HISTORICAL BACKGROUND:

Kelling (1902) was the first to utilise air injection into the abdominal cavity to aid in visualising abdominal viscera by endoscopy.

Jacobeus (1910) pierced the abdominal wall of 20 cadavers and demonstrated that no damage was done to the viscera by the needle. The same author (1912) published a monograph on the subject of laparoc and thoracoscopy under air insufflation. Weber (1912) conducted pneumoperitoneum in animals and cadavers to outline abdominal tumours radiographically. Levy (1912) made similar observations concerning the diagnostic value of intra-abdominal pneumoperitoneum.

Rautenberg (1914), Meyer-Betz (1914), Goetsch (1918) and A. Schmidt (1919) used air intraperitoneally to aid in the diagnosis of liver diseases. Orndoff (1919) used oxygen and nitrogen claiming better results with these gases.

A. Stein & Stewart (1919) were first to utilise pneumoperitoneum to reveal gynaecologic disorders radiographically. This work was re-emphasized by
Orndoff (1930). Stewart and A. Stein (1919) also noted that pneumoperitoneum in conjunction with a barium meal was much more informative than barium meal alone in diagnosing gastro intestinal pathology.

Alvarez (1920) first utilised carbon dioxide as the intraperitoneal gas and concluded that rapid rate of absorption of carbon-di-oxide was advantageous to the patient and it was just as effective as oxygen or nitrogen for diagnostic purposes. Ballard (1920) demonstrated adhesions of the intestine to the abdominal wall using pneumoperitoneum.

I.C. Rubin (1920) determined the potency of fallopian tubes non-operatively by means of intra-uterine inflation with oxygen and the production of an artificial pneumoperitoneum in seventy patients by the use of Rubin apparatus. He endeavoured to establish several points -

1. The tolerance of the patient for the method as a diagnostic procedure,

2. the possible danger of infection,

3. the danger of embolism,

4. the diagnostic reliability of the findings and interpretation,

5. the minimum volume of oxygen necessary to produce the pneumoperitoneum which could be seen by fluoroscopic examination.
Peterson & Van Mealu Menberg (1921) described a definite technique for visualising the pelvic organs by gynaeceography. They emphasized that positioning of the patient was most important, and accomplished by attaching a step like apparatus which contained the film to an ordinary table. Peterson (1921) proved the sterility of the technique by culture that the gas was sterile upon aspiration from the peritoneal cavity after the initial injection. Peterson (1921) also suggested using pneumoperitoneum as a means of diagnosing early pregnancy. But this was never accepted.

Sante (1921) described the use of pneumoperitoneum as an aid in diagnosing retroperitoneal masses. Sante and Carelli utilized pneumoperitoneum to the abdominal rather than the pelvic organs.

Case (1921) disclosed three deaths as a result of procedure done for preceding three years. He attributed these deaths to extremely poor technique. The deaths were considered preventable.

Rubin (1921) described in detail a usual flowmeter manometer apparatus which assured the intra-peritoneal introduction of known amounts of carbon dioxide under safe pressure.
Peterson (1922) found out that the pneumoperitoneum is of considerable diagnostic value in obstetrics and gynaecology.

Carrelli (1923) confirmed the usefulness of the procedure on 800 examinations.

Yung (1923) observed that the normal pelvic status of a patient could be easily demonstrated by pelvic pneumogynaecography. He suggested that by prior use of pneumogynaecography in diagnostic problems, many exploratory laparotomies could be avoided.

Fertash (1924) in a monograph on diagnostic pneumoperitoneum in surgery gave a full account of the early work done in the field.

Since 1926, most of the literature pertaining to pneumoperitoneum was written by Stein and his co-workers. Stein and Arene (1929) described a new self-retaining instrument which could be used for Rubin test, instillation of radiopaque solution into the uterus, or trans uterine pneumoperitoneum. A special X-ray table was first described in 1939 by these workers. A more complicated modernized modification of this table was described in 1952. Much of the work concerning the "Stein-Leventhal syndrome" involves about the use of pneumoperitoneum as a diagnostic aid in demonstrating the polycystic ovaries.
Maxfield and Mollwain (1944) concluded that a pneumoperitoneum is a valuable diagnostic procedure to be used in conjunction with other methods of examination.

