

Surgical outcomes of robotic-assisted tubal reanastomosis in a single institution

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Modern Contraceptive Method Prevalence by Region, Latest Year

Contraceptive Type	Africa	Asia	Europe	Latin Am. and Caribbean	Northern America	Oceania
Percent of Couples Using Modern Contraception						
Female Sterilization	7,1	38,9	5,3	38,7	30,6	24,5
IUDs	19,6	29,7	21,1	10,4	6,6	1,9
Pill	34,8	10,0	36,5	24,5	23,0	30,5
Condom	8,0	11,5	29,1	14,3	16,5	17,3
Injections	28,6	5,3	0,5	8,1	1,9	6,5
Male Sterilization	0,0	3,7	4,3	3,4	18,8	17,3
Other Modern Methods*	1,8	1,0	3,2	0,6	2,6	1,9

* Note: Other modern methods include implants, vaginal barriers, and others.

Source: Compiled by Earth Policy Institute from U.N. Population Division, *World Contraceptive Use 2011*, wall chart, February 2011.

Reasons for request of fertility restoration

- A change in family circumstances such as the death of a child
- Improved economic situation
- A change in marital status (divorve and remarriage)
- Desire of having more children



1%–5% of the patients will request sterilization reversal

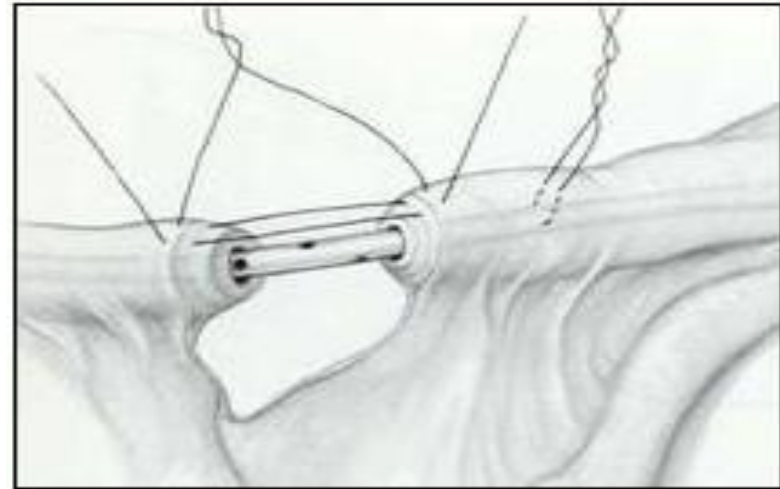
Hillis, Obstet Gynecol, 1999

- Sterilization before 25 years → 18X more likely to request reversal

Hardy E, Contraception, 1996



- Tubal ligation reversal (TLR) involves microsurgery to repair the fallopian tube after a tubal ligation procedure.
- Laparotomy
- Laparoscopy
- Robotic surgery



The advantages of the successful surgical reanastomosis

- The possibility of natural conception
- Chance of multiple singleton pregnancies.

IVF option → a relatively short time to conception

- the cost
- risk of multiple pregnancies
- ovarian hyperstimulation syndrome
- the need for repeating the procedure for desired pregnancy are the disadvantages



Advantages of minimally invasive surgery (robotics & laparoscopy)

- Reduced length of hospitalization
- Reduced postoperative pain
- Reduced blood loss
- Faster return to normal activities
- Better cosmetic result, quicker post-operative recovery
- Including excellent intraoperative visualisation of the pelvic anatomy
- Reduced adhesion formation

