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INSULIN SENSITIZERS

MYTHS & FACTS
MESSAGE FROM THE PRESIDENT'S DESK

Dear Friends,

It is indeed a great privilege and pleasure for me to write this message for the “IFS Conversation” Volume I, July 2016 issue. Polycystic Ovary Syndrome (PCOS) is the most common endocrinological disorder among reproductive age group women. While dietary and lifestyle modifications are the mandatory first line measures to control this disorder, the insulin sensitizers, due to their undisputed potential to ameliorate the effects of insulin resistance and compensatory hyperinsulinaemia, commonly found in PCOS women, have generated a great deal of interest, specially over last decade. However, there still remains a lot of controversy over the exact role of insulin sensitizers in improving live birth rates and minimizing the incidence of complications during pregnancy and delivery. Dr Bharati Dhorpatil and her team have addressed the “Myths and facts” about Insulin sensitizers in this issue, in a most comprehensive and brilliant manner. I am sure, the readers will find it very informative and helpful in their clinical practice.

The “IFS Conversation” also showcases the various recent academic activities conducted by our extremely enthusiastic and committed members spread over 15 chapters across India. Several of our members have also made IFS very proud through their remarkable achievements at the recent ESHRE Annual Meeting held at Helsinki on 3-6 July. My heartfelt congratulations are conveyed to each one of you! Our latest endeavor - the e-publication “NEXUS” has been proudly launched in June 2016. It is aimed to bridge the gap between ART clinicians and embryologists and provide latest concepts on quality control, basic IUI and IVF techniques and lab protocols. The “NEXUS” has been possible due to valued partnership of IFS with ORGICO India Private Limited, initiated through the innovative idea and hard work of our joint secretary - Dr Pankaj Talwar. The inaugural volume focused exclusively on “IUI - bolts & nuts” and next issue is already under preparation titled as “Semen Analysis: trouble shooting”. The great achievements at the recent ESHRE Annual Meeting held at Helsinki on 3-6 July. My heartiest congratulations are conveyed to Dr. R.K. Sharma on “IUI- bolts & nuts” and next issue is already under preparation titled as “Semen Analysis: trouble shooting”. The great achievements...
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- Dr. Rashmi Sharma

Co-opted Members:
- Dr. Neena Malhotra
- Dr. K.D. Nayar

With reference to the recently published news report, the undersigned, on behalf of the Governing Council of Indian Fertility Society (IFS), wish to convey our firm and undivided opinion, that IFS strongly condemns the use of ART/IVF technology in such patients. We fully agree and support the recommendations by ICMR that IVF treatment shall be limited to only up to 50/55 years age group couple at the maximum. The view is endorsed due to well acknowledged serious health risks to the mother as well as due to potential serious impact on physical, psychological and social well being of the child to be born out of such treatment, apart from the question of financial security.

The IFS strongly rejects all justification whatsoever to support such practices, which will go down in the history, as a dark spot against all good work being carried out by thousands of infertility practitioners in our country. This highly controversial case however raises several very uncomfortable and disturbing questions which simply cannot be brushed aside under the carpet, putting all blame on a particular doctor or a single IVF centre as no law has been broken by them and as proclaimed by them IVF treatment was carried out in good faith for their patient and that particular section of society they work for. As concerned responsible citizens, if we really want to get to the root cause of this problem, we ourselves and the society as a whole, must address following questions-

1. What drives a 72 years old woman to opt for the tremendous hardship of pregnancy, childbirth and months of sleepless nights which most of the 30 year something will consider too exhaustive and harder than any other full time job in the world?

2. What drives a septuagenarian couple to subject themselves to more than 2 years of stressful infertility treatment and make a 24 x 7 commitment, when their most other counterparts would be enjoying a relaxed, tension free life with just enough energy to cope with minimal essential physical activity? Is it the simple greed or the pressure to have a baby, especially on women, is so huge that everything else in comparison appears easier? And who is to be blamed for it- the woman, her husband or the society?

