

Female and Male Sterilisation

Advanced slide kit complementing the
WHO training tool www.fptraining.org



Female Sterilisation

Contents

Female Sterilisation

To enable teachers to understand and explain:

- Introduction
- Surgical planning
- Postpartum sterilisation
- Interval sterilisation
- Laparoscopic sterilisation
- Hysteroscopic sterilisation Essure
- Preoperative counselling
- Contraceptive failure rates
- Causes of failed sterilisation
- Potential post-sterilisation effects
- Risk of regret
- Opportunistic bilateral salpingectomy

Introduction female sterilisation

- **Definition:** permanent pregnancy prevention by occluding the fallopian tubes
- **Epidemiology**
 - 19% of all women 15-49 years worldwide
 - Latin America and the Caribbean 26%; Asia 23.4%; Europe 3.8%; Africa 1.7%
 - Female-to-male ratio 3 to 1
- **Frequency related to**
 - Age
 - Race
 - Education
 - Time of life
- **Indication:** patient's (and partner's) desire
- **Restrictions** (in many countries there are legal restrictions)
 - Age
 - Mental illness or disability

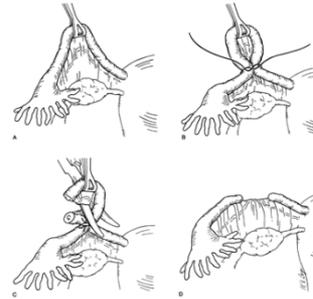
Surgical planning

- Pregnancy is key factor in determining
 - Timing
 - Surgical approach (abdominal, laparoscopic or hysteroscopic)
 - Setting (inpatient or ambulatory)
 - Tubal occlusion method
- Decision should also be based upon
 - Patient preference
 - Surgical history
 - Medical comorbidities
 - Access to services
 - Experience gynaecologist
 - Costs
 - Insurance coverage

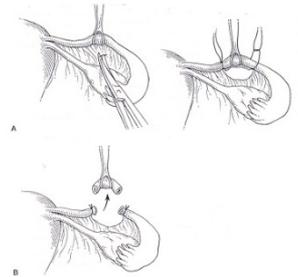
Postpartum sterilisation

- Performed at CD or within 24-48 hours after VD (minilap)
- Sterilisation desire before or during pregnancy
- In-hospital sterilisation
- Caveat obstetric and logistical problems
- Not recommended
 - Filshie clips (failures 0%-8.4%)
 - Distal fimbriectomy (higher failure rates)
 - Complete salpingectomy after VD (increased bleeding rate)

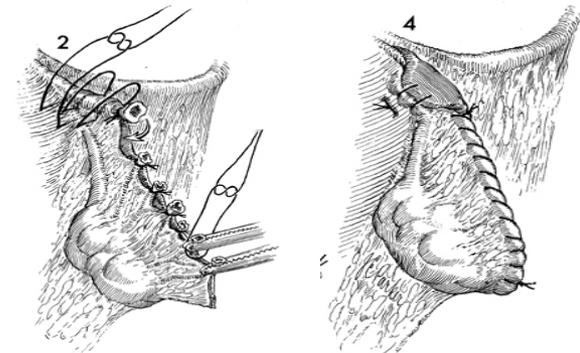
Pomeroy



Parkland



Complete salpingectomy



Interval sterilisation

- **Definition:**
 - Sterilisation outside postpartum period (6 weeks after birth)
- Laparoscopy (outpatient procedure)
- Hysteroscopy (outpatient procedure)
- (Mini)laparotomy
- Hysterectomy
 - If there are other indications such as abnormal bleeding, pelvic pain, or pelvic organ prolapse
- **Interval vs. postpartum sterilisation**
 - Woman's preference
 - Provision and availability
 - Efficacy comparable
 - Major morbidities lower (0.10% vs 0.39%)
 - Minor morbidities lower (0.26% vs 0.82%)

Laparoscopic tubal ligation (1)



- Preferred techniques
 - **Bipolar electrocoagulation** → reusable instrumentation, lower cost, more ectopics
 - **Titanium Filshie clip** → increased potential for reversibility, not in case of tubal disease, low risk mesosalpingeal injury; less post-procedural pain
 - **Silicone Falope ring** → increased potential for reversibility, not in case of tubal disease
 - **Complete salpingectomy** → technically more difficult, increased risk of complications, increased operation time
- To be avoided
 - **Proximal isthmus** → fistula formation
 - **Distal portion** → injuring adjacent structures
 - **Fimbriectomy** → sterilisation failure

Laparoscopic tubal ligation (2)

- **Advantages**

- Successful at first attempt 99%
- Immediately effective: no need for additional contraception or confirmative imaging
- Procedure possible at time evacuation for abortion
- Successful reversal
- Subsequent procedures possible