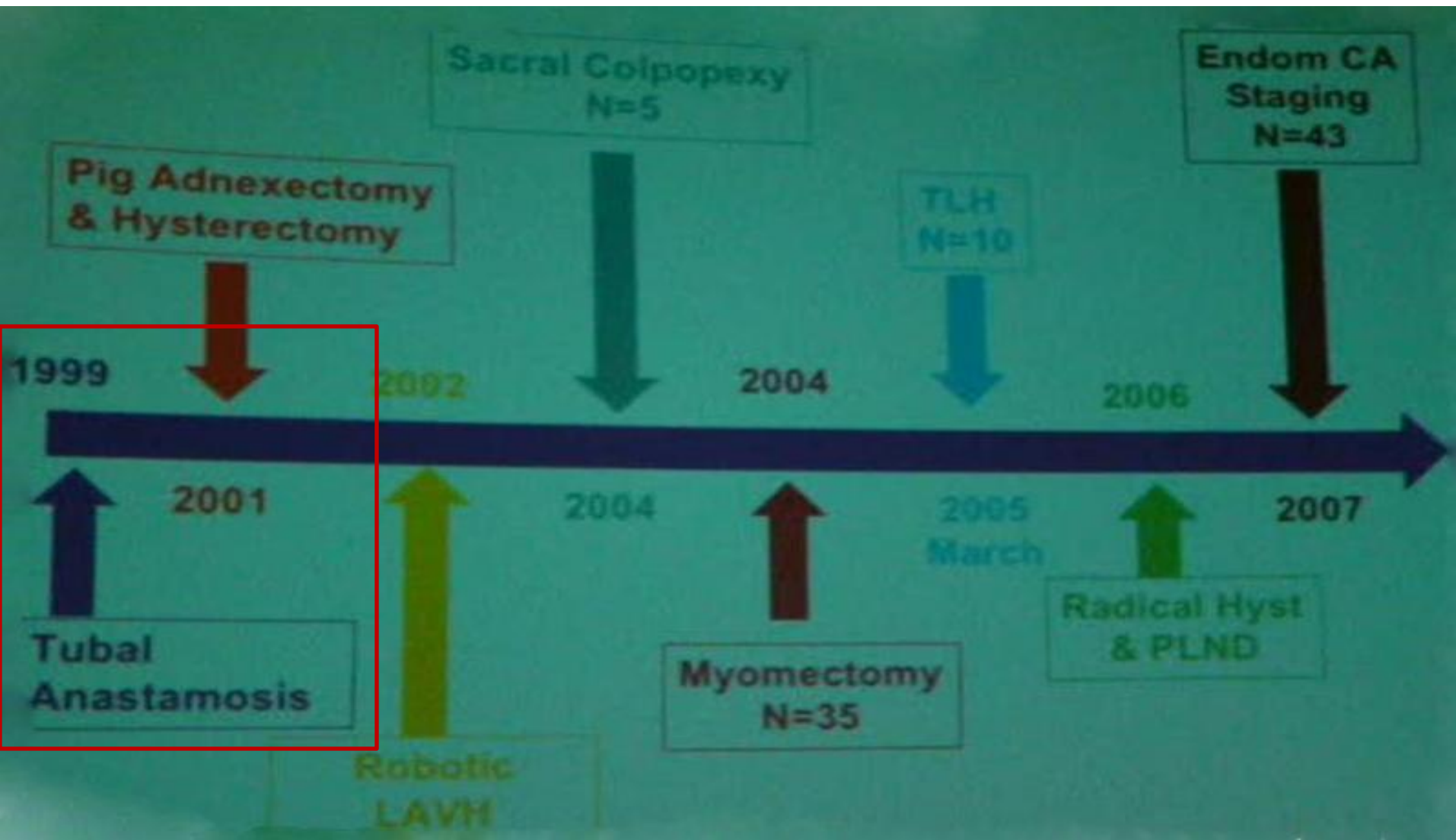


Disadvantages of laparoscopy

- Learning curve need for surgeons to take special training in performing the many operations
- Surgeons to be highly skilled in advanced laparoscopic techniques (For instance skill and experience of the surgeon for suturing)
- Working on a two-dimensional flat video display
- An unstable camera platform
- Limited degrees of instrument motion within the body
- Ergonomic difficulty

