Chapter 9
Summary

This thesis is about the niche, defined as an indentation of at least 1 mm representing myometrial discontinuity at the site of the caesarean scar that communicates with the uterine or cervical cavity, and mainly diagnosed using sonography and in particular with contrast-enhanced sonohysterography (SHG). Part I reports on diagnostics of the niche, part II on gynaecological symptoms and risk factors associated with a niche, and part III on niche pregnancy.

Chapter 1 is a general introduction and describes the outline of this thesis. The caesarean section (CS) rate is rising, and with that also the niche prevalence and interest for the niche. The niche is mostly evaluated with the use of transvaginal sonography (TVS) and SHG, but up to now there is no gold standard for the detection and measurement of a niche. As a result, a wide range in niche prevalence has been reported. In the first part of this thesis, we tried to learn more about the diagnostics and prevalence of a niche. We do know that not all women with a history of CS develop a niche, and therefore it is relevant to study the risk factors for the development of a niche. In addition, there are indications that a niche is associated with symptoms, especially with postmenstrual spotting. In the second part we tried to identify symptoms and risk factors associated with a niche. Furthermore, caesarean scar pregnancies (CSPs) have been described in the literature. In the third part, we aimed to report favourable treatment modalities for CSPs.

Part I
SHG is a widely used method for the assessment of the uterine cavity and for the detection and measurement of a niche. In Chapter 2, we compared gel instillation sonohysterography (GIS) with saline contrast sonohysterography (SCSH) for the evaluation of the uterine cavity. First SCSH and subsequently GIS were performed in 65 women suspected of having an intrauterine abnormality. Distension of the uterine cavity, image quality, visualization of intrauterine abnormalities and pain were recorded for both procedures. We found that the image quality of SCSH was slightly better than that of GIS, which was likely to be attributable to the presence of air bubbles in the gel. We concluded that the small difference in uterine cavity distension in favour of GIS and stable distension during at least 4 minutes make GIS a suitable alternative for SCSH if air bubbles can be prevented. More stable filling of the uterine cavity with gel is especially an advantage when performing 3D ultrasound.

In Chapter 3 we studied the reproducibility of niche measurement with 3D sonography. We evaluated the inter- and intraobserver agreement for measurement of niche size and volume, and assessment of shape with the use of three-dimensional (3D) ultrasound. Twenty 3D ultrasound volumes of uteri with a niche were selected and niche measurements were performed off-line twice by one observer and once by another observer in the longitudinal and transversal plane. The following measurements were performed: residual myometrial thickness (RMT), depth perpendicular to niche base, maximal depth, maximal width, width at niche base and the volume of the niche. In addition, we assessed the shape of the niche. We have shown that these niche parameters can be measured with a high level of agreement, in particular in the longitudinal plane. Our results demonstrated low reproducibility for niche shape.

Part II
Chapter 4 and 5 describe two prospective cohort studies, evaluating the niche prevalence and its relation with symptoms. In Chapter 4, 225 women were examined with the use of sonography six to twelve months after CS. The included women completed a questionnaire and pictorial blood loss assessment chart (PBAC). A niche (defined as an anechoic area with a depth of at least 1 mm) was present in 24% of women with TVS and 56% with GIS, and was found to be associated with
postmenstrual spotting. The volume of the niche was significantly larger in women with postmenstrual bleeding. We made a classification based on the sonographic shape of the niche. Niche shape was not associated with abnormal uterine bleeding. In Chapter 5, 263 women were included and sonography was performed six to twelve weeks after their CS. Women were followed by questionnaire and PBAC at six to twelve weeks, six months and twelve months after CS. The prevalence of a niche (defined as an anechoic area with a depth of at least 2 mm) was 50% with TVS and 65% with GIS, and women with niche had more often complaints of postmenstrual spotting twelve months after CS. In addition, the prevalence of postmenstrual spotting was higher in women with a RMT <50% of the adjacent myometrium than in women with a RMT >50%. Urinary incontinence was not related to the presence of a niche.

Chapter 6 contains a systematic review of the medical literature on the prevalence of a niche using various diagnostic methods, on potential risk factors for the development of a niche and on niche-related gynaecological symptoms in non-pregnant women. Reported niche prevalence varies depending on the method of detection, the criteria used to define a niche and the study population. As each study evaluated different risk factors, we classified the risk factors into four categories: those related to closure technique, to development of the lower uterine segment or location of the incision, to wound healing, and miscellaneous factors. Probable risk factors for the development of a niche are single-layer myometrium closure, multiple CSs and uterine retroflexion. Finally, we demonstrated with our review that the predominant symptom associated with a niche is postmenstrual spotting.

Part III
We describe our experience with the treatment of four caesarean scar pregnancies (CSPs) and provide an overview of the available literature in Chapter 7. Based on these cases and the literature, we postulate that transcervical needle aspiration of amniotic fluid followed by intra-amniotic injection of methotrexate is a good option for the treatment of a CSP, which may prevent surgical treatment in a lot of cases. Surgical treatment can still be performed if methotrexate fails. A disadvantage of medical treatment in comparison with surgical treatment is that it requires more time for the serum ß-HCG levels to drop to normal and the pregnancy tissue to resolve completely.

Chapter 8 provides the main findings of this thesis, a general discussion of the results and suggests future research strategies. There is a high variance in niche prevalence between studies, which may be explained by the heterogeneity of the studied populations and the lack of consensus on diagnostic criteria for a niche. The exact mechanism that leads to symptoms in women with a niche is still under debate. As a niche does not preclude a normal function of the lower uterine segment, with or without pregnancy, we prefer to avoid the term ‘defect’.

There are still no universal treatment guidelines for the management of CSP’s. We believe that transcervical needle aspiration of the gestational sac and intra-amniotic injection of methotrexate is a preferable treatment option as surgical intervention and the related risk for complications can be prevented in the majority of cases. If medical treatment fails, we suggest hysteroscopy in patients with a sufficient thick myometrium, and laparoscopic or vaginal removal of the pregnancy in case the CSP grows toward the bladder.

Future research on the niche needs a uniform definition and standard method for niche assessment. In the absence of evidence for the correct cut-off value for niche depth, we propose the following definition for a niche: an indentation of at least 1 mm representing myometrial discontinuity at the site of the caesarean scar that communicates with the uterine or cervical cavity seen on SHG. Future research should demonstrate if this is the correct cut-off value. In addition, we propose to use the parameters described in our reproducibility study (Chapter 3). At least volume and RMT should be included, as we demonstrated that these parameters are related to postmenstrual spotting. In addition, RMT is an important factor in the decision to treat with either hysteroscopy or laparoscopy in women with gynaecological complaints. The focus for future research should be on the aetiology
of niche development and related symptoms, and its impact on patients functioning, including sexuality. More research is needed to confirm if a niche is related to subfertility and/or to uterine dehiscence and rupture in a subsequent pregnancy. In addition, well-designed RCT’s are needed to get to know the optimal treatment modality of a niche, tailored to niche characteristics and symptoms of individual patients.