- **Immediate complications**

- Bleeding tube or mesosalpinx (clip 0.2% vs ring 2.5%)
- Injury to nearby structures (infundibulopelvic ligament)
- Conversion to laparotomy (0.15%)
- Postoperative pain (ring > electrosurgery, decrease with topical 0.5% bupivacain)

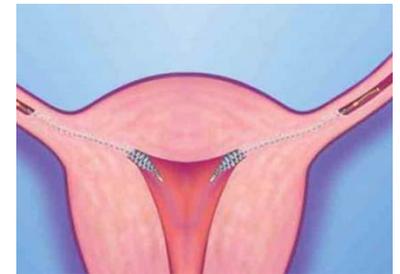
- **Delayed complications**

- Ectopic pregnancy (at 10 years after sterilisation)
 - Bipolar 17.1/1000 procedures
 - Titanium clip 2.0/1000 procedures
 - Postpartum partial salpingectomy 1.5/1000 procedures
- Device migration or expulsion of Filshie clip and Falope ring

Hysteroscopic sterilisation Essure

Compared with laparoscopic sterilisation at 2 years

- Pregnancy rate higher (2.4% vs. 2.0%) or similar (1.8% after HSG)
- Less pregnancies ectopic (1.3% vs. 3.9%)
- More menstrual dysfunction (26.8% vs. 22.3%)
- More hysteroscopic surgeries (13.8% vs. 6.4%)
- Less pelvic pain (21.0% vs. 25.6%)
- Fewer intra-abdominal gynecologic surgeries (7.7% vs. 8.1%)



Preoperative counselling couple

- Full range of contraceptive options (male contraception, LARCs)
- Risks and benefits different procedures
- Efficacy and costs
- Permanent sterility
 - Reversal options limited, IVF
- Medical history
 - Increased surgical or anaesthetic risk
 - Comorbidities (including chronic pain syndrome)
- Patient's capacity for decision-making

Contraceptive failure rates (1)

Method	% of women experiencing an unintended pregnancy within first year of use	
	Typical use	Perfect use
No method	85	85
Spermicides	28	18
Condom male	18	2
Diaphragm	12	6
Combined pill	9	0.3
Evra Patch	9	0.3
NuvaRing	9	0.3
Progestin –only pill	9	0.3
Depo-Provera	6	0.2
Implanon	0.05	0.05
IUD Copper T380Ag*	0.3	0.3
IUD Mirena (LNG)*	0.2	0.2
Female sterilisation	0.5	0.5
Male sterilisation	0.15	0.1

*Source I.Sivin, Contraception 1990,; Vol.42NO 4.; adapted from Trussel Contraception 2011

Contraceptive failure rates in 10 years

Occlusion method	Failure rates per 1000 women
Postpartum partial salpingectomy ¹	7.5 (2.7– 12.3)
Interval partial salpingectomy ¹	20.1
Bipolar electrocautery ¹	24.8 (16.2 – 33.3)
Falope ring ¹	17.7 (10.1 – 25.3)
Bipolar coagulation ¹¹	30
Silicone rubber band application ¹¹	24
Hysteroscopic sterilisation ¹¹	96
Filshie clip ⁸	6.0 (12-24 months) to 22.3 (17 years)

Causes of failed sterilisation

- Luteal phase pregnancy at time of sterilisation (0.23%-1.7%)
- Wrong structure occluded or resected
- Incomplete tubal occlusion from a defective device, improper positioning, or incomplete desiccation
- Tuboperitoneal fistula formation and spontaneous recanalization of the tubal lumen

Potential post-sterilisation effects

- **Menstrual function**
 - Decreased flow, duration and pain, more irregularity
- **Ovarian reserve**
 - Not affected (no earlier onset of menopause)
- **Persistent pelvic pain**
 - Increased after Essure (n=458; 8.1% <3 weeks; 4.2% >3 months)
 - 6-fold increase in women with any kind of chronic pain syndrome
- **Sexual function**
 - Unchanged or improved (unless sterilisation regret)
- **Hysterectomy**
 - Increased (women more likely to seek surgery for treatment)
 - Due to patient's preference?
- **Breast cancer**
 - Not increased
- **Ovarian and endometrial cancer**
 - Decreased

Risk of regret to be sterilised (1)

- Request for reversal 1%-4%
- Age is strongest predictor for
 - Sterilisation regret
 - Seeking information about sterilisation reversal
 - Obtaining a reversal
 - Undergoing a post-sterilisation IVF procedure

