Study of Role of Metformin in Management of Polycystic Ovarian Syndrome

Abstract

Background: Insulin resistance is a common feature of Polycystic Ovarian Syndrome and is present in approximately 40-50% of this disorder. Response to insulin sensitisers appear to be maximal in women with disturbed insulin sensitivity. This argues in favour of its usefulness in patients with marked hyperandrogenism and insulin resistance. In this study, only metformin is used as an insulin sensitising drug.

Methods: The study analysed the usefulness of short term metformin therapy to reduce features of hyperandrogenism and hyperinsulinemia in PCOS patients. Out of 96 patients of PCOS, 48 cases were treated with metformin (1500 mg / day) for 3 months to 1 year and 48 controls were advised dietary modification and exercise. The changes in weight, BMI, menstrual cycles, ovulatory response and hormonal changes were compared in case and control.

Results: Study reveals marked improvements in all parameters amongst the cases who received metformin therapy.

Conclusion: Metformin may be a highly effective treatment protocol for the improvement of clinical, biochemical and hormonal profile in PCOS.

Keywords: Polycystic ovary; Metformin; Hyperinsulinemia; Hyperandrogenism

Research Article

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Introduction

Polycystic Ovarian Syndrome is a heterogeneous disorder affecting 5-10% of women of reproductive age. Insulin resistance plays an important role in dysregulation of folliculogenesis, anovulation and hyperandrogenemia in this disorder. Given the central role of insulin in the aetiology of PCOS, insulin sensitising agents have the potential to ameliorate insulin resistance and alleviate the spectrum of endocrine, meatabolic and reproductive abnormalities in women with PCOS.

Metformin, an insulin sensitising drug was given to PCOS patients for 3 months to one year with an aim to achieve the following

a) To decrease body weight and body mass index

b) To decrease the features of hyperandrogenism like decreased hair loss, diminished facial and body hair growth

c) Resumption of regular menstrual cycles

d) To achieve ovulation and pregnancy in infertile patients; to reduce fasting insulin and testosterone levels

e) To reduce LH, FSH and LH: FSH to normal level.

Material and Methods

The prospective study was carried out in Malda Medical College and hospital from 1st July 2014 to 31st May 201. 96 patients with menstrual irregularities, ultrasound finding of polycystic ovaries and anovulation on folliculometry along with raised or altered LH, LH: FSH, insulin, testosterone levels were selected for the study. 48 cases received metformin (1500 mg/ day) for 3 months to 1 year depending on the response. The changes in weight, BMI, menstrual cycles, ovulatory response, and hormonal changes were critically analysed. These results were compared with rest 48 control patients of the same weight and BMI range who were advised dietary modification and exercise and the efficacy of metformin was assessed.

Result

Tables 1-4

Table 1: Change in menstrual disorder after treatment between cases and control.

Menstrual disorder	Total number		Cycle Restored		Cycle not Restored	
Hypomenorrhoea	Case	4	4	100%	_	_
	Control	4	2	50%	2	50%
Oligomenorrhoea (35 d- 3 months)	Case	30	22	73.3%	8	26.7%
	Control	30	10	33.3%	20	66.7%

Oligomenorrhoea (3mths- 6mths)	Case	14	10	71.4%	4	28.6%
	Control	10	2	20%	8	80%
Amenorrhoea	Case	0	0	0	0	0
	Control	4	0	0	4	100%
Total			36	75%	12	25%
			14	29.2%	34	70.8%

Table 2: Effect on Hirsutism on treatment in case & control.

Effect	Case				Control			
	No Hirsutism		Hirsutism		No Hirsutism		Hirsutism	
Before Treatment	38	79.2%	10	20.8%	38	79.2%	10	20.8%
After Treatment	38	79.2%	10	20.8%	38	79.2%	10	20.8%

Table 3: Evaluation of changes in mean values in different parameters amongst case & control before and after treatment.

Mean	Case (48)		Control (48)	
Parameters	Before Treatment	After Treatment	Before Treatment	After Treatment
Wt (kg)	53.29	51.86	53.17	52.63
BMI (kg/ m^2)	23.01	22.36	23.05	23.66
LH (mIu/ ml)	19.63	7.34	14.01	13.59
LH:FSH	2.32:1	1.07:1	2.09:1	2.19:1
Fasting insulin (mIU/ml)	12.48	7.33	10.35	10.51
Testosterone	0.68	0.54	0.63	0.64

Table 4: Response of Metformin on ovulation.

Duration of ovulation	Total	Ovulation		Anovulation	
3 Months to 6 Months	24	16	66.7%	8	33.3%
3-6 Months with Clomiphene	4	4	100%	_	_
6 Months to 12 Months	18	14	77.8%	4	22.2%
6 -12 Months with Clomiphene	2	2	100%	_	_

Discussion

75% cases in our study showed cycle restoration in contrast to 29.2% in control. Marked improvements in all parameters like weight, BMI, LH, LH: FSH, fasting insulin, and testosterone were found in cases who received metformin therapy. Metformin could not show any improvement in hirsutism score. 36 (75%) out of 48 cases became ovulatory with metformin treatment. 6 of them needed additional clomiphene. 16 (44.4%) cases ovulated with 3-6 months of metformin and 14 (38.9%) needed them for 6-12 months.

Conclusion

Metformin either by weight reduction or by modest reduction of insulin and androgen level helps in restoration of menstrual cycles, ovulation and normalise LH: FSH, insulin and testosterone level as evident in our study. Metformin has also been found to potentiate the action of ovulation inducing drugs. Metformin may be considered as a useful drug reserved for infertile PCOS patients who are not responding to clomiphene citrate.

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