Early Pregnancy Cerclage – vaginal or abdominal?

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- Setting the scene
- Early pregnancy figures in UK
- Trends and shifts
- Care provision
- New horizons

UK Figures (2008)

- 700,000 births per annum in UK
- 200,000 terminations
- >250,000 miscarriages
- 15,000 ectopic pregnancies

- Reference: CEMACH report, 2008, RCOG Press, London

Trends and Shifts

- Increasing average maternal age
- Increasing demand for all EP events
- Increasing knowledge about early pregnancy events (17,500,000 entries on Google)
- Patient Choice an important driver for management and shared decision making based on evidence based practice

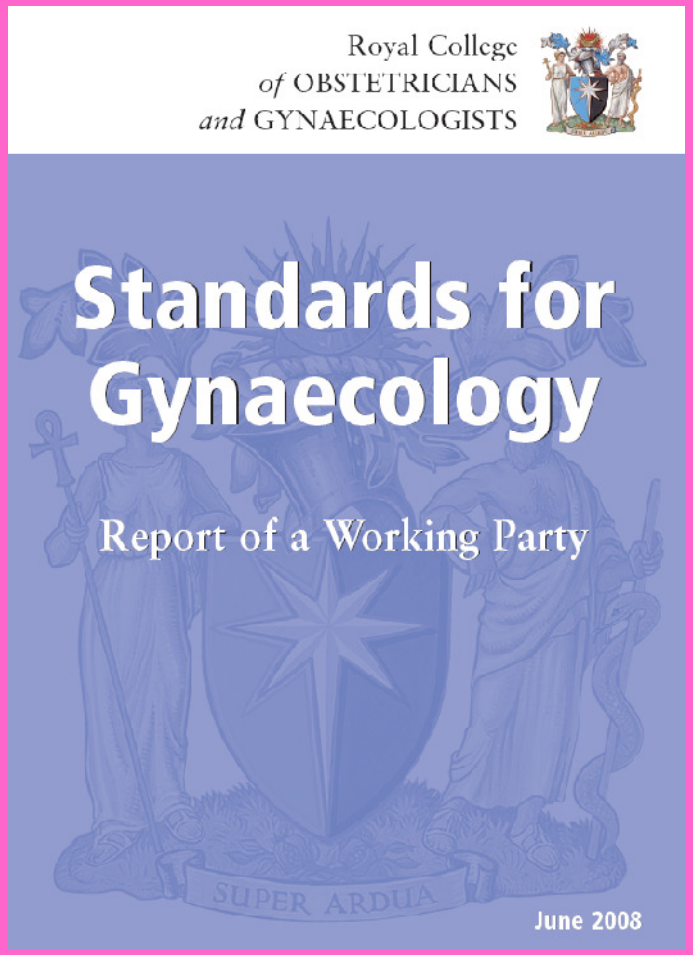
Standards in Early Pregnancy + Ectopic Pregnancy + Recurring Miscarriage

AEPU/RCOG Joint Document (2007)
RCOG Standards in Gynaecology (2008)

AEPU Roy Farquharson, Chair, Association of Early Pregnancy Units
Lesley Regan, Hon President, AEPU

Website: earlypregnancy.org.uk rcog.org.uk/standards

June 2008



2 EARLY PREGNANCY LOSS

3. ECTOPIC PREGNANCY

4. RECURRING MISCARRIAG

Standard	CORE	Aspirational
Patient Information	Designated Reception Area Universal use of clear, understandable terminology by all staff	Dedicated staff constantly at reception desk to provide greeting, obtain patient details and explain structure and triage function of EPU
Patient Choice In Management	Education of patient relevant to diagnosis and management Open explanation of expectant, medical and surgical options	Dedicated phone line for patient queries and electronic access to protocols from outside unit
Dedicated Quiet Room	Room for breaking bad news away from work area	Single-use room only with soft furnishing and absence of medical equipment
Availability of Service	5 day opening during office hours	7/24 opening and service provision with full staffing and daily scan support
Competence of Scanning	Recognised ultrasound training and preceptor assessment and validation (RCOG/BMUS) Register of staff competent at scanning	Lead Clinician Presence of RCOG/BMUS trainer in EPU Annual assessment of audited activity
Blood HCG level measurement	Laboratory access to blood HCG measurement and result within 48 hours of sampling	Same day sampling and result with electronic result link to laboratory
Written Information Leaflets	Visible open access to written information leaflets in EPU	Online external access to PIL
Acknowledgment of Privacy and Dignity	To provide individualised patient support and acknowledge confidentiality	Place one to one care as best practice at all times
Bereavement Counselling	All staff trained in emotional aspects of early pregnancy loss To enable access to counselling and provide immediate support	To provide all emotional and psychological counselling requirements within EPU and supported by dedicated staff and related agencies
Site of EPU	Geographically separate from all maternity areas	Own EPU entrance/exit

What does an Early Pregnancy Clinic/Unit do?

- All early pregnancy problems are seen by a multidisciplinary team in a dedicated area with easy patient access and privacy (for breaking bad news) plus good quality scan service and laboratory backup (HCG result computer link)
- Adapted (MEWS-based) Triage Assessment on presentation (~ 1-2% score>4)
- Diagnosis & surveillance of PUL/PUV/ectopic
- Treatment & Surveillance of EP loss, ectopic failed PUL/molar pregnancy/hyperemesis
- Initiation of Management Plan for Medical/Surgical/Expectant protocols & options

Inherited Thrombophilia Tests
UK National EPU Survey 2008

(Norrie et al, Brit J Haem, 2009, 144, 241-4)

- 70% response rate (115/164 EPU's) in UK
- Heritable Thrombophilias (eg FVL, Prot C, S) tested for late miscarriage (80%), recurrent miscarriage (76%) and placental abruption (88%)
- Highly variable range of tests between EPU's which frequently led to heparin/aspirin administration in next pregnancy
- Evidence based practice for testing and intervention inconsistent across UK