3. Why is the risk of losing their share of inherited money / property so important to this septuagenarian couple to justify their decision for such drastic steps at this phase of their lives? Is it not the inability of the state / country to provide financial security and dignity to all its senior citizens and the absence of same is one of the main reasons for this obsession of many couples to have a child at no matter how much are the risks?

4. Most importantly - why is there still no ART Regulation Law despite ICMR thinking about it since 2005 (ICMR guidelines 2005)? During this 11 year period, IVF clinics have increased hundred folds in number but the pace at which our law making system has moved over the same duration is most astonishing.

The same clinic earlier made headlines all over the world in 2006 with the news of a 70 year old woman giving birth to an IVF baby, but nothing material has been done in effect to have prevented such practices. It is not just a question of one couple, one baby or one doctor, there must be thousands of other similar couples in same vulnerable circumstances getting lured into undergoing years of infertility treatment which they ignorantly assume, will end all miseries of their lives. Those who do get pregnant, then face the challenge of putting their own and their baby's lives at considerable risks and suffering. The law making authorities should have woken up long ago. The most important undeniable need of the hour is for the government authorities to sit together with the IVF service providers and finalize the draft ART Bill 2014 to make it practical as well as efficient enough to protect and take care of the interests of all stake holders and implement it as a law on a most urgent priority.

Meanwhile, the doctors need to realize that IVF technology is not the magical care for all sins and ills of the society. IFS recommends all its members to strictly refrain themselves from succumbing to the emotional blackmail and psychological pressures put upon them by the patients and refuse all such treatments, which are clearly and totally against interests of the society.
INTRODUCTION
Polycystic ovary syndrome (PCOS), also called hyperandrogenic anovulation (HAA) or Stein-Leventhal syndrome, is a set of symptoms due to a hormonal imbalance in women.[1] Symptoms include: irregular or no menstrual periods, heavy periods, acne, facial hair, etc.[2,3] PCOS is due to a combination of genetic and environmental factors.[4] Risk factors include obesity, not enough physical exercise, and a family history of someone with the condition.[6] Diagnosis is based on two of the following: absence of ovulation, high androgen levels, and ovarian cysts.[3] Cysts may be detectable by ultrasound. Other conditions that produce similar symptoms include adrenal hyperplasia, hyperthyroidism and hyperprolactinemia.[7] Efforts to improve fertility include weight loss, Clomiphene, or metformin. In-Vitro Fertilization is used by some in whom other measures are not effective.[10] Androgen Excess PCOS Society suggested a tightening of the definition that a person has PCOS if she has all of the following:

1. Excess androgen activity
2. Polycystic ovaries (by Gynecological Ultrasound)
3. Oligoovulation (anovulation) or menstrual disturbance

DEFINITION
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3. Oligoovulation (anovulation) or menstrual disturbance

In 1990 a consensus workshop sponsored by the NIH/NIHCD suggested that a person has PCOS if she has all of the following:[13]

1. Menstrual Disorders: PCOS mostly produces oligomenorrhea (few menstrual periods) or amenorrhea (no menstrual periods), but other types of menstrual disorders may also occur.[11][13]
2. Infertility (13) : This is generally results directly from chronic anovulation (lack of ovulation).[11]
3. High levels of circulating masculinizing Hormones: The most common signs are acne and Hirsutism (male pattern of hair growth), but it may produce precocious sexual development and hyperandrogenism.[13][14] The diagnostic criteria of NICHD 1990 have evidence of Hyperandrogenemia.[15]

