The diagnosis of the cause of infertility is not very easy especially when it is necessary to establish the status of the Fallopian tubes and the relationship between the tubes and the ovaries. Hysterosalpingography (HSG) is very often practised for this purpose, but this examination is of value only when it shows complete tubal blockage. In other cases the rate of false negative and even false positive is very high as shown by laparoscopy. Swart et al. (1995) in a meta analysis found for HSG a point estimate of 0.65 for sensitivity, and of 0.83 for specificity and underline the fact that HSG was not suitable for the evaluation of periadnexal adhesions.

In contrast, laparoscopy is considered as the gold standard to explore tubo-peritoneal infertility. Nevertheless, laparoscopy is very often performed without discovering any significant pathology.

Unfortunately, laparoscopy presents some risks which can be very serious, as recently shown in the French register of laparoscopic accidents, where six major injuries occurred in diagnostic laparoscopies (Chapron et al. 1997). The results are either a delay carrying out laparoscopy, which can be prejudicial to the patient, for instance if an IVF procedure is decided on the basis of a wrong diagnosis, or the conducting of a great number of normal laparoscopies, with the potential risks that accompany such procedures.

Other diagnostic procedures as hysterosonography or falloposcopy are not sufficiently accurate to support a therapeutic strategy. Culdoscopy could have been an alternative method but was abandoned in the 1970s in its classical version for laparoscopy.

More recent improvements have been suggested such the use of dorsal decubitus, (Mintz 1987), the use of hydroflotation (Odent, 1973), and transvaginal hydrolaparoscopy, which provides a very good imaging of the pelvis (Gordts et al. 1998).
Following this initial work, we have defined the concept of Fertiloscopy (Watrelot et al. 1997-1999) as the combination at the same time of a transvaginal hydropelviscopy, a dye test, a salpingoscopy, a microsalpingoscopy and lastly a hystéroscopy performed under strict local anaesthesia. (photo 1)

**TECHNIQUE**

1) **INSTRUMENTATION**

1.1. **SINGLE USE INTRODUCERS**

Fertiloscopy uses specific instrumentation of single-use type. The other equipment is the same as the one used for gynaecologic laparoscopy even if special scope is required in order to use all the possibilities given by fertiloscopy.

Specially designed introducers are the key to performing fertiloscopy. They are disposable. They come in a kit which is composed of two introducers, one for the uterine cavity, the other one for the pouch of Douglas. (photo 2)

The uterine introducer (FH-1-29 [www.fertiloscopy.com](http://www.fertiloscopy.com)) is fitted with a balloon in order to have a good seal during the dye-test.

It also has a smooth mandrel to allow an easy insertion in the uterine cavity. Once in place, the mandrel is removed and due to the flexible nature of the introducer, it can be fixed to the patient’s thigh thanks to the Velcro provided.

The Douglas introducer (FTO 1-40 [www.fertiloscopy.com](http://www.fertiloscopy.com)) has got three channels. The central one is fitted with a sharp mandrel in order to be inserted in the pouch of Douglas. It is then replaced by the telescope.
The second channel allows inflation of the balloon located at the tip of the introducer. The balloon is of paramount importance: firstly it prevents the introducer from slipping involuntarily out of the abdominal cavity, secondly, by pulling on the introducer, the pouch of Douglas can be stretched in order to have a better view of it, thirdly, the balloon acts, as a ball joint from which the telescope can be directed in every direction. The last lumen is an operative channel allowing either the use of 5 French instrumentation (1.5mm diameter) as an outflow channel. (photo 3)

1.2. VERES NEEDLE

A veres needle is necessary and it is either possible to use a disposable one or a reusable. The important point is to be sure that the safety mechanism works normally.

