Ovarian Hyperstimulation Syndrome: What Do We Know Now?
Shalini Gunawardena, RN, BSN

DEFINITION
Ovarian hyperstimulation syndrome (OHSS) is an iatrogenic complication of assisted reproduction technology. OHSS often occurs several days after assisted ovulation following gonadotropin therapy or during early pregnancy. OHSS is a self-limiting disorder that resolves once exposure to human chorionic gonadotropin (hCG)-stimulating medication is removed. Conception, however can cause symptoms to persist and worsen. According to The American Society of Medicine, OHSS is described as an exaggerated response to ovulation induction therapy.¹

PATHOPHYSIOLOGY
OHSS is caused by increased capillary permeability, which results in a shift of fluid from the intravascular space to third space areas such as the abdomen and lungs.¹ Current research has pointed to different factors that influence the process of OHSS development. These factors include increased secretion of protein-rich fluid from enlarged ovaries, increased follicular fluid levels of prorenin, and renin and angiotensin-mediated changes in capillary permeability. Vascular endothelial growth factor (VEGF) has also been linked in the pathophysiology of OHSS.¹ VEGF is an angiogenic (contributing to new blood vessel development) cytokine that stimulates the vascular endothelium. Researchers believe that it plays an integral role in follicular growth, corpus luteum function and ovarian angiogenesis.

RISK FACTORS
Patients at risk for the development of OHSS come from various backgrounds. The key to successful management of this syndrome lies in the ability to identify these at-risk patients early. Risk factors include: having a history of OHSS, being of a young age, having a history of polycystic ovarian disease, experiencing rapidly rising or high final estradiol levels or having a low body weight.

COMMON CLINICAL SYMPTOMS
Every patient is unique in their presentation of OHSS symptoms, however there are common clinical findings that the majority of patients present with. These involve the following:
- Rapid weight gain
- Decreased or absent urine output
- Hemoconcentration
- Abdominal distention
- Electrolyte imbalances that include low circulating sodium (hyponatremia) and high potassium (hyperkalemia) levels

CLINICAL MANAGEMENT
The management of OHSS varies from clinic to clinic and greatly depends on presenting symptoms. Nurses play a unique role due to their front-line presence in the patient cycle. Their clinical assessment of patients as they cycle plays a critical role in the early identification of OHSS. Patients at risk for the development of OHSS are often
encouraged to follow diets promoting increased electrolyte fluid intake early and often. Depending on the clinic’s philosophy, both increased or limited sodium as well as limited potassium consumption may be instilled to help mitigate the effects of fluid retention, third spacing and electrolyte imbalances. Another simple dietary option, recently detailed in a poster presented at the 2008 Annual Meeting of the American Society for Reproductive Medicine, outlines the successful use of oral whey protein during the gonadotropin phase of stimulation.2

Prevention
The best treatment for OHSS may be prevention. There are many different options available to patients at risk of developing OHSS. These include:
- Using low-dose gonadotropin stimulation to encourage a gradual slow rise in estradiol levels
- A natural cycle approach
- Cycle cancellation
- Gonadotropin-releasing hormone (GnRH)
- Lower dose hCG or recombinant luteinizing hormone (rLH) as triggers or coasting until estradiol levels decrease prior to trigger3

Management
Once a patient has started to exhibit early symptoms of OHSS, current literature recommends shifting from prevention to management in order to address symptoms once they have started. Cycle management can include:
- Use of volume expanders such as albumin or hetastarch in sodium chloride post-procedurally4
- Use of oral cabergoline initiated the day of hCG trigger for seven to 10 days5
- Use of an antagonist in collaboration with a freeze-all cycle6
- Discuss freezing all of the embryos upfront to prevent late-onset OHSS development

NURSING CONSIDERATIONS
The development of OHSS during an in vitro fertilization (IVF) cycle can be an extremely stressful experience for both the patient and healthcare provider. Nurses play several important roles as 1) educator, 2) clinician and 3) support provider.

Educator
As educators, the nurses’ role involves providing information to help empower patients during this taxing time. Answering patient questions will help decrease their anxiety and stress during the course of treatment. In addition, expert nursing skills and knowledge will help the patient make medically correct decisions while balancing the desire to have a family. Ensuring a successful outcome will require a collaborative approach between the entire medical staff and the patient.