DEFINITION
Metabolic Syndrome (13) “Has a tendency towards Central Obesity and other symptoms associated with insulin resistance:1) Serum Insulin, insulin resistance, and Homocysteine levels are higher in women with PCOS.[16] Asians affected by PCOS are less likely to develop hirsutism than those of other ethnic backgrounds.[17]"
Some other blood tests are suggestive but not diagnostic. The ratio of LH
to FSH, when measured in international units, is elevated in women with
PCOS.[41] Possibly, because FAI is correlated with the degree of
androgen excess, patients with PCOS may have supranormal levels.[15] The Free Androgen Index (FAI) of the ratio
of testosterone to sex hormone binding globulin (SHBG) is high[11]
and is meant to be a predictor of free testosterone, but is a poor
parameter for this and is no better than testosterone alone as a marker
for PCOS.[44] Because FAI is correlated with the degree of obesity,[48]
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parameter for this and is no better than testosterone alone as a marker
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Lifestyle modifications and weight loss play a tremendous role in achieving
significant improvement in the symptoms and signs of PCOS but also help to
prevent the long term sequelae of the disease. In a study by Kiddy et al.,[44] about 40% of obese women with PCOS and
hyperandrogenism were treated with lifestyle modification, and 3 out of 4 had
some degree of weight reduction and improvement in menstrual function and ovulation. Many of these studies
were the effects on parameters of IR, hyperandrogenemia, and metabolic syndrome.[50] Recently, metformin therapy continued throughout pregnancy has
been shown to reduce this risk of early pregnancy loss. In a retrospective study of women who became pregnant on metformin and continued through this pregnancy, the rate of early pregnancy loss was 8.8% compared
to 14% of women who were not on the drug.[51] A prospective pilot study, Gluck et al. have reported on 29 women receiving metformin
during their pregnancy aged (65). Fifty-eight percent have had normal
live births, 32% have ongoing pregnancies beyond the first trimester, and
18% have first-trimester miscarriages. No birth defects occurred.[6] This study will eventually include 125 women with PCOS. However, metformin
is not approved for use in ovulation induction or during pregnancy.

The Thessaloniki ASRM/ESHRE guidelines (2008) further emphasized the
same and restricted its use to PCOS patients where there was a glucose intolerance noted. It also indicated that it was helpful in reducing the
incidence of OHSS and missed abortion but did not recommend its use in pregnancy.

The coming years have found many new articles that support its use for modifying the PCOS phenotype prior to infertility treatment, improving
ovulation rates and pregnancy rates and does not significantly improve the rate of congenital anomalies (as noted below). In a Cochrane review published in 2012, a systematic review and meta-analysis[52] indicated that metformin was not effective
in inducing ovulation alone or in relation to clomiphene but was capable of increasing the pregnancy outcome. It is concluded that the role of metformin in improving reproductive outcomes in women with PCOS appears to be limited.

RESTERENCEs
1. Tannys D.R. Vause, Anthony P. Cheung et al 2010.; Ovulation Induction
in PCOS, SOGC CLINICAL PRACTICE GUIDELINES JOGC.
2. Tso Lo, Costello ME, Albuquerqu LT, Androlin RB, Macdon CR.; Metformin in women with polycystic ovary syndrome for improving fertility. Cochrane reviews 2014.

Dr. Sonia Malik
PCO Special Interest Group has been created to escalate recent advancements in PCOS.
Convenor : Dr Sonia Malik
Co-convenor : Dr Bharti Dhorpatil
IFS members can send their short CV to IFS Secretariat to join this SIG and participate in latest updates in PCOS' Importance Management.
Recent market is flooded with Inositol with the pharma promoting the product in various forms and various combinations as well. Particular emphasis is made on the use of Inositol in women with PCOS. Is Inositol truly a wonder molecule? Or is it just another molecule in the block that is now under the limelight and likely to fade in the next couple of years?

Here, we make a brief attempt to give you an insight into Inositol and how it can impact reproductive medicine.

Myo-inositol

Myo-inositol (MI) is considered by some as one of the B Complex vitamins and is synthesized from Glucose in the Liver and Kidneys. It is Hexahydroxycyclohexane and has nine stereoisomers.

In 1988 Larner et al identified that the two inositol stereoisomers, Myo-inositol (MI) and D-chiro-inositol (DCI), are chemical mediators of insulin, acting through different mechanisms. D-chiro-inositol (DCI) is synthesized by an epimerase that converts Myo-inositol (MI) into D-chiro-inositol.

