

HISTORY OF HYSTEROSALPINGOGRAPHY

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We present here an interesting evolution of procedure and dyes for hysterosalpingography. It has many synonyms like metrosalpingography, metrotubography, hysterotubography, uterotubal injection and uterotubography. Pneumoperitoneum and injection of radio-opaque substances were two available choices, of which the latter is preferred today having less discomfort and a higher degree of diagnostic accuracy.

Kelling (1902), in Dresden, was the first to suggest the injection of gas for endoscopic examination. Nemchow (1909), made the first known attempt to visualize the interior of the uterus with the help of Lugol's solution. In 1910, Rindfleisch used aqueous bismuth paste, while Lovey (1912), visualized the tube by injecting isotonic colloidal silver into the uterine cavity. The first trial of combining periuterine and intrauterine roentgenography for the precise diagnosis of uterine tumours was made in 1913 by Dartigues and Dismier. The radio-opaque solution was

10% collargal injected into the uterus contrasted against an air filled bladder.

Various trials were given to dyes like sodium bromide and thorium citrate by Rubin, and collargal solution by Cary (1914). But hysterosalpingography happened to be in disfavour following the introduction of Rubin's test in 1920. In 1923, Kennedy reported the use of sodium bromide in the localization of obstruction in tubes, which were found to be closed by Rubin's test. Bismuth paste was again given a trial in 1925, by Macquat and Tussan without satisfaction.

The various media were tried for about 20 years, but none was found satisfactory. The reasons for unsuitability were extreme irritation to the peritoneum, discomfort, dangerous sequelae, improper density or inadequate viscosity.

The introduction of lipiodol has an interesting history. A 40% combination of iodine with poppy seed oil was used as a therapeutic agent for intramuscular injection in France in 1902. Accidental observation of radio-opacity at site of injection suggested its use as a radio-opaque agent by Sicard and Forestier in 1921. They gave it a trial for epidural and intrathecal injections where it was found

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to be non-irritating, non-toxic and well tolerated by most of the delicate tissues. It was introduced by Portret in France in 1924 and at about the same time by Houser in Argentina. Houser *et al* also demonstrated its use to determine the patency of the tubes and to locate the block. They also realised the therapeutic value of it, in bringing about patency of tubes followed by pregnancy, on repeated injection of the dye.

In 1925, Beaere of France studied sterility, pelvic tumours and metrorrhagia with lipiodol as the opaque medium and showed the necessity of manometric control during the injection. Ferre (1925) showed excellent films demonstrating uterine fibroids.

A monogram was published by Francillon Lopre and Jean Dalsace of France. Lipiodol thus enjoyed a unique position in the field for a period of about 40 years. However, complications like delayed absorption, formation of foreign body granulomas, pulmonary oil embolism and few fatalities led investigators to search for a medium which would be free of such inherent dangers.

Erbsloh put down the prerequisites of an ideal solution. It should be non-irritating. It should have low viscosity so that it can be injected with minimum pressure. It should not show too much contrast, lest it covers up pathological structure on the posterior wall of the uterus, and should have low surface tension. It should be non-allergic, non-carcinogenic, be completely and rapidly observed and after absorption, be entirely destroyed or eliminated.

In 1933, Malinengo and Cante reported the use of skiadon. This did

not find a long usage because of its inability to flow. Uroselectan in 1936 was given a trial by Prevot and Schultz. Lipiodol-F-ethyl ester of the iodinated fatty acid of poppy seed oil was introduced with great advantage but could not be made available commercially. Water soluble Viscerayopaque, introduced by Rubin in 1941, could not find a place because of the irritability to the peritoneum. It also produced cramps after injection. Combination with local anaesthetic was fraught with danger as warning signal may be lost. Endografen 70% or Biligrafin 50% had also the same disadvantages.

Diodone 50%, an aqueous solution with a colloid to give proper viscosity was used extensively until its withdrawal from market for being carcinogenic by Heuper in 1957. He found a non-carcinogenic substance Diagenol viscous, a 40% solution of sodium acetrizoate with addition of low molecular weight fraction dextan. Its absorption is rather slow. It contains 26.4% of iodine. Its absorption in normal cases takes 60 minutes but remains for longer time in cases of previous pelvic inflammation. Persistence of the medium in cases of hydrosalpinx is of great advantage as initial picture may be misleading and may suggest localized spill. Use of pelvic arteriography and cineradiography have opened new fields for detailed visualization. Hysterosalpingography may be performed by different procedures. They are complete, differential or fractional, with fluoroscopic control. Special types of procedure are with manometric control, balloon technique and using Malmström's instrument. Hysterosal-

pingography combined with gynaecography or pelvic arteriography is also of great use. Differential or fractional hysterosalpingography, introduced by Hyams in 1935 has advantages over the complete method. The advantages are, absence of cramps, progressive visualisation from below upwards and outwards of genital tract and avoidance of vascular injection. Disadvantages are multiple exposures to pelvis and ovary, and being uneconomical for routine purpose. In complete hysterosalpingography, abdominal cramps, during the course of injection, inability to visualize the small irregularity in contour of the uterus and possibility of injection into a vessel are the disadvantages.

In apparently blocked tubes or menopausal and senile uteri, hysterosalpingography under manometric control is a safe procedure. Chances of embolism can be minimized by injecting at low pressure.

Demonstration of incompetent os can be carried out by three ways, namely, balloon technique, lipiodol technique and Malmström Westmann technique. The first two methods are obsolete compared to latest method using M.W. cannula and vacuum extractor apparatus.

Summary

Evolution of scientific facts is a long and arduous process. Progress is achieved by learning from repeated failures of generations. The history of development of hysterosalpingography is briefly narrated here which amply shows that the modern scientist stands on the shoulders of previous generations.

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