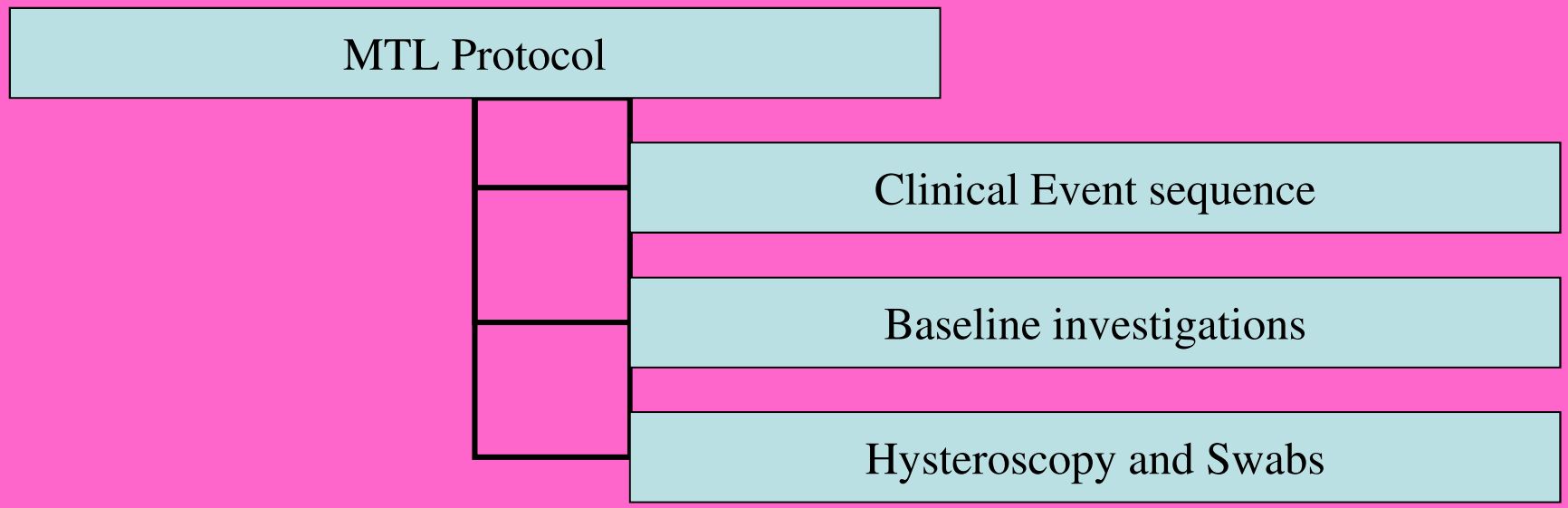
Opportunityisnowhere

Historical Perspective (Cervical Weakness)

- Described in 1658 by Grant:

"*the orifice of the womb is so slack that it cannot rightly contract itself to keep in the seed; which is chiefly caused by abortion or hard labour and childbirth, whereby the fibres of the womb are broken in pieces from one another and they, and the inner orifice of the womb overmuch slackened.*"

First Presentation with Midtrimester Loss (MTL)
~2% risk between 12 to 24 weeks gestation



Event Sequence with Main Cause

EVENT versus CAUSE	CERVIX	LIQUOR PV	FETAL HEART ACTION
Cervical Weakness	OPEN	Absent until expulsion of sac	Present
Maternal Thrombophilia Eg APS	Closed	Absent	ABSENT (Intrauterine death)
Bacterial Vaginosis	Closed	PRESENT	Present ?until sac expulsion

Investigation Protocols for MTL

- Non-uniform
- Inconsistent
- Restricted testing of important variables and causative factors
- Small cohort analysis & description
- Randomised trials - rare

Investigation Protocols for Published Vaginal or Abdominal Cerclage Studies

First Author & Year of Publication	***Number of Patients Vaginal (TVS) or Abdominal (TAC)***	***Hysterscopy before pregnancy***	***Antiphospholipid Syndrome (APS) Testing***	***Bacterial Vaginosis (BV) or Infection Screening***	***TVU of CLM +/- Funnelling surveillance***	
Davis et al (2000)	40 TAC	4 Mullerian Anomalies	NO	NO	NO	Failed TVS Cerclage
Rust et al (2000)	61 RCT of TVS v. TLC	NO	YES	BV & AF Sample	Inclusion Criteria at 16-24/40	Previous PTD
Althuisius et al (2000)	67 RCT of TVS v. TLC	No	No	Yes	Inclusion criteria	Previous PTD
Gibb et al, (1998)	50 TAC	No	No	Yes	No	Failed TVS Absent Cx
Occlusion 2005	TVS +/- occlusion	No	No	No	Yes	Prev MTL Intact Cx
Farquharson et al (2005)	40 TAC	Yes	Yes	Yes	Yes	Failed TVS cerclage

Standardised Investigation Protocol

- Consecutive cases of second trimester loss
- Continuous Care provision by same team at one hospital (Liverpool Women's Hospital)
- Uniform application of standardised investigation pathway
- Management plan constructed after full investigation prepregnancy

- References: Farquharson et al, Transabdominal cerclage: the significance of dual pathology and increased preterm delivery, BJOG, 2005, 112, 1424-26
- Farquharson RG. The incompetent cervix (chapter 14) in The Cervix, Second edition, 2006, Editors Jordan and Singer, Blackwell Publishing, p194-205

Midtrimester Loss Investigations

- Antiphospholipid Syndrome

  (APS testing & Bone mineral density prepregnancy)
- Significant Thrombophilia

  (inherited or acquired APCR, Protein C/S deficiency)
- Bacterial Vaginosis
- Thyroid Function
- Cervical assessment and Hysteroscopy

- Dual Pathology found in 10% of **ALL** MTL cases

What's Missing?

- Reproducible and accurate assessment of internal os integrity
- Preconceptual and T1 testing for APS & BV
- Accurate prediction of efficacy for vaginal suture insertion and next treatment intervention if vaginal cerclage fails
- Considered, informed **prepregnancy** counselling before Transabdominal Cerclage insertion following appropriate investigation and full risk disclosure

Bacterial Vaginosis

- Imbalance in type and number of vaginal bacterial population eg.anaerobes, clue cells with a14% prevalence in antenatal group (Oakeshott, 2002, BMJ)
- effective eradication/suppression proven by RCT's in pregnancy (Okun et al, , O&G, 2005, 105, 857-68 Systematic Review)
- Clindamycin RCT given for 5 days at 12-16 weeks **reduces** MTL (RR 0.20, 95% CI 0.04-0.89 (Ugwumadu et al, Lancet, 2003)
- Clindamycin PV / Erythromycin PO from10 to 32 weeks - what is the value? ORACLE 2, Lancet,2008: Cochrane Database Syst Rev. 2007 Jan 24;(1):CD000262.