THE INOSITOL LINK TO PCOS

It is widely believed that the DCI content in the urine of monkeys and humans with Type II Diabetes was increased4. This was linked to Insulin resistance. It was around this time that clinical features of PCOS was linked to insulin resistance. The differentiation of the cells lead to hyperinsulinemia and this lead to reproductive dysfunction5. Hyperinsulinemia has a direct effect on the ovaries. Acting on the theca cells of the ovary, insulin promotes androgen synthesis. As a result, increased insulin levels in the liver leads to a reduction of circulating levels of sex hormone-binding globulin, resulting in increased bioavailable levels. One part of this, insulin induces a reduction of the synthesis of insulin-like growth factors binding protein-1, giving rise to an increase of circulating IGF-1 and increasing sensitivity of the ovaries to LH.

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Evidence of the beneficial effect of MI on oocyte quality had accumulated. Unfer et al, administered MI with Folic acid twice a day for 6 months to PCOS women with irregular periods and compared it with Placebo. MI supplementation restored spontaneous menstrual cycles and consequently fertility.

Subsequent studies confirmed that daily supplementation of MI in both low and high doses of PCOS restored menstrual cycles, improved hormonal profile and restored ovulation.

Gerli S et al22, conducted a double blind placebo controlled study to assess the use of MI in treatment of PCOS. Of the 92 patients randomized, 47 received 400 mg folic acid as placebo, and 45 received MI plus folic acid. The ovulation frequency was significantly (P < 0.01) higher in the treated group (58%) compared with the placebo (15%), and the time to first ovulation was significantly (P < 0.05) shorter. The effect of MI on follicular maturation was rapid, because the E2 circulating concentration increased over the first week of treatment only in the MI group. A significant increase in circulating high-density lipoprotein, loss of body weight was observed only in the MI group.

Once Insulin Resistance was linked to PCOS, studies were conducted to find the role of Inositol in PCOS. It was realized that insulin resistance could be a result of impaired signaling of its intracellular messenger pathways. A defect in the inositolphosphoglycerides (IPGs) second messenger pathway opened a new horizon in the clinical management of PCOS.

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Establishing the link between Inositol and PCOS, studies were now directed towards highlighting the problem of insulin resistance in PCOS and the use of MI in supplementing Insulin. The first one to be tried was D-Chiro-inositol (DCI).

DCI supplementation to women with obesity PCOS was tried and the results were promising. Clinical trials with 1200mg of DCI in the management of obesity PCOS was found to be effective not only in improving glucose tolerance but also in reducing serum free testosterone levels, blood pressure and plasminogen activator inhibitor plasminogen activation factor into placenta.

In 2002, Nestler and Alland conducted similar trials in lean PCOS and the results were promising with similar results. However, when high doses of DCI were used, the same beneficial effect was not seen. The poor results of DCI supplementation in higher doses while it was effective in lower doses could not be explained. This was disappointing and the enthusiasm of further studies of DCI supplementation reduced.

MI and DCI have insulin sensitizing effect and reduce the levels of insulin in blood. However, MI and DCI have different action within the cells. MI increases the entry of glucose into the cell making it available as a substrate for various metabolic processes. On the other hand, increases the intracellular accumulation of glucose and is responsible for glycerol synthesis.

Inositol is present in the cell membrane as Phosphatidyl MI. Phospholipase C activity of the cell converts this into Insitol 1,4,5-trisphosphate (IP3) and diacylglycerol (DAG) these second messengers operate throughout the life of a cell to regulate a variety of cellular processes including gametogenesis, fertilization, cell proliferation and development of the embryo.

One of the important actions of Inositol is in Insulin pathway. Insulin-signaling pathways involve inositol phosphoglycans (IPGs). When insulin binds to its receptor, two different IPGs are released by the hydrolysis of Inositol lipids (glycosylphosphatidylinositol) located in the cell membrane. These activates the cell via critical pathways that control the oxidative and non- oxidative metabolism of glucose.

DIFFERENT ROLES OF MI AND DCI

Both MI and DCI have insulin sensitizing effect and reduce the levels of insulin in blood. However, MI and DCI have different action within the cells. MI increases the entry of glucose into the cell making it available as a substrate for various metabolic processes. On the other hand, increases the intracellular accumulation of glucose and is responsible for glycerol synthesis.