Becker (1946) proposed the insertion of a trochar into the cul-de-sac as another route of introducing the carbon-dioxide intraperitoneally and he suggested that this was the safest method available for producing pneumoperitoneum.

Lewis (1946) reported a simplified apparatus with two water containers for induction of artificial pneumoperitoneum. The amount and rate of instillation of the carbon dioxide are determined by water displacement.

Maxfield (1951) re-emphasized the importance of pelvic pneumogynaecography in the diagnosis of pelvic pathology and suggested that the procedure should gain widespread acceptance.

Garshon-Cohen (1952) found the trans-uterine approach of great benefit in visualising the pelvic status in sterility.

Kunstator, Guterman & Tulsy (1953) suggested the use of a modified technique of gynaecography in children as an aid in the diagnosis of endocrine disturbances. In many cases they found it invaluable that it saved the child from exploratory laparotomy. They feel
that pneumoperitoneum is especially valuable in these cases because of the difficulty of doing an adequate pelvic examination on a child.

Abrams and Hughes (1955) injected carbon-di-oxide by trans-abdominal route in 161 patients. They found out that, ovarian cyst, ectopic pregnancy and subserous fibroids can be diagnosed by gynaecography.

Stauffer, Durant and Oppenheimer (1956) have shown that the large quantities of Co₂ can be injected into the vascular system without harmful effects.

Jameson & Trulove (1957) described the technique of inducing a pneumoperitoneum by trans-abdominal route.

Suice & Gould (1957) advocated the use of nitrous oxide because of its lack of irritating qualities and because it is absorbed with remarkable rapidity. Nitrous oxide is almost 35 times more soluble than nitrogen, approximately 18 times more soluble than oxygen and 8 times more soluble than carbon-di-oxide.

Calandra (1957) used the Foley's catheter technique in place of cannula for trans-uterine pneumoperitoneum and noticed following advantages:

1. less painful and simple technique,
2. less costly,
3. minimum leakage of gas.
4. no injury to cervix with the tenaculum or with a metallic cannula.

Bodnar (1963) and Ansari (1966) used Foley’s catheter technique and found it better than the metallic cannula.

Stevens & McCort (1964) used trans-abdominal pneumoperitoneography. They found that no single abdominal radiographic examination offers as much information about as many organs. They preferred nitrous oxide than carbon-di-oxide as its absorption rate is less than CO₂. They said that the use of CO₂ frequently requires replenishment of intraperitoneal gas during the procedure.

Ansari (1970) established pneumoperitoneum by cul-de-sac approach.

Indications of gynaeography :-

Ansari & Arronêt (1966) described the following indications for pelvic pneumogynaeography and pelvic pneumohysterosalpingography -

1. Unmarried virgins in whom a pelvic examination is not possible and rectal examination not conclusive.
2. Un-cooperative or mentally retarded patients.
3. Obese patient in whom an accurate pelvic examination is extremely difficult.

4. Patients with congenital anomalies such as absence of vagina, absence of uterus and hermaphroditism.

5. Patients with acquired genital organ abnormalities such as vaginal atresia, complete cervical stenosis and tubal occlusion.

6. Paediatric gynaecologic patients.

7. Patients requiring investigation of sterility.

8. Patients for whom gynaecologic diagnosis are difficult.


11. Stein-Leventhal Syndrome (Stein, 1933).


**Contra-indications of the gynaecography:**

Rubin (1928) advised not to utilise trans-uterine pneumoperitoneum in the presence of subacute pelvic infections, diseased Bartholian glands, purulent discharge from cervix, vagina or urethra.

Gershon-Cohen (1952), Abrams (1955), Buice and Gould (1957) listed the contra-indications of gynaecography as follows -
I. Contra-indications of 'single contrast' pneumoperitoneum:

1. Excessive age, and/or poor cardiac status.
2. The presence of acute or subacute pelvic inflammatory disease.
3. A pelvic tumour or mass completely filling the pelvis.

II. Contra-indications to 'double contrast' pneumoperitoneum:

These include all the conditions noted for single contrast pneumoperitoneum as well as any situation that rule out intra-uterine manipulation such as:

1. Intra-uterine pregnancy,
2. Uterine bleeding,
3. Purulent cervical discharge,
4. Malignancy of uterus and tubes.

Stevens & McCord (1964) advised that pneumoperitoneography should be avoided in subjects with marginal pulmonary reserve, because an approximate 12.5 percent drop in vital capacity occurs following the introduction of a pneumoperitoneum.