MISCARRIAGE CLINIC:List of Investigations 1995-2009

ALL NEW PATIENTS

- Thrombophilia Screen: Antiphospholipid Syndrome (DRVVT,ACA IgG/IgM) ;Activated Protein C resistance (APCR/APCRV (acquired), Factor V Leiden (inherited): Protein C/S level
- Autoimmune screen (ANA/dsDNA/ENA:RO,La/SMA
- ABO grouping: RH grouping/ Antibody
- Hb: WCC & platelets
- FSH/LH/E2/Test/Prog/PRL/Thyroid Function tests+/- Thyroid Peroxidase
- Viral screen CMV/Rubella/TXP/Parvo
- Random blood sugar
- BONE MINERAL DENSITY preconceptual and/or ULTRASOUND

MID TRIMESTER LOSS → DAY CASE HYSTEROSCOPY +

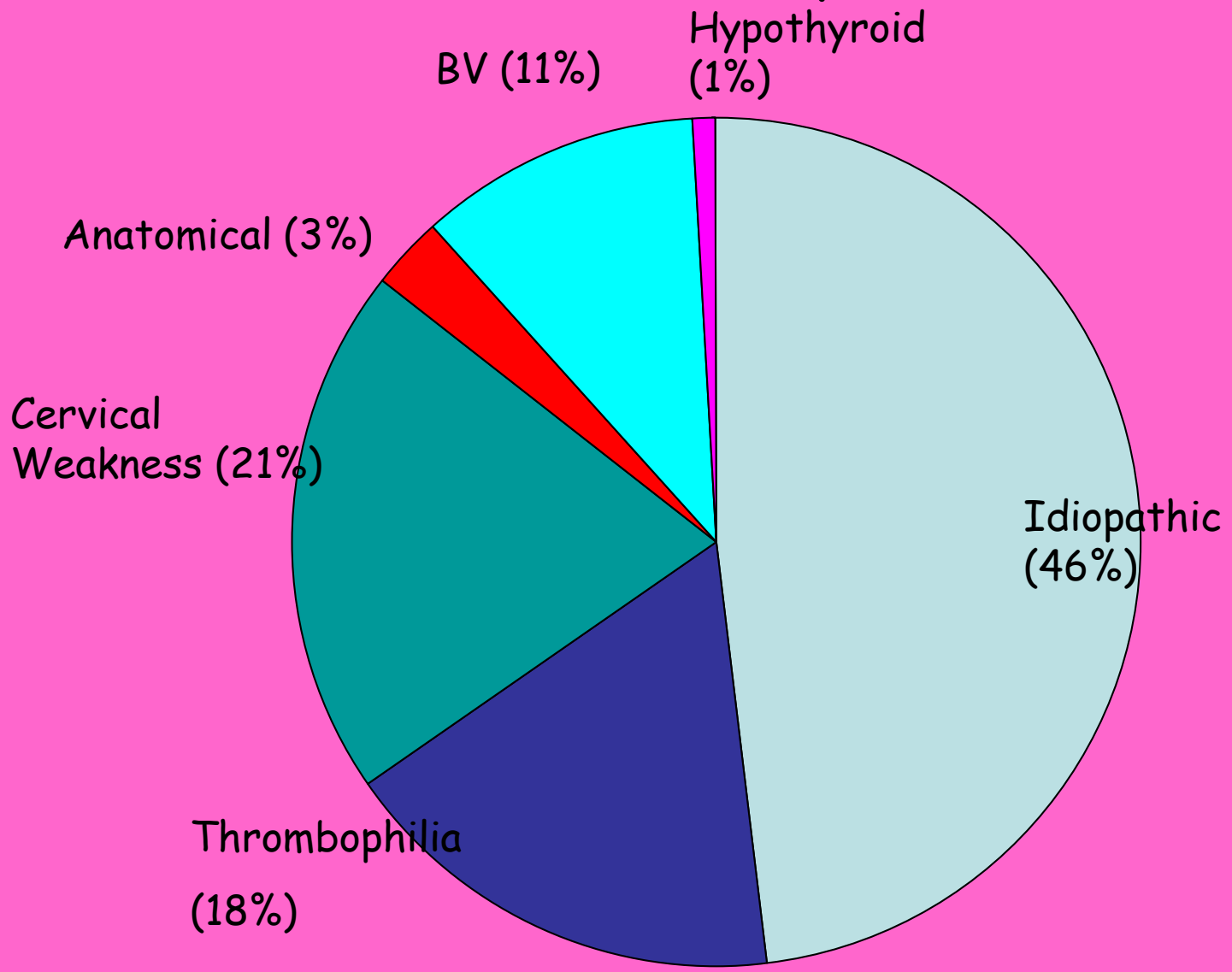
SWABS X2 preconceptual and T1

BACTERIAL VAGINOSIS

PREGNANCY LOSS CHROMOSOMES KARYOTYPED (by CGH)

MidTrimester Loss (1995-2005)

(n=451 consecutive cases at Liverpool Women's)



Next Pregnancy Outcome LWH (n=351, 1995-2003)

- 90 (25%) women did not become pregnant again (Brigham et al, 1999, Hum Rep, 14, 2868-71)
- of 261 MTL cases, 58 cases miscarried (30 in T1=12%) and 28 in T2 =11%).
- of 203 deliveries, 41 (20%) delivered before 34 weeks and 56 (28%) before 37 weeks
- rate of PET (3%), IUGR (3%), Abruption (2.5%) and SB (1case)

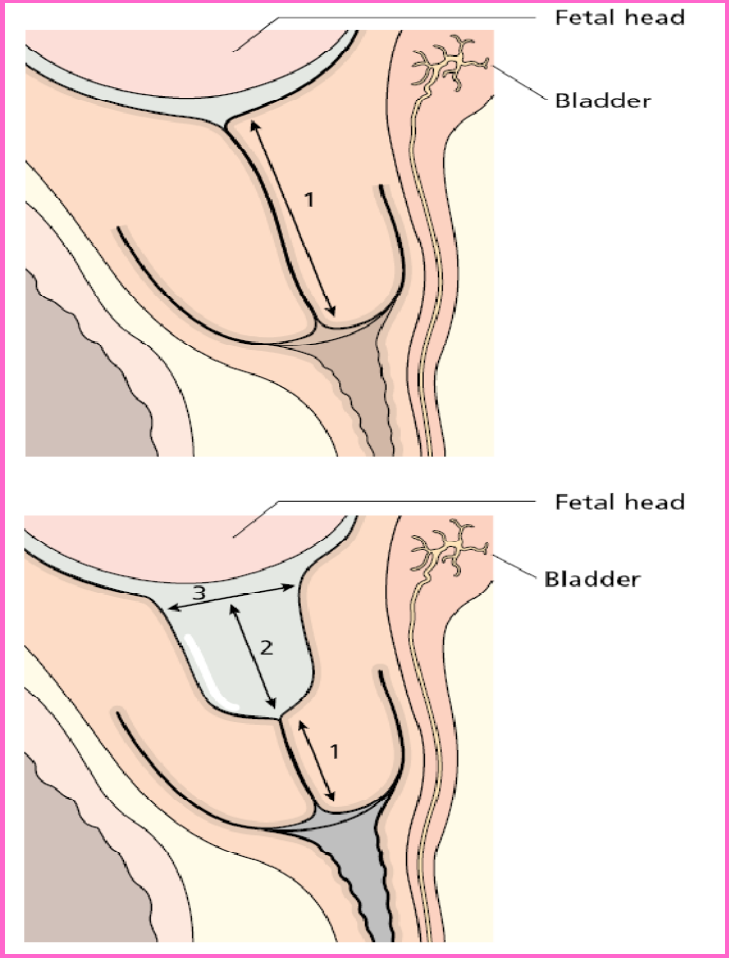
Cervical Assessment Process

- Clinical History and **Time Order of Events** vital in assessment eg. silent dilatation of Cx first or primary SROM (+/- evidence of infection).
- Preconceptual Hysteroscopy to exclude anomaly (CUA), synechiae or denuded endometrium, integrity of internal cervical os and length
- Swab for BV and repeat in T1
- Ultrasound measurement of cervical length (TVU of CLM) at 16, 20 and 24 weeks (T2)