Improves insulin sensitivity & reduces hyperinsulinemia

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EFFECT OF MI ON OCYOTE QUALITY

Oocytes are characterized by high glucose consumption along with the oxidative pathway. When sugar is restricted or unavailable, oocyte quality becomes poor. In PCOS, there is a defect in the transportation of glucose into the oocytes and this may be due to down regulation of genes involved in the glucose uptake pathway. Though both DCI and MI are required to perform such function in synergy with insulin, MI seems to play a more important role in oocytes.

To evaluate the effect of MI on oocyte quality in women undergoing ICSI, a study was undertaken8. It was found that the amount of recombinant FSH administered and the number of days of stimulation was significantly reduced in the MI group compared to the placebo group. Further more, in PCOS patients treated with MI and folic acid10, but not folic acid alone, reduced germinal vesicles and degenerated oocytes at ovum pick-up were observed.

INOSITOL IN IRREGULAR MENSTRUATION

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COMPARISON OF MI WITH METFORMIN IN PCOS

A RCT to study the metabolic and hormonal effects of myo-inositol vs. metformin in women with polycystic ovary syndrome showed that both decreased body mass index, androgenic features, improved menstrual abnormalities and polyovulate cycles but the level of insulin resistance as measured by fasting insulin and homeostatic model assessment of insulin resistance was decreased only on treatment with myo-inositol14. However, metformin intake is associated with a significantly high incidence of gastrointestinal disturbances, and is not popular in pregancy that is not yet established. On the other hand, inositol is a nutritional supplementation, its intake is not associated with any significant side effects, and co-administration with folate not only restored normal ovarian response and the consequent decrease in cancellation rate and improved PR.

INOSITOL AND PREGNANCY

While a woman with PCOS gets pregnant, she is more likely to develop GDM. Should we stop Inositol now that she is pregnant? Inositol is an important nutrient required throughout pregnancy. The fetus, gets its inositol from maternal blood. Studies have shown that in mid-gestation, the MI concentration in venous blood from the umbilical cord was fivefold higher than that detected in the maternal serum. At term, serum MI concentration of the neonate decreased, but it was still two- to threefold higher than in maternal blood.

During pregnancy, women experience an increase in oxidative stress and some pregnancy disorders are associated with both high levels of oxidative stress and unbalanced levels of some micronutrients in the maternal blood. MI seems to restore and maintain a healthy pregnancy and fetal development. During pregnancy, total body fat is reduced due to the fetal hormonal milieu. This is not observed in neural tube defects. The uptake of MI from embryonic cells is competitively inhibited likely to fail in the case of congenital malformations, especially of CNS and heart, observed with high frequency in infants born to diabetic mothers could be attributed to hyperglycemia induced tissue specific gene expression.

Several studies have reported that folate resistant neural tube defects could be prevented by combining MI with folic acid.

INOSITOL DOSAGE

The D-Chiro isomer in different tissues in the body was studied and it was observed that a specific MI/DCI ratio exists within each tissue. It was around this time that clinical features of PCOS was linked to insulin resistance. The differentiation of the cells lead to hyperinsulinemia and this lead to reproductive dysfunction. Hyperinsulinemia has a direct effect on the ovaries. Acting on the theca cells of the ovary, insulin promotes androgen synthesis. As a result, increased insulin levels in the liver leads to a reduction of circulating levels of sex hormone-binding globulin, resulting in increased bioavailable levels. One part of this, insulin induces a reduction of the synthesis of insulin-like growth factors binding protein-1, giving rise to an increase of circulating IGF-1 and increasing sensitivity of the ovaries to LH.

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levels are present in tissues characterized by high consumption of glucose (brain, heart, ovaries). The therapeutic range of MI in PCOS is 2 to 4 grams. Pharmaceutically products are now available with this dosage and ratio 40:1. This innovative formulation is particularly useful in the management of PCOS because of its,
(1) action on liver, mainly exerted by DCl, aimed at reducing insulin levels
(2) selective effect on the ovary, where MI is thought to counteract the increased DCl levels, and hence reestablishing FSH sensitivity.
Duration of treatment is 3 months to one year and the action is seen within three months. Caffeine reduces the action of MI.