Ansari & Arronet (1966) described that gynaeacography is not recommended in the presence of a large tumour mass filling the entire pelvic cavity, for elderly patients with cardiopulmonary disorders, in acute
or subacute pelvic inflammatory disease, and in shock regardless of etiology. Specifically the trans-uterine route in contra-indicated in tubal pregnancy, uterine bleeding and questionable adnexal disease.

Criteria for large or small ovaries and uterus:

The pelvic viscera of normal females of child bearing age vary considerably in size. Standard text books of Anatomy and Obstetrics (Schaeffer, J.F., Morris's Human Anatomy text, and Eastman, N.S. Obstetrics, Tenth edition, Appleton - Century croft - New York) recorded normal ovaries measuring 2.5 to 3 cm. in length, 1.5 to 3 cm. in width and 0.7 to 1.6 cm. in thickness. In adult virgins, the uterus has a length of 7 to 8 cm. a maximal width of 4.5 to 5.5 cm. and an anteroposterior thickness of 2 to 3 cm.

Stein and Leventhal (1935) described that the normal ovary was one-fourth to one half the size of the uterine fundus whereas the polycystic ovary was at least 3/4th as large as the uterine shadow.

Stein (1949) suggested that ovarian uterine ratio is 0.25 to 0.50 which is further supported by Gershon-Cohen (1953), Schule and Assen (1961). A ratio of 0.5 or more is suggestive of polycystic disease of ovary.

Gershon-Cohen & Novem (1952) mentioned range of normal ovarian index from 3 sq. cm. to 12 sq. cm.
Weigen & Stevens (1967) calculated uterine index by multiplying smallest height and width of the uterine shadow. Similarly, they determined ovarian index by multiplying greatest length and width of ovary. They demonstrated the normal uterus and normal ovaries as smooth organs free of adhesions, with the normal ovarian index less than 15 cm² in size. The normal ovaries varied in size (ovarian index) from 3.7 cm² to 14.6 cm² with a mean of 9.0 cm². The polycystic ovaries were typically symmetrical and abnormally large, varying in size (ovarian index) from 6.0 cm² to 38.0 cm² with a mean of 16.8 cm². They concluded that the normal uterine index ranges from 15 sq. cm. to 55 sq. cm.

According to Krael (1969) ovaries are regarded as enlarged when the index is over 15, but there is no radiological criteria for small ovaries. An index of less than 4 probably represent pathologically small ovaries.

Lippe et al (1975) concluded that in children ovary was 2.5 to 5 cm. in length and 1.8 to 3.9 cm. in width. He described that the uterine size varies from 3.5 cm. in length in the first month of life (because of intra-uterine hormonal stimulation) to a small structure of 2.5 cm. or less in length by 10 month. The size remains infantile until estrogen stimulation, during
puberty, results in rapid enlargement to a width of
5-7 cms. and thickness of 2.0 cm.

**Role of Gynacography in Stein-Leventhal Syndrome:**

This syndrome was first described by Stein and
Leventhal in 1935 when they reported some patients with
enlarged polycystic ovaries, amenorrhea and infertility.

Stein (1935), for the first time, made use of
pelvic pneumogynacography for the diagnosis of Stein-
Leventhal Syndrome. They studied 100 cases by
gynacography which were proved by biopsy. In 80% of
these cases they were able to show enlarged ovaries.

Ingersoll (1950) concluded that a specific
entity, polycystic ovaries with a thickened tunica
albuginea exists and is associated with a variable
clinical syndrome.

Leventhal (1938) noted that procedure is of
greatest value, for clinical examinations cannot always
detect such ovaries and may be denied a successful ovarian
resection.

Short and London (1961) utilised pelvic
pneumogynacography, in four or five of their cases of
Stein-Leventhal syndrome before laparotomy.
Edwards (1963) showed enlarged ovaries in 18 cases by gynaecography. Laparotomy was done in 13 cases of clinically proved enlarged ovaries and in each case enlargement of ovaries suspected radiologically was proved.