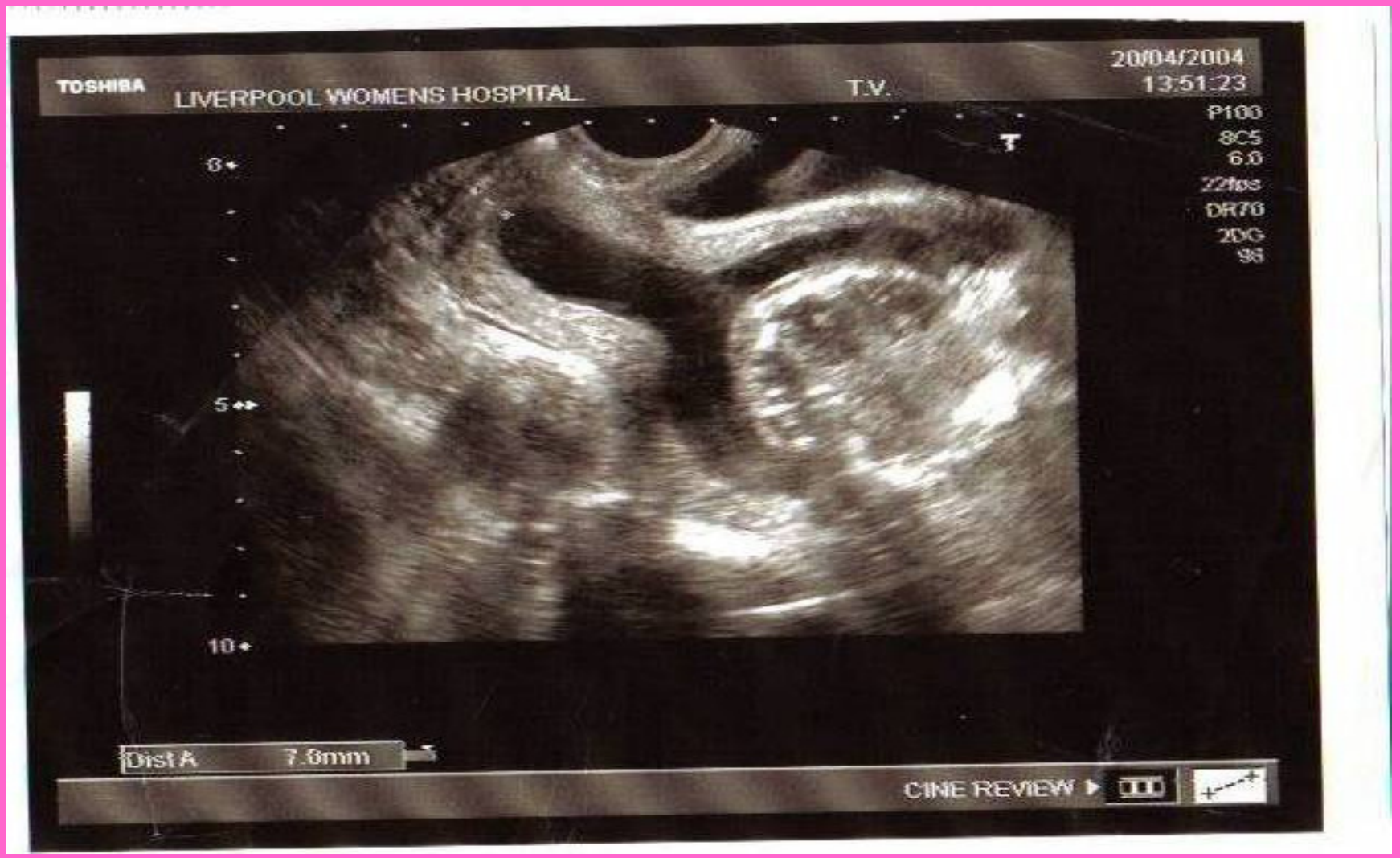
Cervical Length Measurement (CLM) and Funnelling

- Normal CLM circa 50mm

- Funnelling often appears after 16 weeks



TVU of Open Cervix at 16 weeks

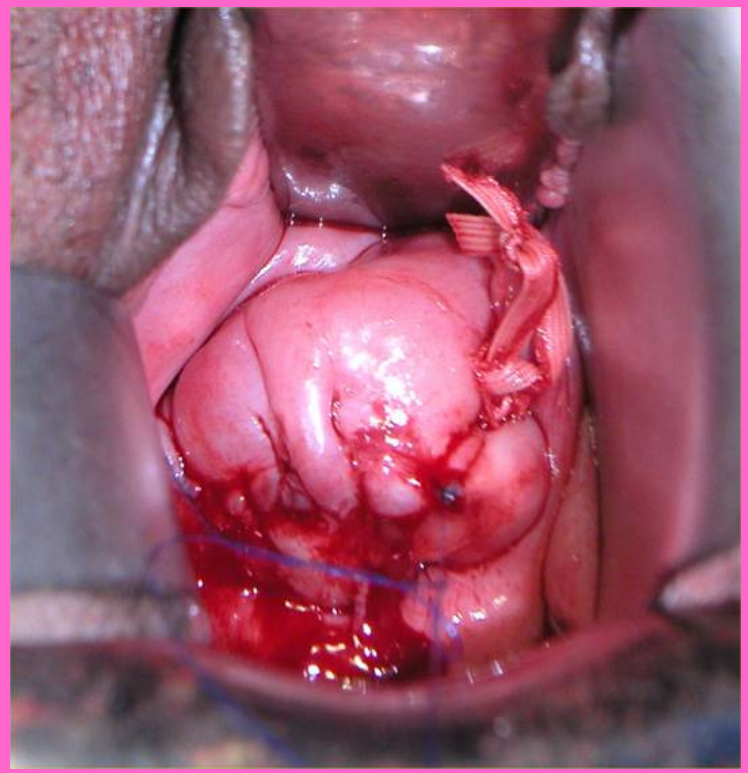


Vaginal Cerclage

- CIPRACT RCT: cerclage v. bed rest (Althuisius, AmJOG, 2001)
- Prophylactic cerclage or Serial TVU of CLM (Berghella et al, AmJOG, 2002)
- Cochrane (Issue 1) review (Drakeley et al, O&G, 2003)
- Abdominal versus vaginal cerclage: systematic review (Zaveri, AmJOG, 2002)
- Cerclage and cervical insufficiency: an evidence based analysis (Harger, O&G, 2002)
- Occlusion RCT (2005)