SAFETY OF INOSITOL
Commonly used dosage of Inositol in clinics is 4g/day. This is completely free of side effects. Human clinical trial data indicate that adverse events related to MI treatment are: Gastrointestinal symptoms (nausea, flatulence, loose stools, diarrhoea) at dose of 12 g/day or higher. Furthermore the severity of adverse events stays the same also at 30 g/day.

COCHRANE REVIEW
Evidence from four trials of antenatal dietary supplementation with myo-inositol during pregnancy shows a potential benefit for reducing the incidence of gestational diabetes. However, the current evidence is based on small trials that are not powered to detect differences in outcomes including perinatal mortality and serious infant morbidity. All of the included studies were conducted in Italy which raises concerns about the lack of generalisability of the evidence to other settings. Further trials for this promising antenatal intervention for preventing GDM are encouraged and should include pregnant women of different ethnicities and varying risk factors and use of myo-inositol (different doses, frequency and timing of administration) in comparison with placebo, diet and exercise or pharmacological interventions.

CONCLUSION
Clinical data have shown that Inositols, particularly MI and DCl are found increased DCI levels, and hence reestablishing FSH sensitivity. This promising antenatal intervention for preventing GDM is encouraged and should include pregnant women of different ethnicities and varying risk factors and use of myo-inositol (different doses, frequency and timing of administration) in comparison with placebo, diet and exercise or pharmacological interventions.

KEY POINTS

- Inositol is a carbohydrate normally present in the body. It works as a second messenger for various cell processes.
- MI and DCl are two important isomers of Inositol.
- Both MI and DCl are involved in the process of insulin signalling, displaying different actions.
- DCl reduces hyperinsulinaemia and increases glycosyn synthesis.
- MI displaces the intracellular DCl in excess, allowing the signal amplification of FSH and glucose uptake.
- Their combined treatment in the physiological ratio 40:1 is an effective strategy targeting metabolic needs as well as endocrine requirements in women with PCOS BMI<25.
- At the ovarian level treatment with MI improves oocyte and embryo quality as well as the ovarian response to FSH

JOIN US AT
FERTIVISION 2016 - 9 to 11 DEC.

IFS FELLOWS BATCH 2015

**IFS FELLOWS BATCH 2016**

**ESHRE CORNER**

Paper Presentation in 32nd ESHRE Conference at Helsinki, Finland, from 3rd to 6th July, 2016.

Dr. N.C. Chimote
Dr. Bindu Chimote
Dr. Amogh Chimote
Dr. Nishad Chimote
Dr. Randhir Singh
Dr. Monica Singh
Dr. Umesh Jindal
Dr. Puneet Rana Arora

**ESHRE EMBRYOLOGY CERTIFICATION**

**Cracking ESHRE Embryology Exam in July, 2016**

Dr. Pranay Ghosh
Dr. Gaurav Kant
Dr. Sanjiv Kumar Maheshwar

**Our Previous Successful IFS Members in June, 2014**

Dr. Randhir Singh
Dr. Yogesh Khanna
Dr. Sarabjeet Singh

**IFS ACTIVITIES UNFOLDING**

**SPECIAL INTEREST GROUPS - PLAN FOR THE YEAR 2016-18**

It has been decided to form 12 Special Interest Groups which has been created for a period of 2 years (2016-2018) for a more focused interaction among the IFS members. More SIGs will be formed in future as per requirement.

Each SIG is lead by eminent specialists and are required to conduct 2 CMEs every year for the benefit of other IFS members. All activities of the SIG should be with prior approval of IFS Secretariat. IFS Members who are keen to join any SIG may please email their short CV to IFS Secretariat, clearly mentioning the name of group they want to join.