1.3. FERTILOSCOPE

To practice fertiloscopy, it is necessary that the telescope has a diameter not greater than 4mm and a 30°lens. In practice, the use of the Hamou II telescope (K Storz-Germany) is strongly recommended for several reasons: its 2.9mm diameter, the 30° foroblique vision and its 120 times magnification make it the only telescope capable of performing microsalpingoscopy. (photo 4)
1.4. ADDITIONAL INSTRUMENTATION

The Douglas introducer has got an operative channel allowing the use of 5 French instrumentation. Biopsy forceps, grasping forceps and scissors are used. (photo 5, 6). Bipolar coagulation (which is the only electrical option in saline medium) is also useful by means of electrode or bipolar forceps.
1.5. ROOM SET UP

The patient has to be in the gynaecologic position. No Trendelenburg position is required and a slight procubitus is even recommended. Monitor and cold light are installed on a mobile videocart located at the left side of the patient. Saline solution comes on the right side by means of a standard infusion set up.

2) TECHNIQUE

The technique of fertiloscopy is rather simple. Nevertheless, it has to be very precise if one is to avoid problems.

2.1. PREPARATION OF THE PATIENT

Preparation of the colon is useful in order to deflate the colon and thus to increase the safety space in the pouch of Douglas. In practice, a mini-enema like Normacol® is very useful.

A careful vaginal examination has to be performed prior to fertiloscopy in order to detect any obstructive Douglas pathology as pelvic mass prolapsed in the cul de sac, or endometriosis of the recto-vaginal septa, which are contra-indications to the technique.(drawings 1 to 9)

2.2. ANAESTHESIA

Fertiloscopy can be performed either under general anaesthesia, or under strict local anaesthesia without any general sedation. We describe here the technique of local anaesthesia: we start by inserting an anaesthetic gel in the fornix (Emla®Asta Medica).10 minutes later, the local anaesthesia using Xylocaine®1% without epinephrine, can be performed without any painful sensation for the patient. 4-5cc of Xylocaine is then injected in the vaginal vault closed to the utero-sacral ligaments.

2.3. INTRODUCTION OF THE “UTERINE FERTILOSCOPE®”

The cervix is first exposed by means of a Colin speculum, inserted deeply in the vagina, in order to expose the posterior cul-de-sac. It is important to use a Colin speculum, because it is the only one, which can be removed while instruments are still in the vagina.

A Pozzi tenaculum is fixed at 8 o'clock on the cervix.

Then, the intra-uterine balloon Fertiloscope® (FH 1-29 www.fertiloscopy.com) is inserted into the cervix. If needed, a gentle dilatation of the cervix is performed with Hegar dilators.

Once in the uterine cavity, the mandrel is removed and the balloon is inflated with 2-3 cc of air.

It is important not to inflate too much the balloon in case of procedure performed under local anaesthesia, because dilatation of the uterine cavity may be rather painful for the patient.

The introducer is lastly attached to the patient’s thigh, with the adhesive provided.
2.4. HYDROPERITONEUM

In order to create a safety space for the introduction of the Douglas Fertiloscope®, a Veres needle is first used.

The point of entry is located 5 to 10mm below the cervix. To avoid that the Veres needle shall slide on the vaginal mucosa, it is necessary, at the start, to retract the safety obturation while impacting the tip of the needle in the very first mm of mucosa. Then, safety mechanism is released and the Veres is inserted with a firm movement. The axis of penetration has to take in account the position of the uterus. In case of retroverted uterus, the axis has to be parallel to the inferior blade of the speculum. In case of anteverted uterus, the axis has to be horizontal. As during laparoscopy, the tactile sensation of transfixing the vaginal wall and the peritoneum is easily acquired with some practice. Once in the right space, the Veres’ tap is opened and therefore, the preheated (35-36°C) isotonic saline solution can penetrate freely in the pouch of Douglas. About 200cc of saline solution are injected before the next step that is the insertion of the Douglas introducer.

2.5. INTRODUCTION OF THE “DOUGLAS FERTILOSCOPE®”

The Douglas Fertiloscope® (FTO 1-40 www.fertiloscopy.com) is then inserted in the same place and with the same axis as those used for the Veres needle, now removed.

If the introducer is in a correct position, and after removing the mandrel, usually, some saline will flow out and therefore the balloon can now be inflated.

If no liquid appears, it is better to check the position of the introducer through the scope. The visualisation of the intraperitoneal structure allows inflation of the balloon at that time. Balloon is inflated with 4-5 cc of air.