Bonham (1963) described that gynaecography revealed even the small degree of ovarian enlargement in patients of Stein-Leventhal syndrome, which were not found on clinical examinations under anaesthesia.

Daves (1964) suggested two criteria for the diagnosis of Stein-Leventhal Syndrome as -

1. An absolute increase in ovarian size,

2. A decrease to one or less in the ratio of the size of uterine fundus to the size of ovary.

With these criteria in mind, they reviewed 8 proved cases, 2 had unsatisfactory study and in one, index was not possible due to concomitant pelvic inflammatory disease.

In normal group, the range of ovarian index was 9.9 sq. cms. to 20.4 sq. cms. with an average of 11.7 sq. cms., while ovarian index were 15.1, 15.35, 17.0, 17.5 & 22.0 and uterine ovarian ratio were 1.3, 1.3, 1.2, 1.3, & 0.6 in proved cases of Stein-Leventhal syndrome.

Warfield and Sherer (1965) reported 85 cases of Stein-Leventhal Syndrome. According to them cylindrical
shape of ovaries was highly suggestive of polycystic ovarian syndrome.

Waigen (1967) correlated clinical roentgenologic and surgical findings of 35 women with pathologically proved polycystic ovaries. In these cases range of ovarian index was 5 sq. cm. to 39 sq. cms. with a mean of 16.8 sq. cms. Range of uterine index was 10 sq. cms. to 50 sq. cms. with a mean of 24.6 sq. cms. In general, the uterus in women with polycystic ovaries is smaller than in control group, possibly due to smaller number of pregnancies. Ovarian uterine ratio of 0.5 or more is suggestive of polycystic ovaries. There was no false positive result where as in five cases roentgenogram was normal but at surgery ovaries were found to be enlarged.

Bhargava and Malhotra (1969) performed pelvic pneumogynaecography in 75 cases which included 65 cases of hirsuitism and 10 normal controls. 24 cases showed ovarian enlargement. 17 bilateral and seven unilateral. Seven cases were surgically explored and the radiological findings confirmed. In normal patients, the ovarian index was found to be 12 sq. cms ± 3 and uterine index found to be 20 sq. cm ± 3. Of the surgically explored cases of hirsuitism, the smallest ovary was 15 sq. cms. and largest 35 sq. cms. with a mean of 19.6 sq. cms. The uterine size in the enlarged ovarian group had a mean of 20 sq. cms.
Role of Gynaecography in the developmental malformations of the female internal genitalia.

Roux et al (1954) diagnosed two cases by gynaecography, one of congenital absence of the ovaries and the second of the congenital absence of uterus. Kunstardter (1954) published his experience with pelvi-pneumogynaecography in children with various endocrinological diseases. Winter and Perlmutter (1955) mentioned one case of genital malformations without giving details. Houlne (1957) reported one case of ovarian aplasia and one case of absence of the uterus with one normal ovary. Bompiani and Rigat (1958) reported six cases of various malformations of the internal genitalia.

Henzl (1960) reported 21 cases of various anomalies of the internal genitalia. They divided them into two groups.

A. Developmental defects of the ovaries -

1. Ovaries absent (5 cases).

2. Rudimentary or extremely hypoplastic ovaries (2 cases).

3. Unilateral development of ovary (1 case).

4. Developmental disturbances secondary to infection etc. (2 cases).
B. Developmental defects of the uterus -

1. Congenital absence of the uterus (4 cases).

2. Uterine deformities, such as, bicornuate, unicornuate, septate uterus etc. (7 cases).

They have shown that bicornuate and septate uterus can be differentiated by pneumography. Uterus bicorni appears either as two soft tissue masses joined in the midline, or as a bent cylinder, whereas septate uterus presents as an ovoid shadow.

They came to the conclusion that pelvic pneumogynaeography is a valuable method for diagnosing anomalies of the female genital tract, particularly in disturbances of the genital development (syndrome of gonadal dysgenesis, adrenogenital syndrome, pituitary dwarfism etc.), disturbances in the development of the urogenital sinus (atresia and stenosis of the vagina), in cases of primary amenorrhoea, menstrual disorders of the hypo-hormonal type in virgins and uterine deformities.

