The diagnostic accuracy and the value of ultrasound thickness measurement of the lower uterine segment (LUS) in patients with previous cesarean section (CS) is still discussed controversially. Although commonly performed for prenatal selection when a trial of labor after cesarean section (TOLAC) is planned, the lack of a suitable protocol and a valid reference value limit its practical use. In order to evaluate the meaning of LUS diagnostics with regard to prediction of the devastating complication of a uterine rupture and outcome in a daily routine setting, 631 patients with previous CS were analyzed in this retrospective study. Myometrial LUS-thickness (mLUS) and/or the thickness of the full LUS (fLUS) were measured with ultrasound for birth planning in 399 (63 %) patients. In a group of 232 (37 %) patients, birth planning was performed without ultrasound LUS diagnostics. Because the results showed that a uterine defect (incidence: 28/631 (4.4 %), 24× dehiscence, 4 × uterine rupture) was more frequently detected coincidentally during repeated cesarean section and was seen in a larger number of patients with normal LUS thickness (detection rate with ultrasound overall: 13.6 %), these data do not confirm any prognostic value of ultrasound LUS thickness measurement for uterine rupture. However, an mLUS thickness < 1 mm was associated with a uterine defect in 100 % and an fLUS < 2 mm in 50 % of cases, respectively. Sensitivity, specificity, PPV, and NPV were better for lower cut-off values (2 mm (fLUS) and 1 mm (mLUS): 75/96/48.3/98.7 %) than for higher cut-off values (3 mm (fLUS) and 2 mm (mLUS): 15.8/93.2/10.4/68.7 %).

Our results indicate that prenatal ultrasound diagnostics in patients with previous CS might be more appropriate for the exclusion of preexisting uterine defects than for prediction. Therefore, ultrasound LUS thickness measurement seems not to be as meaningful for selection before TOLAC as hitherto assumed. Moreover, a thinning of the LUS is a common finding, including in advanced pregnancies without a previous CS, and there are numerous individual and methodological factors additionally influencing LUS diagnostics and its accuracy. From our results and results of the current research, we conclude that further prospective studies are needed to compare a selection protocol with LUS thickness measurements to one that targets exclusion of existing uterine defects and one without any ultrasound LUS diagnostics. Also, the meaning of repeated ultrasound diagnostics at term and/or at the beginning of birth should be studied. Postpartum ultrasound LUS diagnostics might be helpful to identify patients with asymptomatic uterine dehiscences after vaginal birth and therefore to improve the evaluation of outcome. Because it is considered to be a fundamental precondition for valid ultrasound LUS diagnostics, a consistent ultrasound protocol using both a transabdominal and a transvaginal scan performed by an experienced examiner should be used in further studies.