The telescope is introduced by unscrewing the valve located at the proximal end of the main channel, and irrigation is continued through the sheath of the scope.

Observation can now start.

2.6. USE OF OPERATIVE CHANNEL

A red tap on the introducer closes the operative channel. When opened, it allows the passage of additional 5 French (1.5mm diameter) instrumentation. It is necessary to rotate the introducer until the red tap is located on the left side. In doing so, the operative channel will be above the main scope channel and, therefore, the instrument can be seen through the 30° lens of the telescope.

The operative channel is also useful as a saline outflow channel. It is important when blood is present in the pouch of Douglas, to be able to rinse the cavity in order to increase quality of vision.
Drawing 1
Sagittal section of the pelvis

Drawing 2
Exposition of the cervix

Drawing 3
A) A Pozzi forceps is attached at 8 o’clock
B) Introduction of uterine introducer (FH 1-29)
Drawing 4

Insertion of veres needle and creation of the hydroperitoneum with saline solution

Drawing 5

Insertion of the Douglas introducer (FTO 1-40)

Drawing 6

Fertiloscope is introduced
Drawing 7
Dye test

Drawing 8
The three necessary movement for a complete view

Drawing 9
Salpingoscopy
3) OPERATIVE PROCEDURE

The vision obtained is inverted in comparison with that obtained by laparoscopy. Therefore, some time is necessary to be familiar with the fertiloscopic view. In fact, the learning curve is rather short for any laparoscopic surgeon.

3.1. EXPLORATION OF THE PELVIS (photo 7 to 16)

As in many procedures, it is important to have a systematic method. The first element to find is the posterior part of the uterus. It is the roof of the explored space. Then going alternatively from one side to the other, it is possible to find the origins of the adnexae: the utero-ovarian ligament and the tubal isthmus. In following the utero-ovarian ligament, the ovary can be reached, and every part of the ovary must be examined. The upper part of the ovary can be seen, thanks to the 30° lens of the telescope, by entering the space between ovary and fossa ovarica and rotating the scope on its axis. Tube can be followed from the isthmus to the ampulla and the fimbria. Due to the inverted vision, the tube appears to be located internally to the ovary, which can be disorientating at the beginning.

If the view of any structure is difficult, it is necessary to wait until more liquid has been instilled, which will improve the vision. It is also necessary to move the telescope in all directions not forgetting the forward and back movements.
Photo 7: Fimbria and normal ovary

Photo 8: Zoom on Ovary

Photo 9: Ovulation in progress

Photo 10: Ovulation (see the follicular fluid)

Photo 11: Right utero-sacral ligament and fimbria

Photo 12: Appendix
3.2. THE DYE-TEST (photo 17 to 20)

When all genital structures have been recognised, the dye-test can be performed. The dye is instilled through the appropriate channel of the uterine introducer. A 20cc syringe is connected and dye has to be pushed gently in order to avoid tubal spasms. The dye is visualised at the fimbria and it is necessary to move from one side to the other to be sure of bilateral patency.
3.3. SALPINGOSCOPY (photos 21 to 30)

Salpingoscopy is known as a very useful mean of investigation of the tube (Surrey). Brosens, for instance, has clearly demonstrated the pathological value of intra-tubal adhesion. Brosens and Putemans have described a salpingoscopic score which is useful to classify the findings. Nevertheless, routine salpingoscopy is rarely performed during laparoscopy because it is necessary to use a second telescope and an additional cold light source, video camera, monitor and irrigation. On the contrary, salpingoscopy is very easily practiced during fertiloscopy with the same telescope due to the position of the fimbria and the use of a small telescope. The technique is simple. It consists of stabilising the fimbria by means of grasping forceps introduced in the operative channel. Then, by pushing gently the telescope in the fimbria, it is possible to enter in the ampulla and reach the isthmo-ampullary junction. During the whole procedure, it is necessary to irrigate the tube, through the sheath of the telescope. A tap located on the sheath allows for in-flow adjustment to avoid too high pressure in the ampulla. By rotating the telescope on its axis and due to the 30° lens, each portion of the ampulla can be examined. All pathological findings can be identified such as intra-ampullary adhesions or flattened folds. These findings are of great importance when deciding whether surgical repair of a damaged tube is licit, or whether IVF is a better option.
SALPINGOSCOPY OVERVIEW