Daves (1964) encountered eleven cases of major congenital pelvic anomalies. They confirmed clinically suspected pelvic kidneys and a congenital cervico-vaginal band by pneumograms. However, didelphia with hematomata were misinterpreted as sarcoma.
In four apparently normal females of primary amenorrhoea, gynaecography revealed congenital absence of uterus and tubes in three cases while in fourth case an infantile uterus was present.

In a true hermaphrodite, gynaecography revealed infantile uterus, one gonad demonstrated proved to be a ovary, and a testis was found in inguinal region.

According to him, the pneumograms does not afford a distinction between testis and ovary but gonads can be readily identified as such and uterus and tubes are easily recognisable. This makes pneumograms the equivalent of exploratory laparotomy without biopsy in cases of hermaphroditism and makes laparotomy unnecessary in cases of congenital absence of female organs.

Role of gynaecography in various sex and endocrine disorders:

Kunstadter, Guterman and Talsky (1953) pointed out the role of gynaecography in various sex and endocrine disturbances in the paediatrics age group. They reported 16 cases of various lesions such as ovarian agenesias, primary hypopituitarism, hypo-ovarianism, sexual precocity and pseudo-hermaphroditism.

Thomas (1968) performed gynaecography in 9 cases of primary amenorrhoea which were clinically diagnosed as Hypogonadism, Turner’s syndrome, variant of Turner’s
syndrome, gonadal dysgenesis, Testicular feminisation, chromosomal mosaicism and hypogonadism with low gonadotrophin secretion. In seven of the nine cases — gynaecography had a definite role to play in primary amenorrhoea. When combined with estimation of the urinary gonadotrophin secretion, and the chromosomal analysis, it will lead to a correct diagnosis.

Kodonough (1971) reported a case of asymmetrical gonadal dysgenesis in a five year old child. The clinical and various laboratory tests were inconclusive. Gynaecography showed a small gonad in the left adnexal area and an absent or rudimentary streak gonad in the region of the right adnexa.

Lippe et al (1975) performed gynaecography in 46 children and adolescents. The patients were grouped into 7 categories based on their initial clinical presentations: sexual precocity, gonadal dysgenesis, primary amenorrhoea, hirsuitism and/or virilisation, pseudohermaphroditism and previously unclear diagnosis. They found out that gynaecography was useful in characterising ovarian and uterine size, identifying ovarian neoplasm and polycystic ovaries and determining the presence or absence of the uterus and gonads. They also pointed out that it is a most valuable diagnostic procedure for the evaluation of children and adolescents.
with certain kinds of disorders of sexual development. The procedure has obviated the necessity for exploratory surgery in several patients while making surgical intervention mandatory in others.

Additional procedures such as bimanual pelvic examination, a papenicolau smear, cystography or vaginography and fundoscopic examination can be performed at the same time. In addition, in some selected cases, peritoneoscopy combined with gynaecography is very much informative.

**Role of Gynaecography in unruptured tubal pregnancy:**

Stein (1926) reported first case of tubal pregnancy, diagnosed by gynaecography. Tubal pregnancy casts a dense cone shaped shadow, the apex arising from the uterine horn. The size depends upon the duration of pregnancy. The ovary may be seen separate from the mass or may form the part of adnexal mass. Stein (1943) added another fifteen cases of tubal pregnancy diagnosed by gynaecography.

**Role of Gynaecography in carcinoma cervix:**

Suice and Gould (1957) employed gynaecography for evaluating the spread of carcinoma of the cervix and uterus. They concluded that not only the true extent of the cancer be determined but also the implantation of the
radium and the injection of radioisotopes can be better
directed as a result of accurate determination of the
size and shape of pelvic structures and the presence of
associated anomalies.

Daves (1964) did the pneumographic staging of
carcinoma - cervix, based on the following considerations.

1. The free edges of the broad ligaments are seen on
   edge in pelvic pneumogram and appear paper thin.

2. The soft tissue of normal lateral pelvic walls
   constitutes a smooth density tapering anteriorly and
   posteriorly and measuring about 0.5 cm. at the thickest
   point. Smoothness is more important than thickness
   since an obese patient may have upto 2 cms. of normal
   tissue thickness.

3. On the lateral pneumogram, the recto uterine and
   vesico uterine recesses are filled with gas and
   uncluttered by tissue and the normal cervix is small
   or unseen.