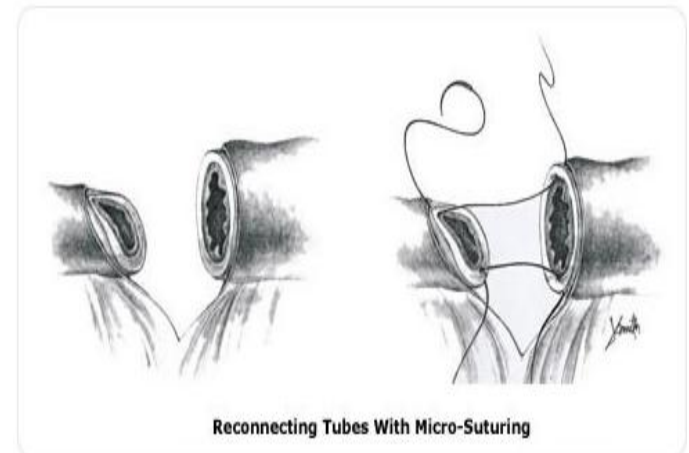
Table 2. Advantages and disadvantages of robotic surgery

Advantage	Disadvantage
Surgical system advantages	High costs
Better InSite® vision (3D)	Robotic system
Digital camera zoom	Maintenance system
Camera stability	Start up
Greater <i>df</i> (Endowrist®)	Bulky size of the robotic system
Improved dexterity	Sometimes difficult access to patient
Elimination of fulcrum effect	Separation surgeon from the operating field
Better ergonomics for surgeon	No tactile feedback
Motion scaling	Chance of breakdown
Elimination of physiological hand tremor	Use of 8 mm ports
Telesurgery possible	Monopoly of single market leader
Telementoring possible	



Surgical Technique

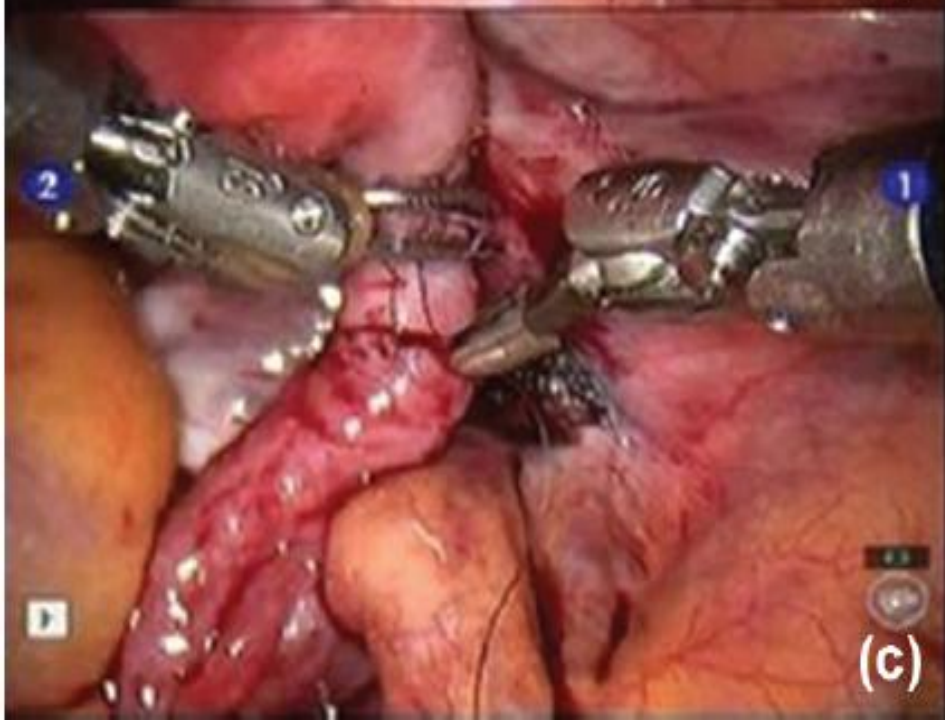
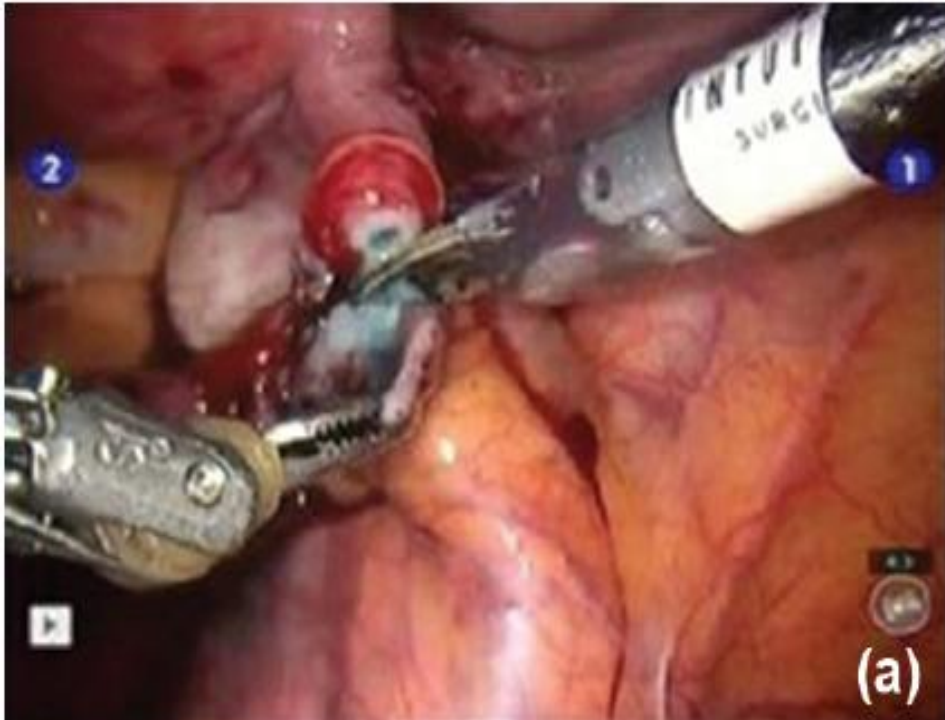
- Total excision of the occluded portions, proper alignment
- Precise apposition of each layer of the proximal and distal tubal segments
- The type of anastomosis is usually described by its site and the diameter of the tube,
 1. Ampullary-ampullary (same size)
 2. Ampullary-isthmic (different sizes)
 3. Isthmic-isthmic (same size)
 4. Isthmic-cornual