Photo 21: Panoramic view

Photo 22: Salpingoscopy

Photo 23: Salpingoscopy

Photo 24: Salpingoscopy – flattened folds

Photo 25: Ampulla

Photo 26: Grasping the fimbria
3.4. MICROSALPINGOSCOPY (photos 31 to 40)

As we have seen, salpingoscopy is of a great value when a tube is blocked to know whether it can be repaired or not. More often, patent tubes are discovered at the time of fertiloscopy. In these cases and according to the work of Marconi, it seems very interesting to have a more precise evaluation of the tubal epithelium. This can be obtained by performing microsalpingoscopy.

Microsalpingoscopy is possible thanks to the Hamou II telescope (K.Storz Germany) which allows to obtain a magnification up to 180 by rotating the wheel near the eyepiece. Microsalpingoscopy is performed after the dye-test. So, it is possible to examine the number of dye stained nuclei on the tubal epithelium, which are either intermediary cells on the epithelium or inflammatory cells (Mastocytes) in the middle of the tubal folds. According to Marconi, the number of dye stained nuclei allows to classify the tubes in four stages from normal (stage 1) where no nuclei are dye stained to pathological (stage 4) and where a great number of cells appear to be dye stained. Such aspect can be confirmed by taking a microbiopsy thanks to the 5 French biopsy forceps available.
MICROSALPINGOSCOPY OVERVIEW

Photo 31: Stage 1

Photo 32: Stage 1, some nuclei are dye-stained

Photo 33: Stage 1

Photo 34: Stage 2
Photo 35 : Stage 2

Photo 36 : Stage 2 dye stains nuclei are sometimes visible in simple salpingoscopy (without magnification)

Photo 37 : Stage 3

Photo 38 : Stage 3

Photo 39 : Stage 4 (every edges of the folds have a lot of dye-stained nuclei)

Photo 40 : Stage 4 mastocytes (between the mucosal folds) and epithelial cells (on the edge of the folds) are dye stained
3.5. HYSTEROSCOPY (photos 41 to 43)

Hysteroscopy is the last step of the procedure. It is practiced with the same scope. Endometrial biopsy is performed at this time if any pathology is suspected.

Photo 41: Uterine polype
Photo 42: Hysteroscopy - mucous plug in the tubal ostium
Photo 43: Hysteroscopy; the dye previously injected is not an obstacle to have a clear hysteroscopic vision

3.6. OPERATIVE FERTILOSCOPY

Even if the main aim of fertiloscopy is diagnostic, operative fertiloscopy is a new challenge. At present, some procedures are possible such as ovarian drilling, limited adhesiolysis, and biopsy. All these procedures are performed thanks to the 5 French operative channel. Therefore they are rather limited due to the small diameter of instrumentation (5 French = 1.5mm) and also due to the fact that instrumentation comes from a co-axial approach without the triangulation obtained in laparoscopy. Nevertheless, in the next future, better adapted instrumentation will allow to realise more operative procedures. Ovarian drilling is very easily performed during fertiloscopy. Proposed
by Fernandez, in the treatment of women with Polycystic Ovarian Syndrome (PCOS), after failure of clomiphene citrate, fertiloscopic drilling has proved to be as effective as laparoscopic drilling and in a very mini-invasive way. A 5french bipolar probe is used either disposable (Versapoint® Gynecare USA) or reusable (Ovadrill® Erbé-Soprane Germany-France), 10 to 15 holes are performed on each ovary after visualisation of the ovarian ligament which is the landmark of a proper ovarian drilling. Operative procedure is very fast (less than 15 minutes) and is realized as an ambulatory procedure. Biopsies are also performed. They were used in the tubes to correlate the microsalpingoscopic findings with the histologic aspects. Adhesiolysis is also possible by using the combination of bipolar probe and scissors. Of course it is only possible when adhesions are limited (i.e. when adhesions affect the tubo-ovarian relationship).

