This chapter defines the prognostic factors associated with successful tubal surgery. New perspectives have emerged in the management of distal tubal occlusion from the tremendous advances gained in the field of assisted reproduction technology and in operative endoscopy techniques. With regard to surgery, it has been demonstrated on numerous occasions that classical microsurgery\textsuperscript{1–3} and laparoscopic surgery\textsuperscript{4–9} show comparable results in terms of pregnancy rates. No doubt the crucial issue in the surgical management of distal tubal occlusion is the proper selection of the patient according to a set of strict criteria, which have a prognostic value on the chances of postoperative conception.

**Physiopathology of the Hydrosalpinx**

To understand the physiopathologic events associated with the development of distal tubal occlusion, an experimental model has been created in the rabbit by ligating the uterotubal junction and the ampullofimbrial junction.\textsuperscript{10} This model closely reproduces the natural clinical hydrosalpinx observed in 10% to 15% of all infertile patients. The experimental hydrosalpinx can reach 2 cm in size 6 months after the ligature. Morphologically, only the epithelium of the ampulla is affected by a significant deciliation process, appearing by 2 months after the induction of the experimental hydrosalpinx; epithelial height is seen to be decreased, and the stroma thickens because of submucosal oedema and fibrosis. After 6 months, primary mucosal folds become scarce and atrophic, whereas secondary folds completely disappear in the ampulla (Fig. 23.1).

Ampullary muscularis is typically invaded by fibrosis and the size of the capillaries in the tubal wall is significantly decreased; this decrease in the ampullary vascularization probably explains the deciliation process. It should be pointed out that the muscularis layer also shares a role in the transportation of the fertilized egg, as intrauterine pregnancies in Karthagener’s syndrome have been described.\textsuperscript{11} In addition, there is a generalized adrenergic denervation of the tubal wall, this feature being more prominent on the isthmic portion than at the level of the ampulla where the innervation is minimal in the healthy tube.\textsuperscript{12} All these lesions induced by the hydrosalpinx in the muscularis layer are permanent and explain the high failure rate associated with the surgical restoration of tubal patency.

The increase in fluid volume of the hydrosalpinx is probably the result of the depolymerization of the fluid...
FIG. 23.1. Experimental hydrosalpinx: (a) normal isthmus; (b) dilated isthmus after induction of experimental hydrosalpinx; (c) normal ampulla; (d) dilated ampulla after induction of experimental hydrosalpinx. Reduction in number and in size of ampullary folds is shown, with flattened epithelium between the ampullary folds. Please see insert for color reproduction of this figure.

components and a subsequent transudation from the underlying chorion. It could also result from a slowed-down secretion of fluid by the epithelial cells combined with the complete absence of drainage.10-12

The experimental hydrosalpinx of the rabbit and the hydrosalpinx observed in infertile women have similar patterns: distension associated with the unfolding of the mucosal folds and degeneration of the epithelial cells. As is discussed later, the deciliation index investigated on fimbrial biopsies and the degree of dilatation are correlated, and both serve as physiopathologic prognostic factors for the success of a salpingoneostomy; indeed, from hydrosalpinx specimens obtained at hysterectomy, it seems that the occurrence of dilatation of the tube results in the adrenergic denervation and fibrosis of the muscular layer, exactly in accordance with the observations made in the experimental model.10,11

Diagnosis of the Hydrosalpinx

The presence of hydrosalpinx can be diagnosed by hysterosalpingogram or by laparoscopy with or without chromopertubation. A meta-analysis of all the studies comparing hysterosalpingography to the gold standard of laparoscopy with chromopertubation showed the hysterosalpingogram to have a sensitivity of 65% percent in the diagnosis of tubal obstruction and a specificity of 85%.13,14

Transvaginal ultrasonography (US) has also been used to evaluate pelvic structures. Normal fallopian tubes can only be recognized in the presence of pelvic fluid. Transvaginal US is very specific in the diagnosis of hydrosalpinx, but its sensitivity is poor.15 Occasional longitudinal folds in the ampullary portion of the fallopian tube can be seen16 by transvaginal ultrasonography. A study by Atri et al.15 evaluated the accuracy of endovaginal sonography in the detection of fallopian tube blockage and found the specificity of transvaginal US to be 100% percent with a sensitivity of only 34%.

Methods using the passage of air or fluid to visualize the tubes sonographically have also been described. The same principle makes sonohysterosalpingography a useful tool in the diagnosis of hydrosalpinx.17-19 Color Doppler ultrasonography has also been used in evaluating tubal patency and diagnosing hydrosalpinx.20,21 Other diagnostic methods include salpingoscopy or falloscopy.22-24

Defining the Prognostic Factors for Successful Tubal Surgery

In the management of distal tubal infertility, in vitro fertilization (IVF) and tubal surgery should not be considered as competitive but rather as complementary modalities.25 When feasible with a good chance of success, surgery should always be attempted; IVF should only be considered when the fertility prognosis associated with conservative surgery is too poor. The conditions for surgical feasibility are based on the thorough evaluation of prognostic factors, usually obtained preoperatively and at the time of laparoscopy; this will orientate the patient toward the best therapeutic alternative. Factors contributing to the establishment of a prognosis for surgery can be subdivided into two groups, tubal and extratubal factors. The information collected during the evaluation phase is usually included in various scoring systems, with the aim of better defining the chances of conception if a surgical approach is selected.

Tubal Factors

Inflammation following pelvic infection of surgery leads to a series of tubal damage that is observed, described,