Clinician
As clinicians, the nurses’ role is critical in the management of OHSS. As front-line staff, nurses often have the most contact with the patient. Understanding the importance of identifying subtle changes in patient status such as decreasing urine output or increased shortness of breath during a routine phone call can mean the difference between continued outpatient management and the need to seek an inpatient admission.

Support Provider
The nurses’ role as support providers is perhaps one of the most significant in the management of OHSS. Nurses’ ability to listen and provide support during patient treatment cycles is critical due to the increased levels of anxiety and stress patients face. Establishing a solid relationship between the nurse and patient will help facilitate the exchange of critical information and ensure the patient feels secure in the care received, regardless of cycle outcome.
CONCLUSIONS

OHSS continues to be the number one complication of infertility treatment. Treatment options today are focused on 1) Prevention for patients identified early as potential candidates for OHSS development or 2) Management for patients who develop OHSS during the course of treatment. As front-line staff, nurses can help facilitate care and help ensure a collaborative approach while educating and supporting their patients.

REFERENCES


About the author:
Shalini Gunawardena, RN, BSN has been practicing in the field of infertility since the early 90s. She started her career at Weill-Cornell Center for Reproductive Medicine in New York and has continued to enjoy her role as an educator and clinician. In her current position as charge nurse at Kaiser Permanente Center for Reproductive Health in Fremont, California, she has been instrumental in helping establish the first in vitro fertilization clinic in an HMO setting in the United States. There, she was responsible for helping build the foundation from which current practices are developed and established. Mrs. Gunawardena is currently pursuing a dual Master's degree in business and healthcare administration.

FOR MORE INFORMATION, OR IF YOU ARE INTERESTED IN BEING AN AUTHOR ON A FUTURE PUBLICATION, PLEASE CONTACT:
Ann Scalia, RN, BSN, CNOR
Senior Clinical Education Specialist, Walgreens
ann.scalia@walgreens.com
Ovarian Hyperstimulation Syndrome: What Do We Know Now?
Shalini Gunawardena, RN, BSN

Clinical Update

Definition
Ovarian hyperstimulation syndrome (OHSS) is an iatrogenic complication of assisted reproduction technology. OHSS often occurs several days after assisted ovulation following gonadotropin therapy or during early pregnancy. OHSS is a self-limiting disorder that resolves once exposure to human chorionic gonadotropin (hCG)-stimulating medication is removed. Conception, however can cause symptoms to persist and worsen. According to The American Society of Medicine, OHSS is described as an exaggerated response to ovulation induction therapy.

Pathophysiology
OHSS is caused by increased capillary permeability, which results in a shift of fluid from the intravascular space to third space areas such as the abdomen and lungs. Current research has pointed to different factors that influence the process of OHSS development. These factors include increased secretion of protein-rich fluid from enlarged ovaries, increased follicular fluid levels of prorenin, and renin and angiotensin-mediated changes in capillary permeability. Vascular endothelial growth factor (VEGF) has also been linked in the pathophysiology of OHSS. VEGF is an angiogenic (contributing to new blood vessel development) cytokine that stimulates the vascular endothelium. Researchers believe that it plays an integral role in follicular growth, corpus luteum function and ovarian angiogenesis.

Risk
Patients at risk for the development of OHSS come from various backgrounds. The key to successful management of this syndrome lies in the ability to identify these at-risk patients early. Risk factors include: having a history of OHSS, being of a young age, having a history of polycystic ovarian disease, experiencing rapidly rising or high final estradiol levels or having a low body weight.

Common Clinical Symptoms
Every patient is unique in their presentation of OHSS symptoms, however there are common clinical findings that the majority of patients present with. These involve the following:

- Rapid weight gain
- Decreased or absent urine output
- Hemoconcentration
- Abdominal distention
- Electrolyte imbalances that include low circulating sodium (hyponatremia) and high potassium (hyperkalemia) levels

Clinical Management
The management of OHSS varies from clinic to clinic and greatly depends on presenting symptoms. Nurses play a unique role due to their front-line presence in the patient cycle. Their clinical assessment of patients as they cycle plays a critical role in the early identification of OHSS. Patients at risk for the development of OHSS are often