It is also possible to open closed tubes as hydrosalpinx, not in order to treat the obturation but to have the ability to perform salpingoscopy to select the best therapeutic option (salpingoplasty or salpingectomy and IVF).

Lastly, treatment of minimal or mild endometriosis is possible but the numbers practised today are too limited to be sure of the effectiveness of such procedures.

**OVARIAN DRILLING (photos 44 to 47)**

![Photo 44: Ovarian Drilling, first step](image)

![Photo 45: Ovarian Drilling](image)

![Photo 46: Ovarian Drilling](image)

![Photo 47: Ovarian Drilling](image)
ADHESIOLYSIS (photos 48 to 51)

Photo 48: Adhesiolysis

Photo 49: Adhesiolysis

Photo 50 a: Adhesiolysis

Photo 50 b: Adhesiolysis

Photo 50 c: Adhesiolysis

Photo 50 d: Adhesiolysis
3.7. END OF THE PROCEDURE

At the end of the procedure, the telescope is removed and the liquid can go out freely. It is not important to remove all the quantity of saline instilled, because it is very well known that the remaining saline will be reabsorbed in the following hours. No stitches are required on the vaginal scar. The patient can be discharged immediately if fertiloscopy has been practiced under local anaesthesia and in the following hours if general anaesthesia was practiced. The only recommendation for the patient is to avoid the use of tampon or to have intercourse for a period of 4 days.

3) CONTRA-INDICATIONS

There is only one real contra-indication: it is the obstruction of the pouch of Douglas either by a fixed retroverted uterus or by a myoma or an endometriosis of the recto-vaginal septum. It is easy to detect an obstructive pathology of the pouch of Douglas either by ultrasonography or by a careful vaginal examination.

In case of any doubt, fertiloscopy must not be performed.
RESULTS

Between July 1997 and July 2005 we have performed 1,500 fertiloscopies and 82 ovarian drillings by fertiloscopy.

We have divided our results in 4 periods: firstly: between July 1997 and October 1997, it was a preliminary study for the first 21 cases to assess the value of fertiloscopic. For this purpose, fertiloscopy was coupled with a laparoscopy. Results shown a very good correlation, and therefore, fertiloscopy was introduced on a routine scheme in our practice. At that time we created the name of fertiloscopy.

Second period: between November 1997 to December 1998 where we performed 268 fertiloscopies.

Third period: between January 1999 and July 2000, when microsalpingoscopy was systematically added and when 211 fertiloscopies were achieved.

Last period starting in September 2000 and where operative salpingoscopy was added. 1011 fertiloscopies were then performed.

Over all, we had 11 false route where insertion of the scope was made under the peritoneum. These cases occurred mostly in the two first periods and we have observed no more false routes since the injection of local anaesthesia is performed not on the central line but laterally in the sacral ligaments. These events were probably due to a dissection created by injection between the peritoneum and the vaginal vault. Another mean of prevention of false route was to insert firmly the veres needle and be sure that the flow of saline is spontaneously very good.

The only complications observed were three cases of rectal injury (3/1500= 0.2%), easily recognised with the scope. In the three cases, due to a lack of experience, the contra-indications had not been respected, and insertion was attempted in a pathologic cul-de-sac. But it is very important to notice that the perforations take place in a site located under the peritoneum. Therefore, the treatment of such injury is conservative with only antibiotics for some days. Of course, everything has to be made to avoid that, and the strict respect of contra-indications is the best prevention mean.

The characteristics of the patients is summarized in table 1, this table also shows that fertiloscopy appeared to be normal in 62% of cases. In 8.2% of all cases (Table 2) salpingoscopy was abnormal, and the patients were referred to IVF for this reason. When microsalpingoscopy was performed (table 3) it was considered as stage 3 or 4 of Marconi in 37% of cases. So these patients were directly referred to IVF. When microsalpingoscopy was normal, Intra-uterine insemination (IUI) was the chosen option.

