Event: Medical Innovation (Secondary Division)
Team Members: Rakshaa Venkatraman, Cindy Ta, Alicia Roice, Ashley Chun
Chapter #: 32411      School: Mountain House High School, California      Innovation: metriGo

POSTER (SolidWorks model made under mentorship of Ms. Erin Graf from LLNL)
Digital version of our printed poster for visibility

metriGo.
THE FALLOPIAN VALVE TO STOP ENDOMETRIOSIS

THE PROBLEM

1 IN 10 U.S. WOMEN OF REPRODUCTIVE AGE HAVE ENDOMETRIOSIS.
A POSSIBLE CAUSE IS RETROGRADE MENSTRUATION.

SYMPTOMS:
- Debilitating pelvic pain
- Infertility
- Interference in daily and social activities
- Dysmenorrhea

YEARLY COST:
- $15,780 per patient, including healthcare and productivity losses

RECURRENT:
- Recurrence rate as high as 40% in 10 years after laparoscopic surgery
- 50% of affected women 'stay in bed all day', with 15-18 bed days per year related to endometriosis pain

THERE IS NO CURRENT SOLUTION FOR ENDOMETRIOSIS.
Current treatments (e.g., pain medication, laparoscopic surgery) only focus on symptom management and are often ineffective.

THE NEED

A way to stop the initial development and the recurrence of endometriosis in high-risk patients. History of abnormal menstruation and diagnosed patients by targeting the source of the disorder rather than simply managing the symptoms is needed.

THE INNOVATION

- metriGo: A package of two implants composed of a platinum-iridium frame and a semi-permeable membrane covering that is inserted into the opening (isthmic) of the intramural segment of each fallopian tube
- Acts as a valve that blocks blood in the uterus from flowing out to the pelvic cavity, forcing it to flow through the vagina (reversing retrograde menstruation)
- The implants will be replaced every two years in order to ensure efficiency and proper functioning

A COMMENDABLE INNOVATION WITH A LOT OF SCOPE FOR APPLICATION AND USE.
- P. A. Shringarpur, MD, OB/GYN

THE BENEFITS

- Prevents endometriosis-related pain at the source by stopping retrograde menstruation
- Doubles as a contraceptive that blocks sperm in order to prevent ectopic pregnancy while the implant is in place
- Minimally invasive, incision-free insertion procedure with minimal pain and short recovery
- Low cost and outpatient procedure makes metriGo very accessible
- Allows patients suffering from the condition to live normal, productive lives

THE COST

Comparing the average yearly costs per patient:
- $2000 vs $15,780 with metriGo

THREE METRIGO VALVES COST APPROX. $600 TOTAL
- Implantation procedure: every two years costs $3600-$3800

CUT THE COST OF ENDOMETRIOSIS BY 88%.

TRAINING & CAREER

- Short training course for gynecologists and primary care doctors
  - Safe use of balloon-embedded hysteroscope in metriGo insertion procedure to place valves in fallopian ostia (similar to standard hysteroscopy procedures)
  - Safe use of hysteroscope and Hemostat forceps to extract valves after 2 years or when necessary

- Provides a template for biomedical engineers to further develop devices targeting endometriotic lesions and bleeding

Acts as a pathway for further research in the future, shifting the focus in endometriosis care from treating symptoms to finding cures.
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INSERTION MODEL (UPSCALED)
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PROTOTYPE VALVES WITH MEMBRANE (UPSCALED)
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References