Occlusion Trial

- Retaining the mucus plug by second suture
- Primary McDonald suture higher around ectocervix
- RCT of primary +/- second suture
- Multicentre international trial



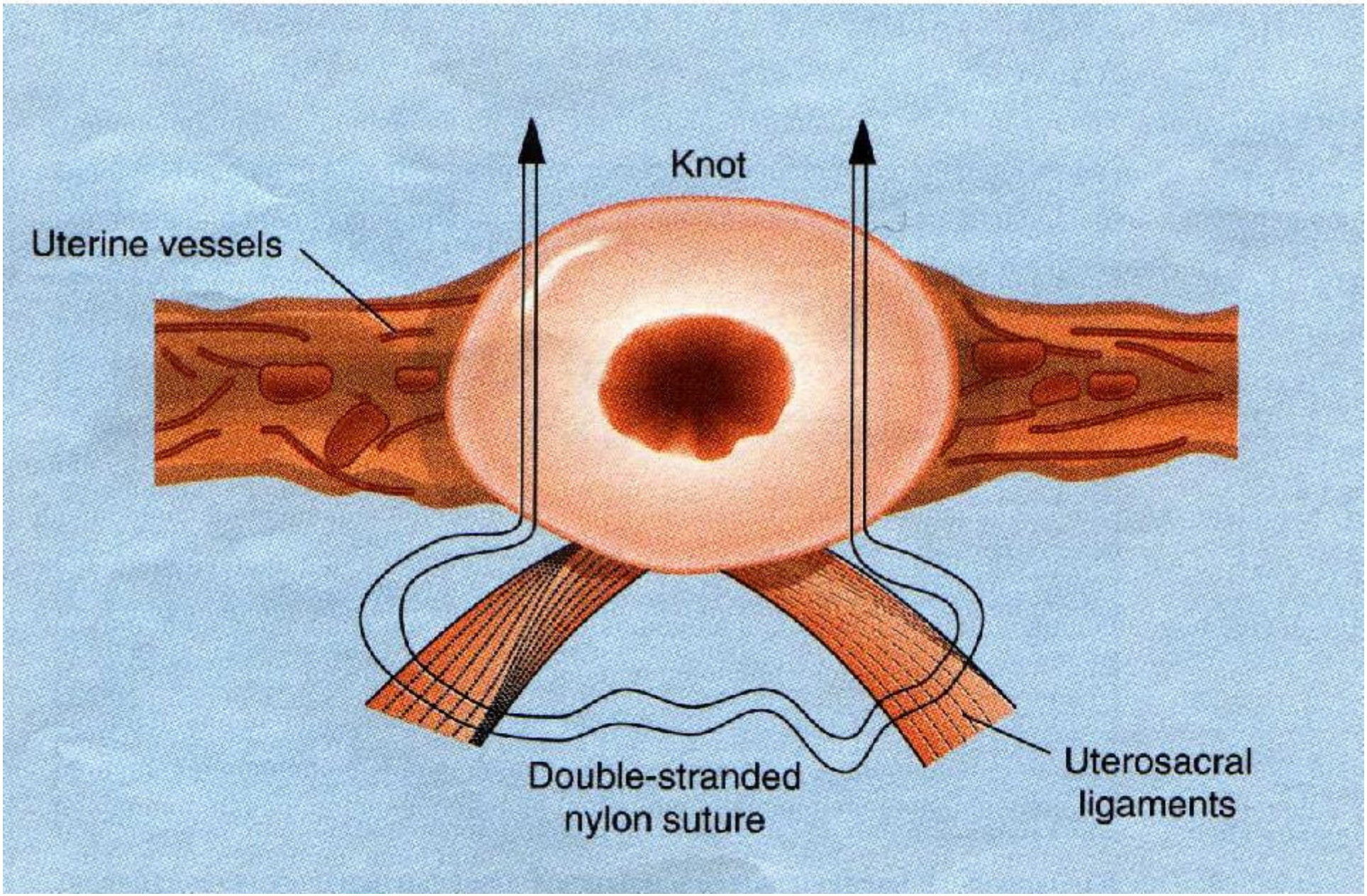
Elective Vaginal Suture (LWH 2001-08)