Material and Methods

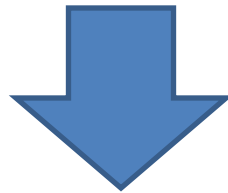
- n=42 patients
- Between March 2009 and October 2013
- A single surgeon with da Vinci S surgical system
- Evidence of normal ovulatory status and spermogram parameters
- The patency of the proximal tubal segment was checked via chromopertubation
- All cases were followed up until the outcome of pregnancy occurred.





Results

- The presence of only fimbria at the distal end with no tubal part distally
- Associated hydrosalpinx
- Cornual block
- Distal segment less than 1 cm or no fimbria



the causes for inability to perform reanastomosis

Results

Age (years)	37 (range 25-41)
Body mass index (kg/m ²)	27,7 (range 20,3 - 36,3)
Bilateral tubal reanastomosis (%)	80,9
Unilateral tubal reanastomosis (%)	19,1
Mean console time (minutes)	75,7
Mean operation time (minutes)	99,8
Conversion to laparotomy or laparoscopy (%)	0
Mean hospital stay (day)	1,8 (range 1-3)
Intraoperative/postoperative complication	None
Median follow-up (month)	33,9 (range 14 – 59)
Pregnancy (%) n=22	52,4
Ectopic pregnancy (%) n=3	13,6
Ongoing intrauterine pregnancies (%) n=3	13,6
Abortus (%) n=4	33,3
Delivery (%) n=12	54,5

Jinekolojide Robotik Asiste Laparoskopik Cerrahi

Robotic Assisted Laparoscopic Surgery in Gynecology: Review

Türkiye Klinikleri J Gynecol Obst 2010;20(3)

Dr. Ahmet GÖÇMEN,^a
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TABLO 1: Robotik asiste tubal reversal olguları.

