The effects of the levonorgestrel intrauterine system (Mirena coil) on endometrial morphology

V Phillips, C T Graham, S Manek, W G McCluggage

Aims: The Mirena coil is a levonorgestrel releasing intrauterine device that is in widespread use. This study aims to document the endometrial morphology associated with this device.

Methods: Endometrial specimens from 75 women with the Mirena coil were reviewed and the histological features detailed.

Results: Morphological features found in most of the endometria were decidualisation of stroma (72 of 75 cases), atrophy of endometrial glands (65 of 75 cases), a surface papillary pattern (38 of 75 cases), and a stromal inflammatory cell infiltrate (59 of 75 cases). Additional common histological features were the presence of foci of stromal myxoid change (29 of 75 cases) and stromal haemosiderin pigment (24 of 75 cases). Reactive atypia of surface glands, glandular metaplastic changes, stromal necrosis, and stromal calcifications were found in small numbers of cases.

Conclusion: The endometrial features are characteristic and relatively constant and are in keeping with the effects of both a progestogenic compound and a mechanical device. Pathologists should be aware of these histological features because the Mirena coil is in widespread use.

The Mirena coil is a highly effective contraceptive and, compared with other intrauterine devices, reduces menstrual bleeding. It is a progestogen containing device and is currently licensed for periods of treatment of five years.

"Given the expansion in the clinical indications for Mirena coil usage we have reviewed the endometrial morphology in a large series of patients treated with this device"
but not the endometrial basalis. The surface had a localised undulating papillary pattern (fig 3) in 38 of 75 cases (best seen in hysterectomy specimens where the endometrium was present in its entirety). Foci of stromal myxoid change were present in 29 of 75 cases (fig 4). Twenty four of 75 cases contained small amounts of haemosiderin pigment within the stroma, in two cases there was stromal necrosis, and in one case there were stromal calcifications. In three cases there was significant reactive atypia of the surface endometrial glands and in seven cases focal glandular metaplastic changes (hobnail, clear cell, or ciliated) were present. Stromal granulomas were not seen.

Of the four patients with a history of endometrial hyperplasia, the three with simple hyperplasia showed no evidence of persisting hyperplasia and the other showed a small focus of persisting atypical hyperplasia.

Coexisting pathology in the hysterectomy specimens included leiomyomas in eight cases and adenomyosis in one. There was one case of cervical intraepithelial neoplasia (CIN) I and one of CIN III. In one case there was cervical microglandular hyperplasia (MGH) associated with focal decidualisation of the cervical stroma.

DISCUSSION
The aim of this report is to describe the histological appearances of endometria associated with the Mirena coil. This device is in common usage and pathologists should be aware of the associated morphological features. These have not been described extensively in the literature and it is our impression that many general pathologists reporting gynaecological specimens are not aware of them.

The glandular atrophy and stromal decidualisation, which were found in most cases, are exactly those expected with a progestogen containing device. The endometrial basalis, as expected, did not show these features because this layer is not hormone responsive. In one case, there was cervical MGH and stromal decidualisation, suggesting that the progestogenic effects may extend beyond the body of the uterus. Other features such as the surface undulations, the inflammatory cell infiltrate, and the stromal haemosiderin deposition can be attributed directly to the local effects of an intrauterine device. The presence of stromal plasma cells in many cases is indicative of an endometritis, these generally being considered necessary for a definitive diagnosis of endometritis because lymphocytes and neutrophils may be a normal component of the endometrium depending on the stage of the menstrual cycle. It may be that, in those cases with stromal plasma cells, this is indicative of a superimposed infectious process. One of the previously referred to studies detailing the morphological features of endometria associated with Mirena coil usage found a prominent infiltrate of CD56 positive large granular lymphocytes. We did not perform CD56 staining in our study. Stromal myxoid change was found in 39% of cases. This is analogous to the myxoid change that can occasionally occur in normal endometrial stroma and in the stromal component of endometriosis, especially when associated with decidual stromal change. Reactive atypia of surface endometrial glands secondary to the intrauterine device was not a prominent feature, with pronounced atypia only being found in three cases. A variety of epithelial metaplastic changes were found in seven cases. These were usually focal in distribution. Stromal granulomas were not identified.

“The glandular atrophy and stromal decidualisation, which were found in most cases, are exactly those expected with a progestogen containing device”
Take home messages

- The endometrial features associated with the use of the levonorgestrel releasing Mirena coil are characteristic and relatively constant.
- These features are in keeping with the effects of both a progestogen compound (for example, glandular atrophy and stromal decidualisation) and a mechanical device (for example, surface undulations, inflammatory cell infiltrate, and stromal haemosiderin deposition).
- Pathologists should be aware of these histological features because the Mirena coil is in widespread use.

References