAR AQ *	TROIKAA PHARMA	16,51,40,450	14.38	75 mg x 1 ml x 1ml	16.8	5.6
3.	ZOBID	AHPL	6,58,10,734	5.73	25 mg x 1 ml x 30m,	40	1.32
					25 mg x 1 ml x 3ml	12	3.83
4.	FENAK	RANBAXY	4,00,91,433	3.49	25 mg x 1 ml x 3ml	9.5	3.17
5.	DILONA	MAPRA LABS	3,80,96,885	3.32	25 mg x 3ml	3.6	1.2
6.	DICLOTA L	BLUE CROSS	3,74,97,531	3.27	25 mg x 1 ml x 3ml	10.5	3.5
7.	DOLOKIN D-AQUA*	MANKIND	2,76,81,656	2.41	75mg x 1ml x 5	59.95	4.00
8.	DICLONAC	LUPIN	2,20,96,893	1.92	25 mg x 15ml	6.43	0.43
9.	DYNAPAR	TROIKAA PHARMA	1,84,01,498	1.60	25 mg x 30ml	40	1.33
10	DEFENAC	LUPIN	1,64,11,941	1.43	25 mg x 30ml	42	1.4

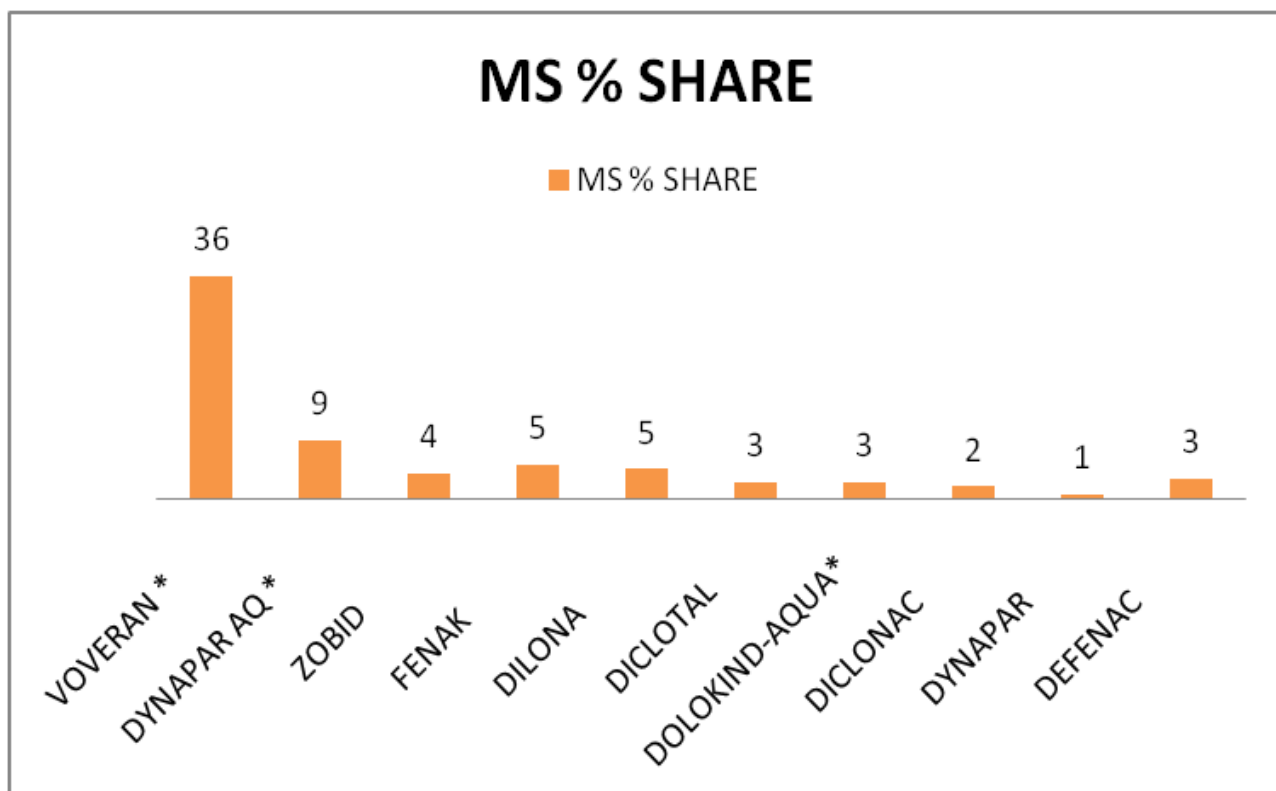


Fig. VALUE VISES TOP TEN BRANDS OF DICLOFENAC INJECTION.