Age at sterilisation	Cumulative 14-year probability of requesting reversal	Likelihood of obtaining reversal	Probability of ongoing pregnancy after tubal reversal
18-24 years	40.4%	2.1%	63%
25-30 years	15.6%		
31-35 years	8.2%	0.2%	
>35 years	4.4%		44% (35y-40y); 5% (>40y)

Risk of regret to be sterilised (2)

- Significant predictors (adjusted risk ratio + 95% CI)
 - Non-white race: 1.3 (1.1-1.5)
 - Being unmarried: 1.3 (1.1-1.6)
 - Postpartum sterilisation: 1.6 (1.2-2.1) after VB; 2.0 (1.5-2.8) after CD
 - Shorter interval sterilisation - youngest child: 1.4 (1.1-1.8)
 - National insurance status: 1.8 (1.4-2.3)
- Inconsistent predictors
 - Conflict about decision
 - Low socioeconomic status
 - Low education
 - Low labor force
 - Rural area
- No predictors
 - Parity, including nulliparity
 - Postabortion sterilisation

Opportunistic bilateral salpingectomy (1)

- Removal of the entire fallopian tube
 - For primary prevention of epithelial carcinoma of the fallopian tube, ovary, or peritoneum
- Rationale: tubal neoplasia is the primary lesion in high-grade serous pelvic carcinomas
 1. Tubal ligation is associated with a decrease in ovarian cancer risk in
 - average risk women (HR 0.76, 95% CI 0.64-0.90)
 - high risk women (OR 0.81, 95% CI 0.74-0.89)
 2. Ovarian cancer risk BRCA1 = 40%-60%, BRCA2 = 20%-30%. Bilateral salpingo-oophorectomy in these women revealed:
 - Risk reduction >80%
 - Occult tubal carcinomas and preinvasive lesions 5%-15%
 - No (pre)malignant lesions in ovaries
 3. Tubal involvement in ovarian carcinoma 75%
 4. Pre-invasive lesions found in tubes of healthy women

Bilateral salpingectomy vs. ligation

- **Counselling:**
 - Increased effectiveness; reduced risk subsequent surgery (ectopic, hydrosalpinx)
 - Reduced ovarian cancer risk (42% to 78% vs 13% to 41%)
 - Increased operative time (<20 minutes)
 - Increased risk in women with significant pelvic adhesions, endometriosis, or abnormal anatomy
 - No reversal possible
 - No differences in surgical complication rates
 - No differences in ovarian reserve
 - May be cost-effective



Male Sterilisation

Contents

male sterilisation

To enable teachers to understand and explain:

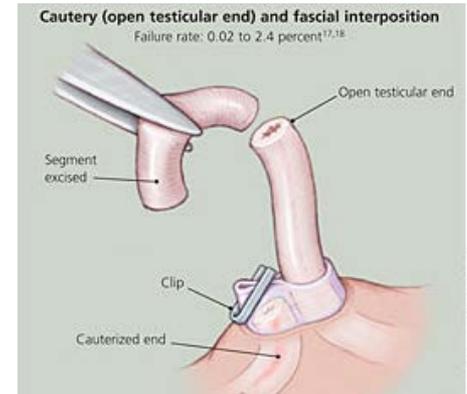
- Introduction
- Procedures and techniques
- Postoperative care
- Confirmation of sterility
- Contraceptive failure rates
- Contraindications
- Complications
- Associated morbidity concerns
- Counselling
- Vasectomy reversal
- Summary

Introduction

- Most effective mode of male contraception
- Interruption or occlusion of the vas deferens
- Can be performed by urologists, GPs and general surgeons
- Outpatient setting
- Local anaesthesia
- Safer, less costly, shorter recovery time than tubal ligation
- Lower acceptance due to misperceptions?
- Not immediately effective

Procedures and techniques

- Vasal transection
 - Conventional vasectomy
 - No-scalpel vasectomy
 - Segment of 1-1,5 cm vas removed
 - Managing the vasal ends
 - Intraluminal fulguration prostatic end 1,5 cm
 - Fascial interposition
 - Testicular end open
 - Ligatures or clips should be avoided



Postoperative care

- Actual pain lower than anticipated pain
- Scrotal support (tight underpants) 48 hours
- Ice pack intermittently
- Acetaminophen (paracetamol) or ibuprofen
- Instructions
 - What is common: mild pain, swelling, bruising
 - When to call?: increasing pain, bleeding, fever, significant swelling
 - Activity: quiet 24 hours
 - Sexual activity: avoided one week
 - Alternate method contraception till azoospermia is confirmed

Confirmation of sterility

- The time to achieve azoospermia declines with increasing number of ejaculations
- Generally after three months or 20 ejaculations
- Single sample
- Follow-up test 1-2 months later
- Non-motile sperm, clinically insignificant?
 - Low sperm count ($<10,000/\text{ml}$)
 - All sperm immotile
 - ≥ 7 months after vasectomy
 - ≥ 24 ejaculations