The various Special Interest Groups and their Convenors and Co-Convenors at present are as follows:

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<th>Special Interest Groups</th>
<th>Convenor</th>
<th>Co-Convenor</th>
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<td>PCOS Group</td>
<td>Dr. Sonia Malik</td>
<td>Dr. Bharati Dheerapatil</td>
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<td>2</td>
<td>Reproductive Endocrinology</td>
<td>Dr. Sudha Prasad</td>
<td>Dr. K. Khanna</td>
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<td>3</td>
<td>Male Infertility</td>
<td>Dr. R.K. Sharma</td>
<td>Dr. PM. Ponnath</td>
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<td>Embryology</td>
<td>Dr. Kuldeep Jain</td>
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<td>Ultrasound</td>
<td>Dr. Ashok Kharuna</td>
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<td><a href="mailto:tlp@yahoo.com.in">tlp@yahoo.com.in</a></td>
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<td>6</td>
<td>Endoscopy</td>
<td>Dr. Urvashi Jha</td>
<td>Dr. Meena Nair</td>
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<td><a href="mailto:urvashijha430@gmail.com">urvashijha430@gmail.com</a></td>
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<td>Fertility preservation</td>
<td>Dr. Pranjali Jha</td>
<td>Dr. K. L. Kajunmooddeen</td>
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<td>8</td>
<td>Endometriosis Awareness Group</td>
<td>Dr. Shikha Sinha</td>
<td>Dr. Shalini G. Madhav</td>
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<td><a href="mailto:shikha_sinha@iisconcd.org">shikha_sinha@iisconcd.org</a></td>
<td><a href="mailto:shalini.madhav@iisconcd.org">shalini.madhav@iisconcd.org</a></td>
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<td>9</td>
<td>Holistic Medicine (Yoga, acupuncture)</td>
<td>Dr. Ritika Aggarwal</td>
<td>Dr. Raj Kumar Yadav</td>
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<td></td>
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<td><a href="mailto:rajkumar_yadav@gmail.com">rajkumar_yadav@gmail.com</a></td>
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<td>10</td>
<td>Counseling &amp; Patient Support</td>
<td>Dr. Poonam Nayyar</td>
<td>Dr. Konkum Mitra</td>
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<td><a href="mailto:konkum.mitra@gmail.com">konkum.mitra@gmail.com</a></td>
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<td>11</td>
<td>Diminished Ovarian Response</td>
<td>Dr. Neena Malhotra</td>
<td>Dr. Mohamed Auraf</td>
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<td><a href="mailto:drmorenauraf@gmail.com">drmorenauraf@gmail.com</a></td>
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<td>09691 945229 955</td>
<td>010 5045627688</td>
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<td>12</td>
<td>Research &amp; Methodology</td>
<td>Dr. Randhir Singh</td>
<td>Dr. Shweta Mittal</td>
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<td><a href="mailto:shwetamittal@hotmail.com">shwetamittal@hotmail.com</a></td>
</tr>
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</table>

**ESHRE EMBRYOLOGY CERTIFICATION**

**Cracking ESHRE Embryology Exam in July, 2016**

Dr. Pranay Ghosh
Dr. Gaurav Kant
Dr. Sanjiv Kumar Maheshwar

**Our Previous Successful IFS Members in June, 2014**

Dr. Randhir Singh
Dr. Yogesh Khanna
Dr. Sarabjeet Singh

**CHAPTER ACTIVITIES**

**BIHAR CHAPTER**
CME held at Patna on 17-6-2016

**PUNJAB CHAPTER**
CME held at Patiala on 24-4-2016

**JAMMU CHAPTER**
CME held at Jammu on 7-08-2016

**ACTIVITIES AT DELHI**
Two International Video conferences (VC) held in April 2016

**MID TERM MEETING**
at Delhi 20-21 Aug

**GR. CHANDIGARH CHAPTER**
CME on Fertility & ART on 11-9-2016

**UP CHAPTER**
PREPARING TO HOST FERTIVISION 2016 AT LUCKNOW

CME held at Lucknow on 21-5-2016

CME held at Kanpur on 19-6-2016

CME held at Jounpur on 6-7-2016

CME held at Lucknow on 2-8-2016
Global Standard Through R & D Excellence

Folisure
Recombinant Follitropin ALFA

A Promise of Consistency

For Efficacy & Economy

Menotas
Menotropin 75/150 IU

Menotas HP
Menotropin 75/150 IU