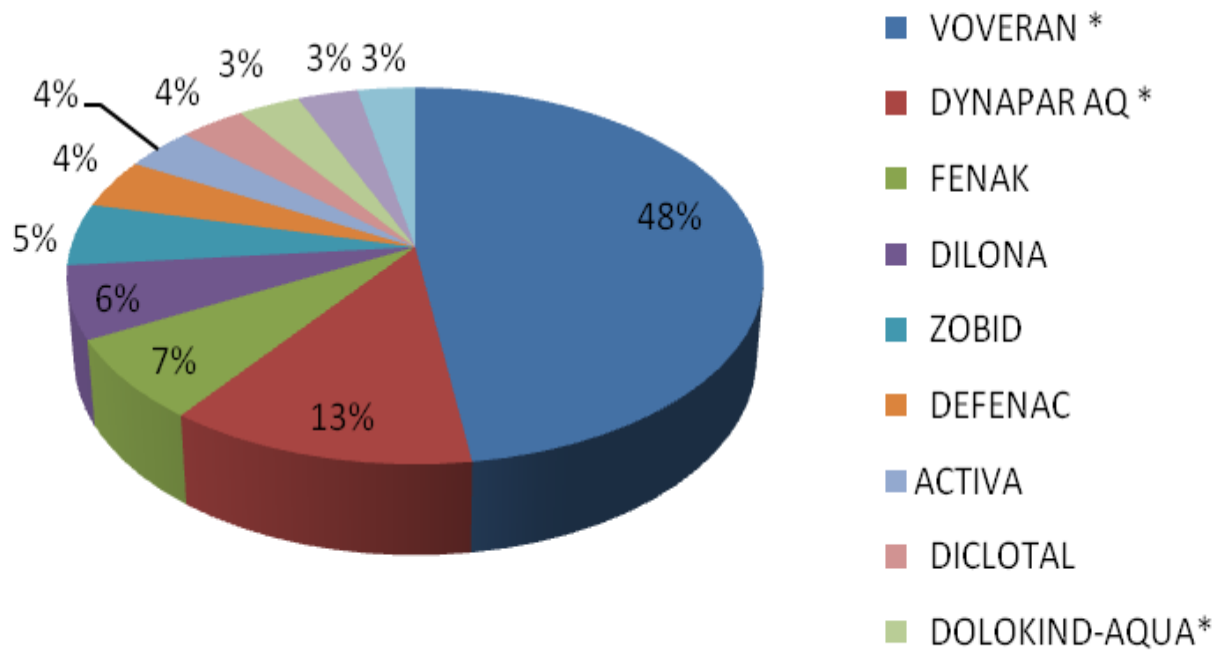
***MS – market sales**

TOP 10 DICLOFENAC INJECTION BRANDS ACCORDING TO UNIT SALES 2011.

S.NO	BRAND NAME	COMPANY NAME	UNIT SOLD	UNIT % MS	PAC KIN G	PRICE (INR)	25mg/ml PRICE INR
1.	VOVERAN *	NOVARTIS	4,84,63,774	36	75 mg x 3 ml	15.44	1.72
2.	DYNAPAR AQ *	TROIKAA PHARMA	1,26,04,965	9	75 mg x 1 ml x 1ml	16.8	5.6
3.	FENAK	RANBAXY	71,44,993	5	25 mg x 1 ml x 3ml	9.5	3.17
4.	DILONA	MAPRA LABS	63,28,279	5	25 mg x 3ml	3.6	1.2
5.	ZOBID	AHPL	54,53,883	4	25 mg x 1 ml x 30m,	40	1.32
6.	DEFENAC	LUPIN	43,19,373	3	25 mg x 30ml	42	1.4
7.	ACTIVA	Zydus Cadila (German Remedies Division)	37,71,790	3	75mg x 1ml	2.5	0.8333 3
8.	DICLOTAL	BLUE CROSS	35,82,465	3	25 mg x 1 ml x 3ml	10.5	3.5
9.	DOLOKIN D-AQUA*	MANKIND	33,92,362	3	75mg x 1ml x 5	59.95	3.9966 7
10.	JONAC	Zydus (G.Rem)	33,03,182	2	25 mg x 3ml	3.5	1.1666 7

NOTE. TOTAL DICLOFENAC INJECTABLES UNIT SALES IN 2011 is 134,033,228. (SOURCE- MAT NOV'11- Country India)

UNIT % MS



MS – market sales

Fig TOP 10 DICLOFEANC BRANDS ACCORDING TO VOLUME SALES IN 2011.

SWOT ANALYSIS FOR DICLOFENAC INJECTION

STRENGTH – In strength we include our power on which we run our business. For Diclofenac Inj. the market strength include

- Larger market around 100 million US \$.
- Growth rate is around 7 %.
- Well accepted molecule compares to others analgesics.
- Fewer side effects to other analgesics.
- Widely used by doctors.

WEAKNESS – In weakness we count those things which will affect the market.