Endometriosis was discovered in 13.9% of cases, and post PID lesions in 16% of cases. Further laparoscopies were practised in case of abnormalities, except in 6 cases, where a microsurgical anastomosis was performed for proximal tubal obstruction. It is interesting to notice that in every case where pathology was found at the time of fertiloscopy, it was confirmed at the laparoscopy. Only some lesions located above the uterus were not correctly appreciated.
<table>
<thead>
<tr>
<th></th>
<th>N / range</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>33,3 (22-42)</td>
<td></td>
</tr>
<tr>
<td>Duration of infertility</td>
<td>4,1 years</td>
<td></td>
</tr>
<tr>
<td>Primary infertility</td>
<td>1228</td>
<td>81,6</td>
</tr>
<tr>
<td>N=</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>11</td>
<td>0,7</td>
</tr>
<tr>
<td>Complications</td>
<td>3</td>
<td>0,2</td>
</tr>
<tr>
<td>Normal fertiloscopy</td>
<td>930</td>
<td>62,1</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>209</td>
<td>13,9</td>
</tr>
<tr>
<td>Post PID lesions</td>
<td>241</td>
<td>16</td>
</tr>
<tr>
<td>Subtle lesions</td>
<td>120</td>
<td>8</td>
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Table 1: global results of 1,500 fertiloscopies

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>normal</th>
<th>abnormal</th>
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<tbody>
<tr>
<td>phimosis</td>
<td>25</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>hydrosalp.</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>adhesions</td>
<td>48</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Endometri.</td>
<td>95</td>
<td>79</td>
<td>16</td>
</tr>
<tr>
<td>No pathology</td>
<td>326</td>
<td>299</td>
<td>27</td>
</tr>
<tr>
<td>total</td>
<td>500</td>
<td>98</td>
<td>19,6</td>
</tr>
</tbody>
</table>

Table 2: results of salpingoscopy (N= 500)

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Stage 1-2</th>
<th>Stage 3-4</th>
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<tbody>
<tr>
<td>Phimosis</td>
<td>12</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Hydrosalp.</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Adhesions</td>
<td>108</td>
<td>56</td>
<td>52</td>
</tr>
<tr>
<td>Endometri.</td>
<td>68</td>
<td>61</td>
<td>7</td>
</tr>
<tr>
<td>No pathology</td>
<td>311</td>
<td>196</td>
<td>115</td>
</tr>
<tr>
<td>total</td>
<td>500</td>
<td>315</td>
<td>185</td>
</tr>
</tbody>
</table>

Table 3: results of microsalpingoscopy (N= 500)
82 ovarian drillings by fertiloscopies were also practiced in case of polycystic ovarian (PCO) syndrome. Results are summarized in Table 4 and seem comparable to those obtained by laparoscopy.

<table>
<thead>
<tr>
<th></th>
<th>N / range</th>
<th>%</th>
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<tbody>
<tr>
<td>Operative time</td>
<td>13’ (9-23)</td>
<td>59,78</td>
</tr>
<tr>
<td>Spontaneous ovulation</td>
<td>49</td>
<td>59,78</td>
</tr>
<tr>
<td>Ovulation with stimulation</td>
<td>26</td>
<td>31,7</td>
</tr>
<tr>
<td>Total ovulation</td>
<td>75</td>
<td>91,4</td>
</tr>
<tr>
<td>Pregnancy (&gt;1 year)</td>
<td>44</td>
<td>53,6</td>
</tr>
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</table>

Table 4: results of 82 fertiloscopic ovarian drilling

DISCUSSION

We have created the name “fertiloscopy” to indicate the global quality of this examination which allows access to the uterine cavity (thanks to the last step of fertiloscopy that is hysteroscopy) the outside of the tubes and the tubo-peritoneal environment, and inside the tube (by the way of salpingoscopy and microsalpingoscopy) all in the same procedure (6).