Pneumographic staging of Ca - Cervix :

Stage I  - Only cervical enlargement in lateral view.

Stage II - Thickness of the broad ligament on either side,
           but not all the way to the pelvic wall.
Stage III - Modular thickening extending to and/or involving the pelvic wall.

Stage IV - Filling in the anterior or posterior recesses (extension to bladder or rectum).

They studied 194 cases, out of that 30 cases were operated. In operated cases, clinical, radiological, pathological and surgical findings were correlated.

1. Pneumographic clinical correlation was found in 15 of the 30 patients.

2. Pneumographic surgical correlation in 16.


4. Poor clinical pathologic correlation but good pneumographic pathological correlation in 9.

5. Poor pneumographic pathologic correlation but good clinical pathologic correlation in 8.

Punia (1980) also did staging of carcinoma of cervix in 29 cases. Out of 29 cases, 11 were found in Stage II, 14 cases in stage III, and 4 cases in Stage IV. No case was found under stage I.

Out of 29 cases, 22 were found consistent with the clinical stage while seven cases were inconsistent. All these seven cases were over-staged by gynaecography.
Sala, Keats, Kenneth, Dolon & Jose (1962) and Daves, Diner & Brenner (1964) found over-staging by this method.

Role of Pelvic pneumocystography in sterility:

Pneumohysterosalpingograms proved more informative than either pneumograms or hysterosalpingograms in the diagnosis of sterility. The combined procedure in particular, demonstrates the tubo-ovarian relationship which is of importance in the investigation of infertility. The pneumogram remains the procedure of choice in the presence of tubal occlusion, ectopic pregnancy, uterine bleeding and questionable tubal abnormality.

Dias Brusual (1965) studied 95 cases of sterility. Simple pneumogram were made in 55 cases and complete gynaecogram in the remaining 30. The radiological findings were subsequently proved by peritoneoscopy or laparotomy, or both in 53 patients. In 21 cases, with normal gynaecological examinations, gynaecography showed that there was an ovarian or uterine tumour or another non-tumoral lesion as the cause of sterility. In 13 patients, in which gynaecological examination was inconclusive, gynaecography provided the diagnosis. In 6 patients, whose internal genital tumour was palpated, gynaecography ruled out the possibility of tumour. In his experience, gynaecological examination gave an
incomplete evaluation that led to errors in diagnosis of 47 per cent cases.

Ansari & Arronet (1966) studied 51 cases of primary or secondary sterility. In addition, one elderly obese woman was studied for the purpose of gynaecological diagnosis. The pneumogram in this patient demonstrated a left ovarian mass, which could not be detected on repeated pelvic examinations. Pneumohysterosalpingography was performed in 42 cases and pneumography in the remaining 10 cases. The radiographic findings were normal in 10 patients and abnormal in 33. The various abnormalities demonstrated comprised of cervical lesions, uterine myomata, uterine hypoplasia, intra-uterine defect, tubal occlusion, Stein-Leventhal syndrome, ovarian tumour, ovarian agenesis, absence of ovary and adhesions.

Benin & Becker (1966) studied 9 cases of sterility for tubal patency and ovarian morphology.

Stevens (1967) studied 102 cases of sterility by pelvic pneumography. Of the 102 patients examined by pelvic pneumography, approximately one-third had a reasonable explanation of their infertility. In two-thirds of the patients, contributory or confirmatory information was obtained. They believe that pelvic pneumography should be employed only after a conventional investigation of the husband and wife has been carried out and infertility persisted.
Role of Gynaecography in Myomata:

Daves (1964) reported eighty-four cases of myomata of which 58 were proved at operation. Ninety-six per cent of these cases were easily recognised on the pneumograms by the characteristic lobulated enlargement of the uterine shadow. Other conditions like sarcoma, adenomyosis, pyogenic and tubercular endometritis produce non-specific varying degree of enlargement of uterus.

Ansari & Arronset (1966) reported three cases gynaecographically while only one of the three was diagnosed clinically.