OUTCOME

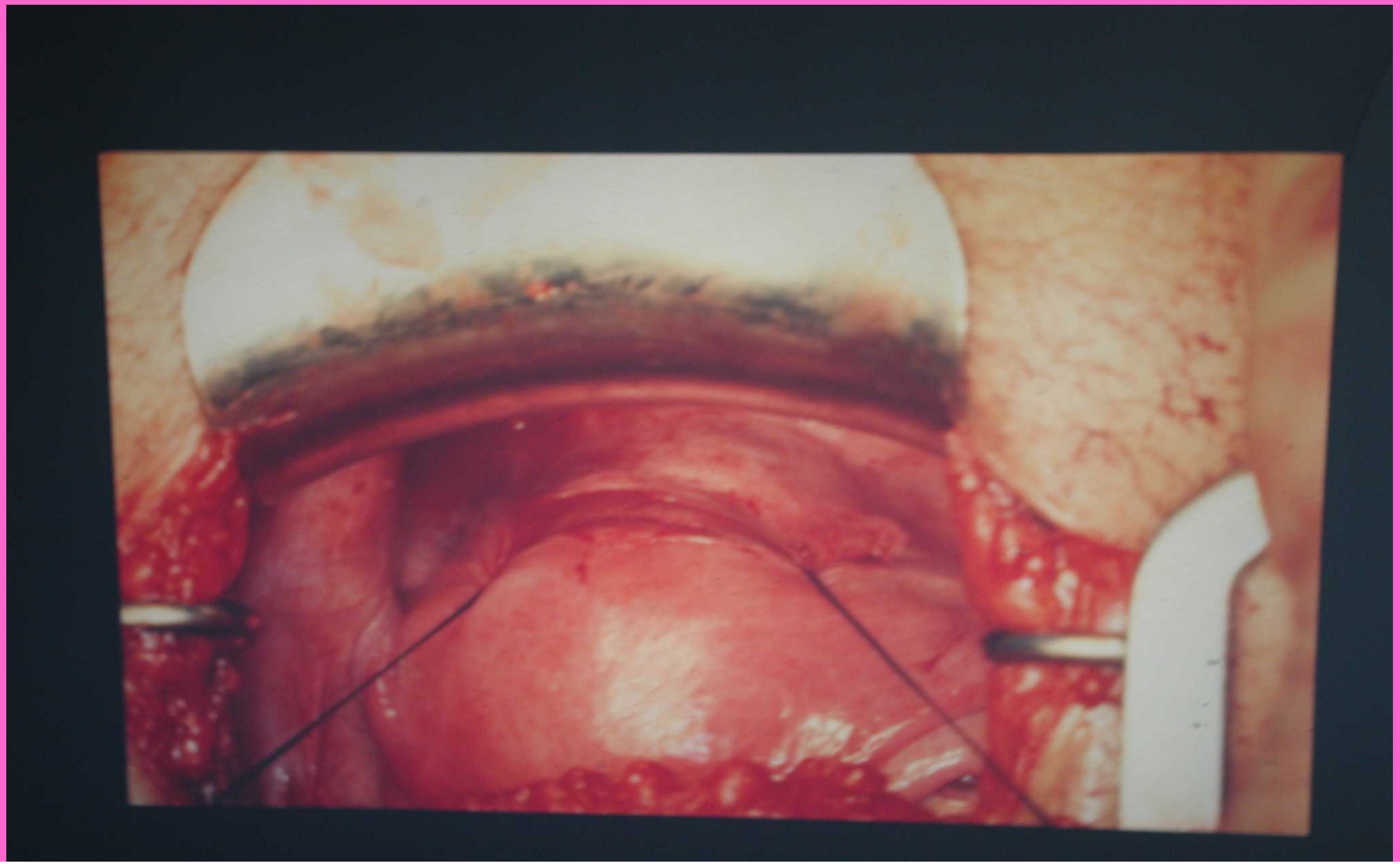
Miscarriages n=12/46 25% Failure Rate

Gestation	Aetiology
21	BV+TCW
25	APS+TCW+BV
14	TCW
17	TCW+Thrombophilia
14,17(twins)	TCW+Thrombophilia+BV
13	TCW+APS+BV
22	BV
16	TCW+BV+overactive thyroid
18	BV+overactive thyroid
22	TCW+APS+BV
23	TCW+BV
18	BV+Thrombophilia

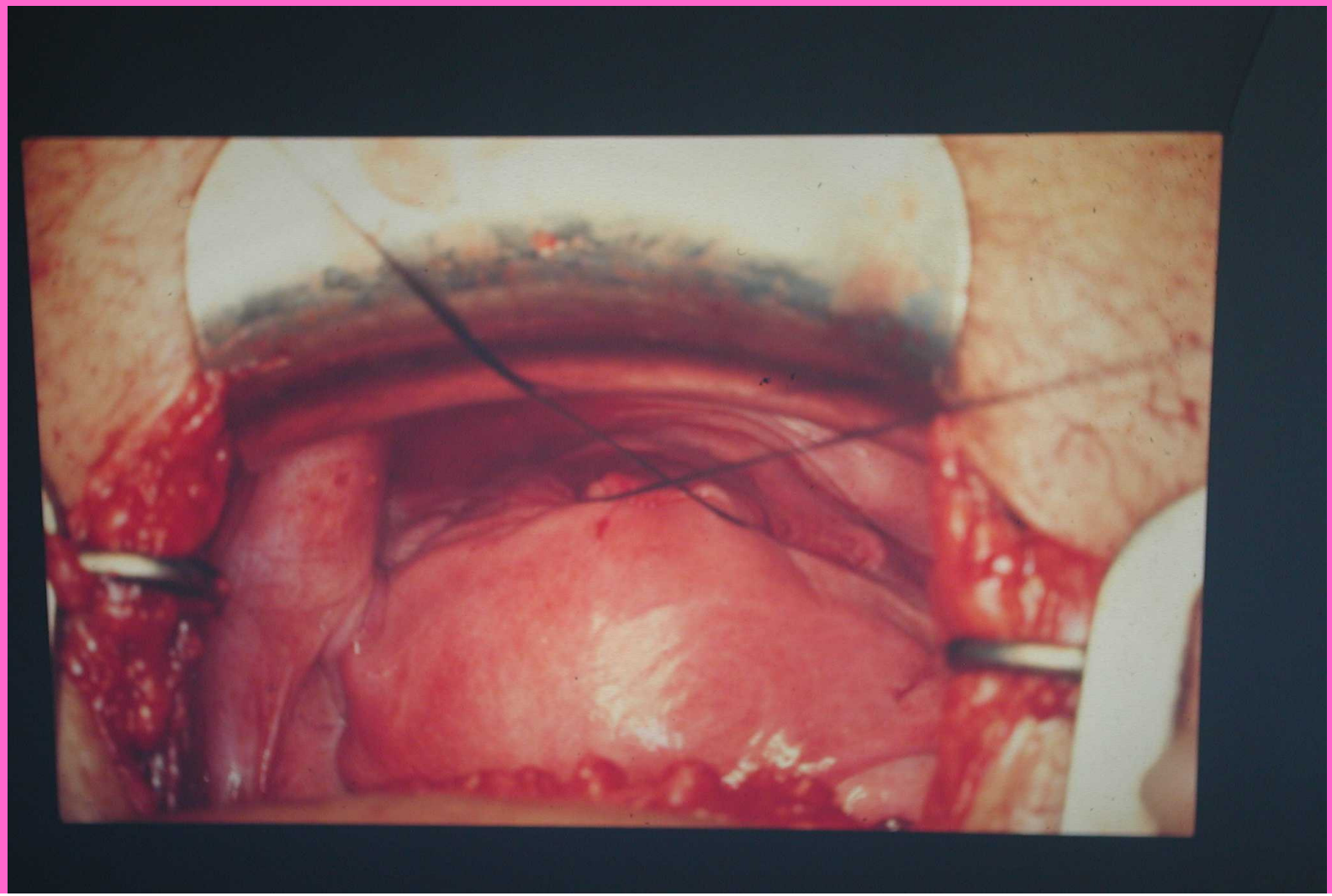
Transabdominal Cerclage Technique



Trans Abdominal Cerclage - pre-conceptual suture insertion



Transabdominal Cerclage -- tying the knot anterior.