- Possibility of allergic reaction due to propylene glycol
E.g. Anaphylactic shock, Asthmatic attacks.
- Possibility of allergic reaction due to sodium metabisulphite.
E.g. Urtecaria.
- No IV Inj in 25mg available.
- Voveran when gives IV with infusion achieves Cmax higher than required which can cause side effect.
- Current formulations have possibilities of formation of crystals in cold climate.

Opportunity – In this we count those things with can get more market share.

- Market Growth rate is high.
- If a brand comes without sodium metabisulphite & Propylene Glycol, the acceptance chance will be high & it can cover a larger market.

THREATS- In this we include those things which threatens a market.

- Any new better NSAID. Introduced.
- Painless Inj.

DATA ANALYSIS-

➤ Diclofenac salt overall market

$\% \text{ GROWTH RATE} = \text{Increase in sales} / \text{last year sales} * 100$
 $\text{Increase in sales} = \text{current year sales} - \text{last year sales}$

1. For Global

$\text{Increase in sales} = 1,579,703,182 - 1,525,776,573 = 53,926,609$
 $\% \text{ GR} = 53926609 / 1525776573 * 100 = 3.53 \%$

2. for Indian

$\text{Increase in sales} = 299039689 - 259451709 = 39,587,980$
 $\% \text{ GR} = 39,587,980 / 259,451,709 * 100 = 15.258\%$

➤ Parenteral market

1. For Global

$\text{Increase in sales} = 106,702,699 - 100,107,855 = 6,594,844$
 $\% \text{ GR} = 6,594,844 / 100,107,855 * 100 = 6.59 \%$

2. for Indian

$\text{Increase in sales} = 27,616,128 - 25,861,323 = 1,754,805$
 $\% \text{ GR} = 1,754,805 / 25,861,323 * 100 = 6.79 \%$

SITUATIONAL ANALYSIS: -

- ✚ The Diclofenac injections available in India and Europe at present are designed for intra muscular use. All available injections cause pain at the site of injection and thrombophlebitis due to solubilizers such as Propylene Glycol and high concentration of Diclofenac.
- ✚ These also contain sulphites which can cause adverse reactions.
- ✚ All the injections available in the market when given as I.V. or as infusion cause very high Cmax levels resulting in more side effects.
- ✚ There is only one brand Dynapar AQ which come in aqua form due to this it have low side effect compare to others.
- ✚ As per sales value Indian diclofenac market is increasing at rate around 15% and global market is around 4%. It means Indian market have high potential compare to global.
- ✚ Sales wise Parenteral market growth rate is around 6.75% globally (Asia & Europe).
- ✚ The growth rate of Parenteral market in India is .3% more than global. It is around 7%.
- ✚ With 36 % Market value share Voveran (Novartis) is No. 1 Brand & Novartis is Market leader.
- ✚ There are near about 120 Parenteral brands available in India & market size is 20million US\$.
- ✚ The top 10 brands capture around 72% market share and rest divided in all the other players.
- ✚ In these top 10 near about 49 % is captured by top 3 which are Voveran (36%), Dynapar AQ (9%), And Zobid (4%).
- ✚ According to last few years data the Voveran sales is reduced and the lose part is mostly gain by Dynapar AQ.

CONCLUSION

- ❖ From this we conclude that the difference between no. 1 and no 2 player is 4 times it means the market is whole depend or surrounding around no. 1 player which is Voveran.
- ❖ Salt wise Sodium salt is most selling diclofenac salt and its preparation increasing day by day.
- ❖ Ester preparation is now going to be out from market. So those companies who still prepare it come with new formulation.
- ❖ The top 3 companies having 49% market it means the market is now in oligopoly condition but it also seems that losing in share by Voveran take market in monopolistic condition.

RECOMMENDATION

- ❖ According to sales value from last few years we found that the diclofenac market comes in star position so it's a good time for a company to come in this market and earn profit from this market.
- ❖ But at the same time due to increasing side effect by using sodium metabisulphite & propylene glycol it also recommended that if a company use some other excipients which have fewer side effects compare to present in currently marketed formulation will help to get more share from market side.
- ❖ It's also found that the Voveran market is reducing. So if a company come with a new product with a good market strategy & have less side effect which is present in current formulation can earn from this market.
- ❖ Salt wise sodium salt market is increasing and most acceptable salt preparation so it's recommended that company should come with sodium salt or may use which have more potential than sodium and have fewer side effect.
- ❖ But it also find that due to increase blood pressure problem sodium salt preparation is replaced by potassium salt.

REFERENCE

- ❖ MIMS.com
<http://www.mims.com/India/drug/search/DICLOFENAC%20INJ>
- ❖ <http://www.medicinenet.com/diclofenac/article.htm>
- ❖ CIMS Oct. – Dec. 2011
- ❖ IMSHEALTH CARE MAT NOV'11- Country India
- ❖ IMSHEATH CARE MAT Nov2011 - Salt vise