Semin & Becker (1966) reported 11 cases of uterine myomata. Uterus becomes enlarged and bossy or is even overshadowed by the myomas. Uterine cavity may show filling defects or marked distortion in presence of intramural fibroids. Subserous fibroids may be found in any part of the pelvic cavity constantly retaining their relationship to the uterus through their pedicles. They become incarcerated in one side of the pelvis and overshadow the parametrium which then appears thickened and bossy. They may even compress the tube which led to the non-filling on the same side of 8 operated cases, five presented an associated salpingo-oophoritis.
Role of gynaecography in cases of ovarian mass:

Daves (1964) reported 70 patients of ovarian mass. Out of which 49 were operated. They had 58 ovarian masses consisting of 25 benign cysts, 13 dermoid cysts, 9 primary carcinomas, 6 benign solid tumours, 4 metastatic carcinomas and one malignant teratoma.

The diagnostic accuracy rate of 74% by gynaecography in cases of ovarian masses was reported in comparison to clinical accuracy rate of 55%.

Neither clinically nor gynaeceographically specific diagnosis is possible with the exception of roentgenographic identification of a dermoid cyst. Cystic and solid tumors of ovary (whether benign or malignant, primary or metastatic) produce ovarian enlargement with no clue to histological diagnosis.

Diseases of fallopian tubes like hydrosalpinx, hematosalpinx or tube-ovarian abscesses are occasionally indistinguishable from primary ovarian masses.

Role of Gynaecography in pelvic inflammatory disease:

Daves (1904) reported forty-six patients to have pelvic inflammatory disease. They concluded that pneumographic distinction between pelvic inflammatory disease and extension of tumour from carcinoma of the cervix depends upon biopsy exclusion of the latter disease.
Semin (1966) described that all the elements of a pelvigram become plastered together to lead to a frozen pelvis in cases of extensive pelvic cellulitis. The urinary bladder and the sigmoid colon become adherent to the genital organs and loose their identity. In addition, loops of small bowel may become adherent to the pelvic structures and appear in the roentgenogram inspite of the trendelenburg position.

Role of gynaecography in carcinoma of body of the uterus:

Daves (1964) reported thirty patients of endometrial carcinoma. The pneumograms of 18 of these showed uterine enlargement and 8 showed irregularity of the uterine outline. The other 4 cases were normal. The uterine enlargement and non-specific changes are produced by a variety of conditions.

Role of gynaecography in pelvic endometriosis:

Theander and Mehlin (1968) described the radiologic findings in pelvic endometriosis with the emphasis on early signs demonstrable by gynaecography or by double contrast examination of the bowel. They studied 650 cases including about 100 with histologically verified endometriosis.
Gynaecographic findings in endometriosis:

Major changes such as marked enlargement of the uterus and the adnexa with gross obliteration of pelvic spaces are easily recognised.

The less conspicuous changes representing early stages of pelvic endometriosis are displacement of the uterus in the form of the backward retraction, retroflexion or combination of two due to shrinkage or expansion of endometrial tissue. Lateral displacement or rotation of uterus may occur by asymmetric adhesions. Forward displacement of the uterus seems to be less common.

Another finding is the enlargement or fixation of the adnexa. If fixed by adhesions, the adnexa will not be situated in the abdominal cavity despite the head down posture of the patient. The only pathognomonic finding is the deformity of a soft tissue mass which changes its shape during menstrual cycle.

Gynaecographic findings similar to those in pelvic endometriosis may be obscured in any other disease capable of producing pelvic adhesions e.g. salpingitis.

Findings in double contrast study of bowel:

Theander and Wahlin (1961) described that the shrinkage of the abnormal fibrous tissue which often develops at the serosal surfaces, tends to produce a
characteristic deformity of its anterior wall at the recto-sigmoid junction. The junction deformity appears as a blunt transversical ridge, 2 to 4 cm. in breadth, with a smoothly curved though slightly uneven surface projecting backwards into the lumen at the level of or closely above the superior rectal valve.

A further type of bowel deformity may be due to the actual growth of endometriotic tissue in the wall. Such mural lesion may affect any part of the intestine e.g. the caecum.

A junction deformity of the bowel may also occur in various other conditions such as peritoneal carcinomatosis and peri-rectal fibrosis due to radiotherapy for carcinoma of the uterus or the ovaries.

The observation of a junction deformity in a woman, who has no ascites and who has not received radiotherapy, thus provides a strong indication of pelvic endometriosis.