TA Cerclage: Indications

- **History of Mid-trimester losses (12 weeks to 24 weeks)**
- **Cervical weakness**
- **Failed elective transvaginal cerclage (TVC)**
- *Study exclusions: Preterm deliveries <34/40*
- *Extensive cervical surgery and absent cervix (following repeated cone biopsy; radical trachellectomy)*

Liverpool Women's

Standardised Investigation Protocol

- Consecutive referred cases of second trimester loss
- Continuous Care provision by same team at one centre (Liverpool Women's) before and during pregnancy
- Universal application of standardised investigation pathway
- Management plan constructed after full investigation prepregnancy

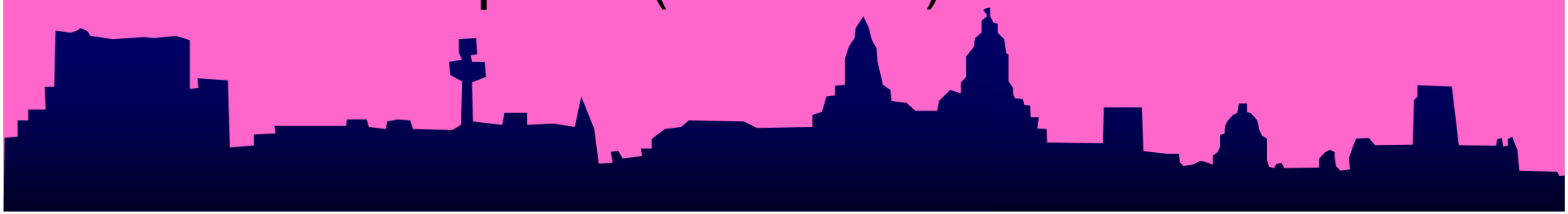
Pregnancy after TAC

- Subsequent delivery →mandatory C/S
- Suture permanent
- Can be utilised for > 1 pregnancy
- 3 patients →2 successful pregnancies with 1 TAC in situ and single case of twins

Reported operative complications

- Injury to bladder
- Small bowel injury (Mingione et al,2003)
- Large bowel fistula (Debbs et al,2007)
- Rupture of membranes, pregnancy loss
- Frequent large Haemorrhage (Lesser et al,1998,Zaveri et al,2002,Mingione et al,2003)

→ Preconceptual (PC TAC) after 2005



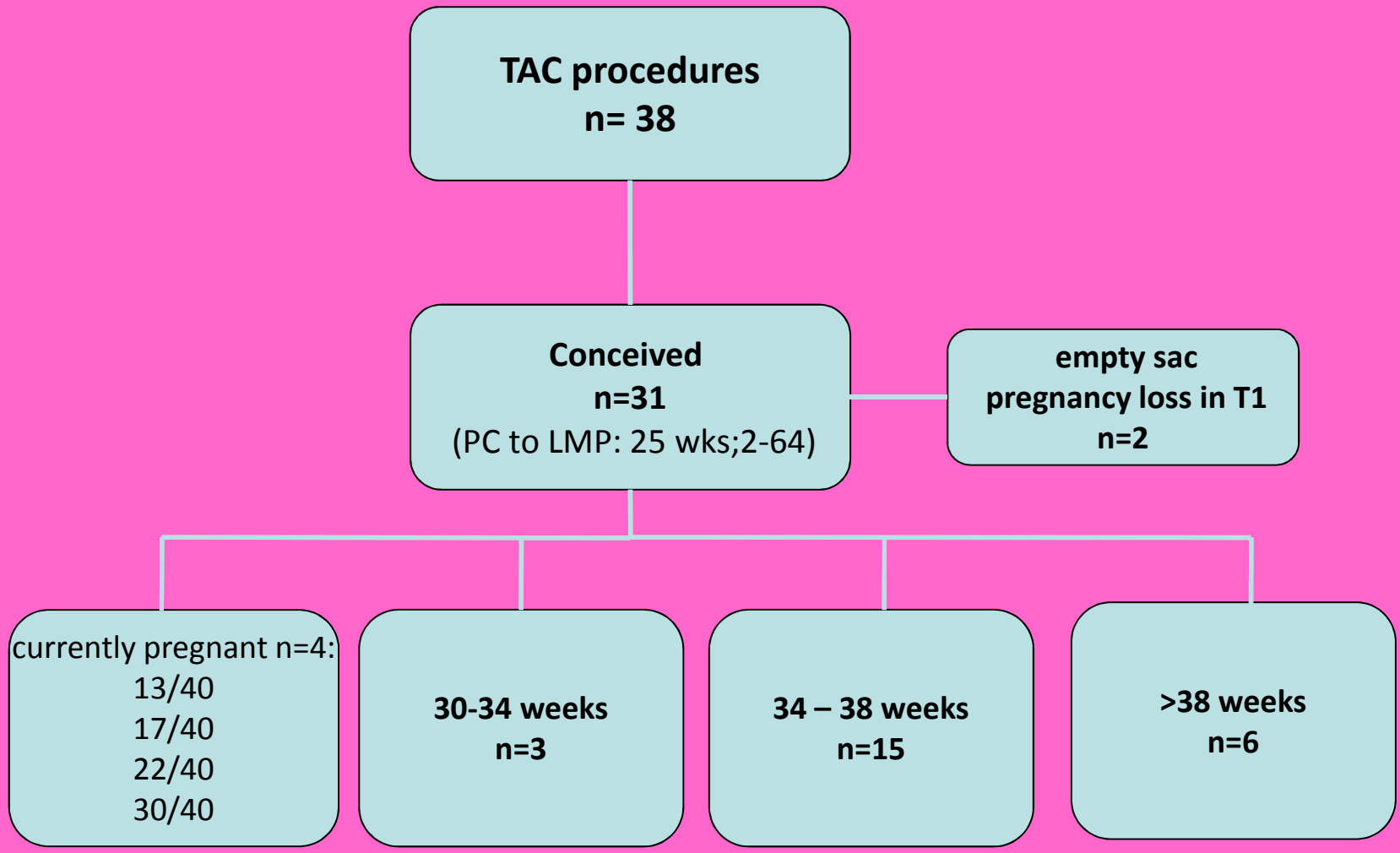
TAC procedures

- All procedures performed at the Recurrent miscarriage (RM) unit- tertiary centre
- Referrals from 15 UK locations
- RM history
- >/= 1previous MTL & cervical weakness
- 1 failed elective vaginal suture (TVC)

Patient demographics and summary of pre-pregnancy investigation

Mean (range)	T1 TAC (n= 40)	PC TAC (n= 38)
Age	30 (21-41 years)	27 (22-40 years)
Parity	5 (3-13)	4 (3-12)
Previous MTL	3 (2-10)	3 (2- 9)
Previous vaginal suture	1 (1-4)	1 (1-4)
	Dual Pathology	
APS	11 (27%)	2 (5%)
Bacterial Vaginosis	7 (17%)	11 (29%)

Preconception TAC



Index Pregnancy losses between 12 to 24 weeks (n=5)

- T1TAC n= 4 (14/40;19/40;23/40;24/40)
- PC TAC n=1 (19/40)
- No correlation between success and number of previous losses &/or number of previous vaginal sutures
- **All 5 failures associated with co-morbidity**
  APS (n=3) or BV (n=2)

Gestation at Delivery

(after 24 weeks)

Gestation (weeks) at delivery	First trimester TAC (n=40) % (n=)	PreConc'al TAC (n=25) % (n=)
>38/40	7% (3)	24% (6)
34-38/40	55% (22)	60% (15)
30-34/40	20% (8)	12% (3)
24-30/40	7% (3)	0% (0)
TOTAL	90 % (36)	96 % (24)