Araştırma grubu, yılı	Hasta sayısı	Operasyon süresi (dakika)	Gebelik, ektopik gebelik
Falcone ve ark. (28) (2000)	10 robotik	159 ± 33/8	5 gebelik
Degueldre ve ark. (27) (2000)	8 robotik	140	2 gebelik
Cadiere ve ark. (33) (2001)	28 robotik	122 (108- 244)	-
Goldberg ve ark. (32) (2003)	10 robotik 15 laparoskopik	Robotik grupta 2 saat daha fazla (p<0.001)	2 grup arasında fark yok
Vlahos ve ark. (31) (2007)	5 robotik	172 ± 53	2 canlı doğum 1 ektopik gebelik 1 kimyasal gebelik
Rodgers ve ark. (29) (2007)	26 robotik 41 mini-laparotomik	229 (205- 252) 181 (154- 202)	2 grup arasında fark yok
Dharia Patel ve ark. (30) (2008)	18 robotik 10 laparotomik	201 155,3	%62.5 gebelik oranı 4 ektopik %50 gebelik oranı 1 ektopik

Robotic tubal anastomosis: surgical technique and cost effectiveness

Sejal P. Dharia Patel, M.D.,^a Michael P. Steinkampf, M.D.,^b Scott J. Whitten, M.D.,^c and Beth A. Malizia, M.D.^d

Objective: To evaluate the feasibility of robotic microsurgical tubal anastomosis and compare the results and cost effectiveness with the same procedure performed by laparotomy.

Design: Prospective cohort study.

Setting: University hospital.

Patient(s): Patients with a history of bilateral tubal ligation who desired reversal for future fertility.

Intervention(s): Tubal anastomoses through either a robotic approach or through a laparotomy.

Main Outcome Measure(s): Operative times, hospitalization, complications, postoperative patency, clinical outcomes, and the cost per live birth.

Result(s): The mean operative time for robotic anastomoses was statistically significantly greater than open anastomoses (ROBOT 201 minutes; OPEN 155.3 minutes), although hospitalization times were statistically significantly shorter (ROBOT 4 hours; OPEN 34.7 hours). The return to instrumental activities of daily living was accelerated in the patients who had undergone a robotic anastomosis (ROBOT 11.1 days; OPEN 28.1 days). Although this was a small series, the pregnancy rates were comparable between groups (ROBOT 62.5%; OPEN 50%), yet the rate of abnormal pregnancy was higher in the robotic group (ectopic: ROBOT 4, OPEN 1; spontaneous pregnancy loss: ROBOT 2, OPEN 1). The cost per delivery was similar between the groups (ROBOT \$92,488.00, OPEN \$92,205.90).

Conclusion(s): Robotically assisted laparoscopic microsurgical tubal anastomosis is feasible and cost effective with results that are comparable with the traditional open approach. (Fertil Steril® 2007; ■: ■–■. ©2007 by American Society for Reproductive Medicine.)

Key Words: Tubal anastomosis, robotic-assisted surgery, tubal surgery, cost-effectiveness

n=97
a median age of 37 years (range, 24-47 years)



- The overall pregnancy and birth rates → 71% and 62%
- 95% of patients <35 years old became pregnant
- 88% delivered at least once.
- Pregnancy and delivery rates → 75% and 66% 36 - 39 years old
50% and 43.8% 40- 42 years old
33% and 8.3% after the age of 43 years.



satisfactory birth rates after tubal reanastomosis by robot-assisted laparoscopy
in patients aged 40 years or less.

