Preconception Care: A Powerful Niche – That is Recognized

Table 1: Summary of the ECLATEN Guidelines on Preconception Care

Optimizing Fertility: The Fertility Exposome Part 2
Gut-Related Factors, Body Ecology, and Fertility

Vaginal Ecology and Fertility

- The effect of known pathogens such as Mycoplasma, Chlamydia, and gonorrhea is clear, causing subclinical changes thought to be risk factors in subfertility. BV is also thought to have an impact on fertility.
- Studies report that up to 40% of patients undergoing IVF cycles have abnormal reproductive tract microbiota; a diverse vaginal microflora at the time of embryo transfer appeared to be an important factor in the success of the IVF-ET procedure.
- The cytokine network is an important factor in the periconceptual period; the cytokine network allows the embryo to navigate itself successfully toward mature life by overcoming the obstacles of environmental conditions. By sending and receiving signals, the microenvironment system affects gene expression and the epigenome in early embryonic life. The microbiome (gut and vaginal) plays an important role in cytokine signaling and may partially serve as a mechanism for the role of the
- Vaginal/gut flora also play an important role in E2 and Pg levels.

- Pretreatment with probiotics has been shown to improve IVF outcome.
- Keep in mind, the reproductive tract microbiome is not an isolated, closed system.
- Factors such as stress, nutrition, food intolerances, obesity, food and environmental toxins, and pharmaceuticals, have been found to impact the vaginal ecology and gut microbiome.
- Some lubricants inhibit sperm motility in vitro (eg, KY jelly, Astroglide, Touch, Replene, olive oil, saliva, KY Sensitive, KY Warming, KY Tingling), however, time-to-pregnancy and fertility do not seem to be different with or without lubricant use. Although no compelling data shows that lubricant use impairs fertility, the use of lubricants that do not inhibit are preferable to optimize fertility.
Oral Ecology and Fertility

- The mouth is the entry point into the GI system from above, and yet too often overlooked in the microbiome conversation, despite the known role of gum disease on chronic inflammation and disease - including CVD.
- Oral flora may play a role in a number of gynecologic conditions including both endometriosis and fertility.
- Links between poor periodontal health and poorer pregnancy outcomes have been reported for at least 2 decades. The most likely mechanism is low grade chronic inflammation having a local effect within the endometrium.
- A cross-sectional study in a hospital setting involving 58 fertility clinic attendees and 70 pregnant controls using the simplified oral hygiene index, community periodontal index (CPI) and matrix metalloproteinase-8 immunosassay. Chronic periodontitis was positively associated with increased TTC in the present study.

Environmentally-Related Factors

- Nearly 23% of American women of childbearing age met or exceeded blood levels for lead, mercury, and PCBs, tracked in an analysis of data on thousands of women. All but 17.3% were at or above the median blood level for one or more of these; 55.8% exceeded the median for two or three.
- As women grew older, their risk of exceeding the median blood level in two or more of these pollutants grew exponentially to the point where women aged 30 to 39 had 12 times greater risk and women aged 40 to 49 had a risk 30 times greater than those women aged 16 to 19.
- This is due to both accumulation over time, and also because these women were born before most environmental protection laws were enacted (which didn’t occur until the early 1970s).
- Women who ate fish more than once a week during the prior 30 days had 4.5 times the risk of exceeding the median blood level in two or more of these pollutants.

City of Men, Handmaid’s Tale...

Environment and Fertility

- Is art imitating life a little too closely for comfort? Data collected between 1999 and 2004 from 3,173 women aged 16 to 49 who participated in the CDC and NHANES survey designed to represent the national population of 134.5 million women of childbearing age found the following:
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In 2009, the Endocrine Society reviewed the evidence of health impacts from endocrine disrupting chemicals and concluded that “the evidence for adverse reproductive outcomes (infertility, cancer, malformations) from exposure to endocrine disrupting chemicals is strong, and there is mounting evidence for effects on other endocrine systems, including thyroid, neuroendocrine, obesity and metabolism, and insulin and glucose homeostasis.”

EDCs may be blamed for the rising incidence of human reproductive disorders, including fertility problems—they have been implicated in disruption of the HPO axis, from decreased GnRH synthesis and release to reduced aromatization, starting in utero with ovarian dysgenesis and persisting throughout life.