Comparison of vaginal (TVS) and abdominal (TAC) cerclage for treatment of cervical weakness for Midtrimester Loss based on consecutive cohort data from Liverpool Women's Hospital (2001-2008)

	Vaginal (n=58)	Abdominal (n=78)
Success Rate	**75%**	**93%**
PretermDelivery rate (PTD <34 weeks)	25%	30% (60% if dual pathology)
Insertion	**12 weeks gestation**	**10 weeks gestation or Preconceptual with less morbidity**
Morbidity	**Minimal**	**Haemorrhage Trauma to bladder/bowel**
Long Term	**Removal at 36 weeks**	**Permanent**
Delivery	**Option of vaginal**	**Mandatory Caesarean Section**

Summary & Overview

- Midtrimester Loss between 12 to 24 weeks occurs in approx 2% of all pregnancies
- Causal factors are known in 50% of cases
- Patient friendly approach involves a specialised team with standardised investigation protocol and agreed management plan
- IVF or spontaneous pregnancies share a uniform approach

Conclusion

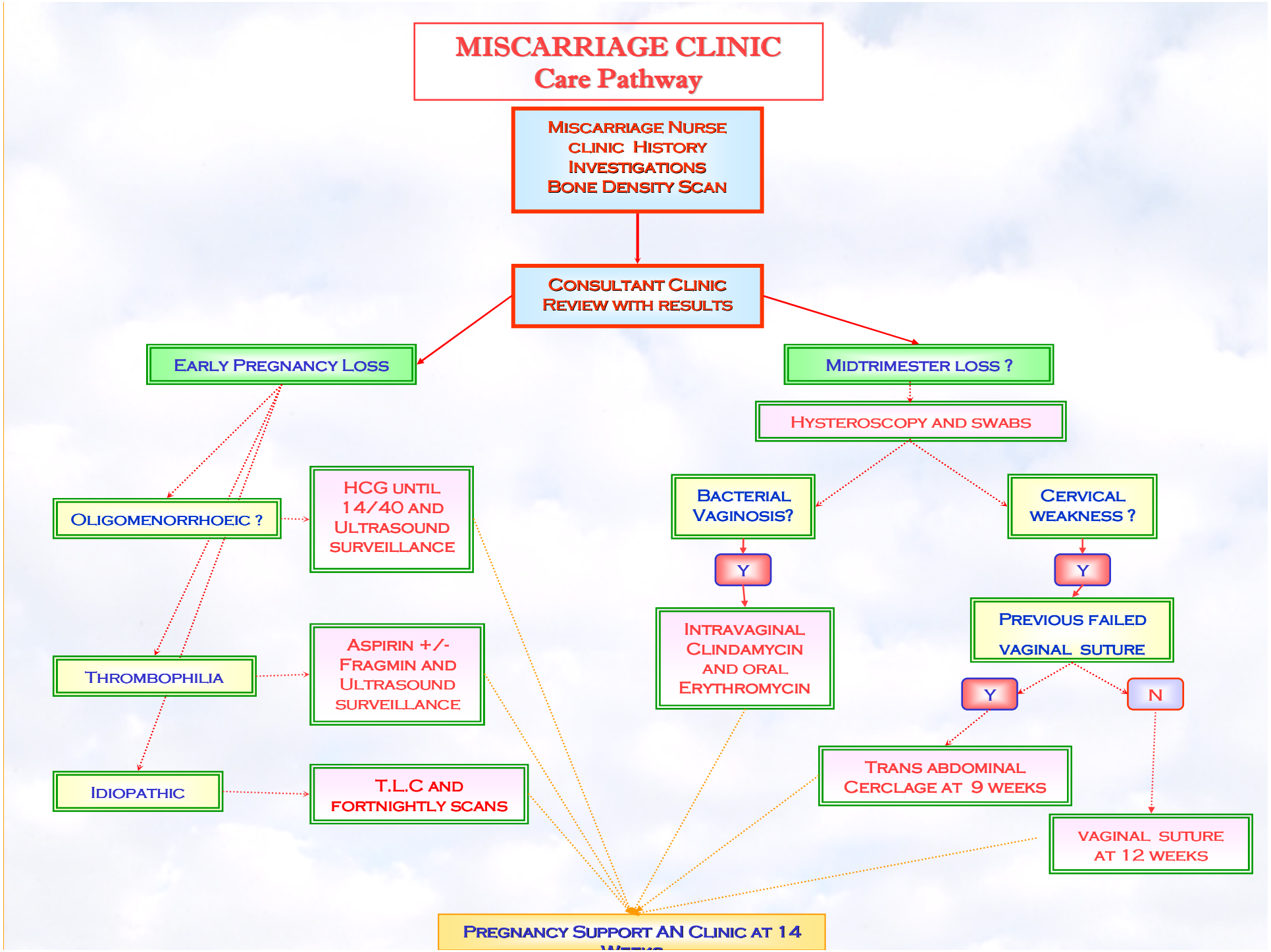
- TAC associated with high (90% or >) successful pregnancy outcome of >24/40
- Preconceptual TAC insertion is equally efficacious compared to T1 TAC
- PC TAC is technically easier to insert and greater precision of suture placement
- Avoids significant surgical morbidity of hemorrhage, bowel and bladder damage

Acknowledgements

LWH: AnneMaria Ellard, Kelly Macnamee, Jo Topping

Thanks to all colleagues and referring hospitals from across the UK

Thank you for your attention


MISCARRIAGE CLINIC
Care Pathway
MISCARRIAGE NURSE CLINIC HISTORY INVESTIGATIONS BONE DENSITY SCAN
CONSULTANT CLINIC REVIEW WITH RESULTS
EARLY PREGNANCY LOSS
MIDTRIMESTER LOSS ?
HYSTEROSCOPY AND SWABS
OLIGOMENORRHOEIC ?
HCG UNTIL 14/40 AND ULTRASOUND SURVEILLANCE
BACTERIAL VAGINOSIS?
CERVICAL WEAKNESS ?
Y
Y
INTRAVAGINAL CLINDAMYCIN AND ORAL ERYTHROMYCIN
PREVIOUS FAILED VAGINAL SUTURE
THROMBOPHILIA
ASPIRIN +/- FRAGMIN AND ULTRASOUND SURVEILLANCE
Y
N
IDIOPATHIC
T.L.C AND FORTNIGHTLY SCANS
TRANS ABDOMINAL CERCLAGE AT 9 WEEKS
VAGINAL SUTURE AT 12 WEEKS
PREGNANCY SUPPORT AN CLINIC AT 14

Standards for Management

- Investigation of Causal Factors
- Surveillance in T1 & T2
- Treatment Interventions during pregnancy