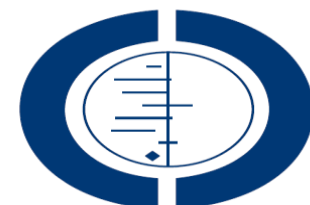
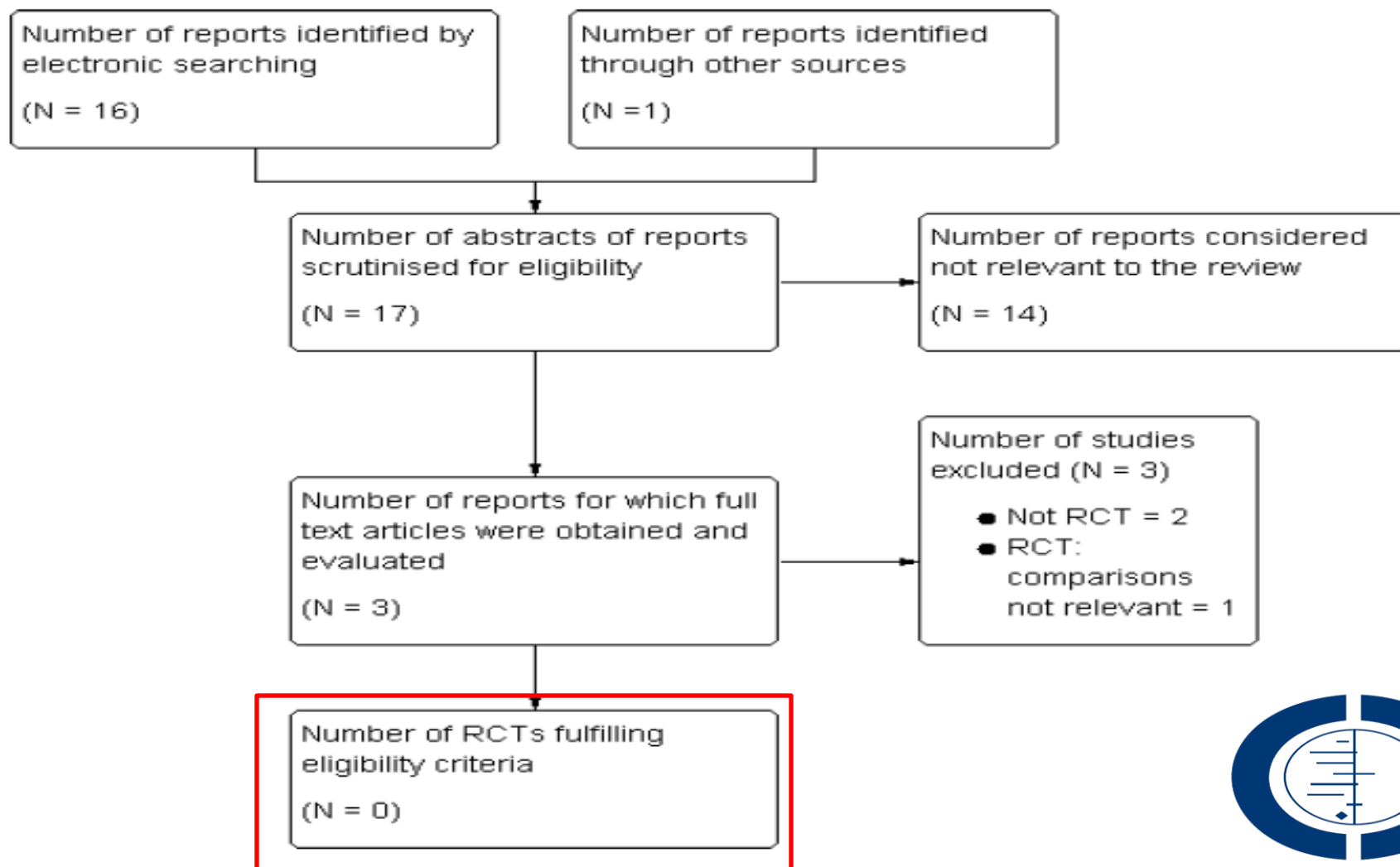
Laparoscopic tubal reanastomosis versus in vitro fertilization: cost-based decision analysis

The most cost-effective choice for a woman desiring pregnancy after tubal ligation is laparoscopic reanastomosis after a prior clip or ring tubal ligation for women ≤ 40 years old. It is also the most cost-effective for the oldest cohort, assuming IVF costs are greater than \$4500.

Minimally invasive versus open surgery for reversal of tubal sterilization (Review)

George K, Kamath MS, Tharyan P

Figure 1. Flow diagram of search process to October 2012.



Conclusion

- Robotic-assisted tubal reversal is safe and feasible.
- This procedure may facilitate minimally invasive treatment for patients who want to retain their fertility without the aid of artificial reproductive techniques.
- Further randomized controlled trials were warranted to determine if robotic surgery truly offers a benefit over other surgical techniques in terms of surgical and pregnancy outcomes.