The introduction of fertiloscopy in the arsenal of useful tools in infertile work-up raises some important questions:
Is it safe? Is it reproducible? Is it as efficient as the “gold standard” that is laparoscopy? Is it purely a diagnostic tool? Due to the success rate of IVF is it still useful to assess carefully the peritoneal cavity and its contents?
Many of these important questions have already been addressed.

1) Is it as efficient as diagnostic laparoscopy?

It was critical to answer this question since standard laparoscopy was considered as the gold standard for tubo-peritoneal evaluation. For this purpose, we have designed the FLY study (Fertiloscopy vs Laparoscopy) it was a prospective multicentric randomized study in which, fertiloscopy then laparoscopy were performed on the same infertile patient by two surgeons A and B randomized for the procedure they had to carry on. The procedures had to be video recorded and reviewed by two independent investigators. This protocol was submitted for approbation by the ethical committee according to the French Huriet Law.

82 cases were recorded and the main statistic study was a concordance study using a kappa score on 6 sites (both tubes and ovary peritoneum and uterus) leading to compare 492 different sites. The Kappa score for each site was comprised between 0.75 and 0.91, allowing the conclusion that the concordance between fertiloscopy and laparoscopy was excellent. Thus the main conclusion of the study was: “fertiloscopy should replace diagnostic laparoscopy in infertile patient with no obvious pathology”.

24
Although it was to our best knowledge the first time where two endoscopic methods have been evaluated in such prospective manner, we have to underline the fact that salpingoscopy and microsalpingoscopy were not taken in account due to the difficulties to perform salpingoscopy in a routine manner during laparoscopy.

2) Is fertiloscopy safe and reproducible?

The reproducibility has been already demonstrated in numerous works including our personal consecutive 1,500 cases. Safety is a concern since the risk of bowel injury exists. For insertion of Veres needle then fertiloscope is made between the cervix and the rectum. Safety is mainly prevention. In case of nodules, mucosal attraction, or fixed uterine retroversion, we had to cancel fertiloscopy once. The detection of such conditions is essentially clinical: a careful vaginal examination before fertiloscopy is critical. Ultra scan may help in some cases but do not replace clinical evaluation. If nevertheless a rectal injury occurs first it is of small diameter (less than 5mm) and located beneath the peritoneum. Therefore the treatment is always conservative with antibiotics for few days. There is absolutely no need to perform further laparoscopy and indeed laparotomy as demonstrated by the survey of Brosens and al.

3) Is fertiloscopy only diagnostic?

Yes it was at the beginning. Today and thanks to the operative channel (cf. supra) we are able to perform proper adhesiolysis, treatment of minimal endometriosis which consequently decreases the number of laparoscopic conversions. It is why, more and more, we propose to practise fertiloscopy under general sedation (similar to ovum pick-up in IVF) in order to carry on the operative gestures at the same time. In fact and often according to the health system, either fertiloscopy is performed as an strict office procedure (and with local anaesthesia) and therefore in case of pathology a further operation will be made, or fertiloscopy is performed in a day care unit and operative fertiloscopy is possible. Another possibility is to practise ovarian drilling in PCOS patient (polycystic ovarian syndrome). Many therapeutic options are today available for PCOS patients as Metformine. The interest of surgical ovarian drilling is a quick efficiency, lack of OHSS (ovarian hyperstimulation syndrome) decreasing of miscarriages. Performed trough fertiloscopy, ovarian drilling is very fast and safe and also allows a thorough evaluation of the pelvis tract in the same time.

4) Due to the success of IVF is there still any interest for endoscopic evaluation in infertile patient?

Indeed there is no use in certain circumstances when for instance infertility is only due to severe sperm deficiency. In other cases many IVF doctors say that HSG is sufficient because in the end IVF will be the only option for the couples. We strongly disagree with this opinion: first HSG is well known for its limits (around 15% of false positive and 35-40% of false negative). It is therefore of great interest to detect pelvic abnormalities such endometriosis or adhesions status. The treatment of these lesions leads
to a good pregnancy rate. Lastly more and more couples are very keen to obtain pregnancy in the physiological way. We believe that after an era of all IVF it is now time to re-evaluate our practice thanks to new mini invasive options like fertiloscopy.

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