Contraceptive failure rates

Method	% of women experiencing an unintended pregnancy within first year of use	
	Typical use	Perfect use
No method	85	85
Spermicides	28	18
Condom male	18	2
Diaphragm	12	6
Combined pill	9	0.3
Evra Patch	9	0.3
NuvaRing	9	0.3
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Implanon	0.05	0.05
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Contraindications

- Coagulation disorders
- Local anatomic abnormality
 - Previous scrotal injury
 - Varicocele
 - Hydrocele
 - Scrotal mass
 - Cryptorchidism
 - Inguinal hernia
- Scrotal haematoma
- Genitourinary or groin or systemic infection
- Sperm granuloma

Complications

- Safest method of permanent sterilisation
 - Mortality 0.5/100,000
 - Major complications 1 in 1250
 - Minor complications 1–6%
- Haematoma (non-scalpel 0.1–2.1% vs incision 0.3–10.7%)
- Infection (non-scalpel 0.2–0.9% vs incision 1.3–4.0%)
- Sperm granuloma
- Persistent post-vasectomy pain (2–15%)
 - Chronic congestive epididymitis
 - Sperm granuloma
 - Nerve entrapment
 - Therapy: NSAIDs, warm baths, local nerve blocks, granuloma excision, micro-denervation spermatic cord, vasectomy reversal, complete epididymectomy
- Vasectomy failure (technical errors, techniques used, recanalisation 0.2%, unprotected intercourse)

Associated morbidity concerns

- Cardiovascular disease: no increased risk
- Prostate cancer (Systematic review and meta-analysis 2017)
 - 16 cohort studies, 33 case-control studies, 4 cross-sectional studies
 - No association between vasectomy and high-grade, advanced-stage, or fatal prostate cancer
 - Weak association between vasectomy and any prostate cancer which is unlikely to be causal but likely related to increased detection based on patterns of care
 - Findings confirmed in European EPIC study (2017) and the US CPS-II study (2016)
- Testicular cancer: no increased risk

Associated morbidity concerns

- Immune dysfunction
 - Anti-sperm antibodies in 60–80%
 - No increased risk of lupus erythematosus, scleroderma, rheumatoid arthritis, etc.
- Kidney stones:
 - ≤45 years: twofold risk (RR 1.9, 95% CI 1.2–3.1)
 - >45 years: no increased risk
- Sexual life
 - No perceptible changes to the ejaculate volume
 - No changes in sexual function, erections, orgasm or libido
 - No more prevalent sexual problems
 - No decreased sexual frequency
 - Improved sexual satisfaction of couples

Counselling

- The clinician should be informed about:
 - Contraception method used
 - Social/family status
- The patient should be informed about:
 - Nature of procedure
 - Risks and benefits
 - Failure rates
 - Permanent sterility
 - Alternatives
 - Interim contraception
 - Semen analysis to confirm sterility
 - Condoms for STI protection

Vasectomy reversal

- Strongest predictive factor
 - Unstable relationship
- Less likely to be predictive:
 - Men without children
 - Men older than 30 years
- Not predictive
 - Religion
 - Number of marriages
 - Occupation
- Microsurgical procedure
- Successful in 50–70%, depending on:
 - Method of vasectomy (open testicular end preferred)
 - Duration of obstruction
 - <3 years: patency rates >95%, pregnancy rate 75%
 - >15 years: patency rates 71%, pregnancy rate 30%
 - Agglutinating and immobilising antisperm antibodies

Summary female sterilisation

- Pregnancy is key factor in determining timing, surgical approach and occlusion method
- Interval sterilisation can be performed by laparoscopy and minilaparotomy
- Unwanted pregnancy after sterilisation occurs in around 2% of women
- 1 in 3 unwanted pregnancies after sterilisation is ectopic
- Laparoscopic sterilisation is immediately effective, can be done at time evacuation for abortion, and is mostly reversible, but needs general anaesthesia
- Bilateral salpingectomy should be discussed if tubal ligation is being considered
- Young age is most important factor of sterilisation regret

Summary Male Sterilisation

- Vasectomy is the safest and most cost-effective method of permanent contraception
- It can easily be performed in an outpatient setting under local anaesthesia
- There are only few contraindications and few complications
- There is no increased risk of cardiovascular disease, prostate cancer or testicular cancer
- There is no relationship with changes in sexual function, erections, orgasm, or libido
- Nonetheless, worldwide, vasectomy is performed three times less than tubal ligation
- Therefore, more counselling efforts must be made by caregivers to clear persistent misperceptions of the vasectomy procedure and its side effects