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EVALUATION OF A POLYPROPYLENE MESH COATED WITH ANTIBIOTICS IN AN INFECTIOUS MODEL OF VAGINAL SURGERY IN RABBITS.

Hypothesis / aims of study
Use of mesh in vaginal surgery allows a guarantee of anatomical and functional results over time, but serious complications (as dyspareunia, pain, mesh contraction) may limit its use.One cause of these complications can be mesh infection. Our research intended to confer antibacterial properties to the meshes.
The objectives were the development of a polypropylene mesh coated with a polymer matrix containing ofloxacin, evaluation in vitro and in vivo in an infectious model of vaginal surgery in rabbits.

Study design, materials and methods
The addition of ofloxacin has been made possible by its dispersion in a mixture of acetone and PLA50. Using a hydraulic press has kept the macroporosity of the mesh after the coating.
The study of the fixation and release was performed in chromatography.
Tests of bacterial adhesion and bactericidal activity were performed in vitro using immunofluorescence, the used bacterial strain expressing a fluorescent protein (GFP +) allowed a quantitative and qualitative analysis.
For the evaluation in vivo, 20 rabbits were operated. The agreement of the regional ethics committee on animal experiments was obtained. The animals were divided into four groups: infected or not and the polypropylene mesh was coated or not with ofloxacin. The mesh was located between the vaginal wall anteriorly and the rectum posteriorly.
The bacterial inoculation intraoperatively was conducted with a strain of E.coli.
The explantation at 1 month led to the production of bacteriological tests. A histological study was performed to quantify the impact of antibacterial quality of tissue integration.

Results
In vitro, the study of the release demonstrated the presence of a burst effect at 48 hours and a total release after ten days.
Immunofluorescence of the mesh coated with ofloxacin and infected by *Escherichia coli* was similar to the control (uninfected mesh).
The bacterial tests performed in the in vivo model of vaginal surgery in rabbits did not reveal any evidence of E.coli in the group polypropylene mesh coated wiht ofloxacin and infected group.
A statistical significant association between infection and erosion was obtained ($p < 0.001$).
The coating of the mesh by the mixture of polymer and ofloxacin was not accompanied by an increase in the rate of erosion.
The histological scores of inflammation (neutrophils) was higher in the group of polypropylene coated ofloxacin group compared with the polypropylene alone group.

Interpretation of results
Only 20 rabbits have been operated with this technique. We have validated the infectious model of vaginal surgery and all infected animal were alive at one month.
Our data suggests that erosion is strongly associated with infection and mesh coated with antibiotics could reduce erosion rate.

Concluding message
This work demonstraded the interest of a polypropylene mesh coated with ofloxacin and placed in contact with a vagina. We were able to validate a model of surgical infection recurring vaginal complications observed in clinical pathology.
Our animal model of vaginal surgery in rabbits is very promising and could be used as a model to study vaginal erosion. In addition it provides a new approach for understanding the pathophysiology of erosion.

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Is this a clinical trial?	**No**
What were the subjects in the study?	**ANIMAL**
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	**Yes**
Name of ethics committee	**Comité d'éthique pour l'expérimentation animale du Languedoc-Roussillon FRANCE.** **Ethical committe for animal experiment Languedoc-Roussillon, France**