Persistent Organic Pollutants (POPs) have been found to lead to early menopause, and EDCs are also associated with medical conditions that interfere with fertility including PCOS, endometriosis, and fibroids.

Of note, even chemical exposure below the lowest observed adverse-effect level (LOAEL) has been associated with reproductive failure in animal models, for example, in rats, perinatal exposure to environmental BPA doses, below the current LOAEL, induced defective GnRH pulses up to adulthood, leading to infertility.

Key Areas of Exposure

- Home
- Workplace
- Diet
- Hobbies

Table 1: Employee exposure to endocrine disruptors

<table>
<thead>
<tr>
<th>Exposure Source</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Care Products</td>
<td>Hair spray, nail polish, mouthwash</td>
</tr>
<tr>
<td>Household Cleaners</td>
<td>Detergents, air fresheners</td>
</tr>
<tr>
<td>Dietary Exposure</td>
<td>Hormones in food, endocrine disruptors in packaging</td>
</tr>
<tr>
<td>Medication</td>
<td>Hormones in prescription drugs</td>
</tr>
</tbody>
</table>

Fish...

- In 2004, the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) issued a joint consumer advisory on methylmercury in fish and shellfish. The warning specifically targets women who may become pregnant, are pregnant or are nursing mothers, and also includes young children.
- While the health benefits of fish in the diet were emphasized, several types of fish contain comparatively higher concentrations of mercury and should be avoided including shark, swordfish, King mackerel and Tilefish.
- Other types of fish ‘may be consumed in up to two meals (6 oz. each) per week, including: shrimp, canned light tuna (but not albacore, which has more mercury), salmon, pollock and catfish.’
- The Advisory also warns about local fish advisories, which are generally posted for specific populations which supplement their diets with locally, caught fish.

Tobacco

- Use of tobacco by the female partner, and possibly by the male partner, has been associated with subfertility, and may account for as much as 13% of cases.
- The odds of pregnancy per number of in vitro fertilization (IVF) cycles was significantly lower in smokers compared to nonsmokers.
- Possible mechanisms for subfertility in smokers include adverse tubal and/or cervical changes, damage to gametes, and increase in spontaneous abortion and ectopic pregnancies.
- Numerous studies linking smoking to early menopause suggest that cigarette smoking causes premature depletion of the ovarian pool of oocytes and premature aging of the ovary by one to four years; this decrease in ovarian reserve can account for the subfertility observed in smokers.
- Components of cigarette smoke may cause oxidative stress and DNA damage to the ovarian follicle. For this reason, smoking by a pregnant woman may be harmful to the ovaries of her fetus.
- Subfertility associated with smoking can be reversed within a year of cessation.
- In a study of the effect of in-utero exposure to cigarette smoke on the fertility of the female partner, fecundability was reduced among women exposed to cigarette smoke in utero.

Pharmaceuticals and Fertility

- Pharmaceuticals even as seemingly "benign" and as common as NSAIDS and antidepressants have been associated with decreased fertility.
- NSAIDs have recently been shown to inhibit ovulation and reduce progesterone levels in young women, also one of the largest populations to take them regularly because of dysmenorrhea. They appear to prevent the ovarian follicle from rupturing so women who are taking NSAIDs cannot release an ovum. The dominant follicle remained unruptured in 75% of women in the diclofenac group, 25% in the naproxen group, 33% in the etoricoxib group, and 0% in the placebo control group. For those taking diclofenac, ovulation was reduced by an amazing 93%, whereas for both naproxen and etoricoxib, ovulation was reduced by about 75%. "All control patients on placebo ovulated, but ovulation was far less frequent in patients who were on NSAIDs." These results were seen after only 10 days on a typical dose of any of these medications.
- In a study published in AJOG, 92 of 957 women reported antidepressant use while attempting to conceive. Data suggested, after adjusting for other variables, that antidepressant use in a given cycle is associated with a reduced probability of conceiving in that cycle.
What About EMFs?

Docs: Wireless devices can harm pregnancies

Next up:

Optimizing Fertility: The Fertility Exosome 3