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LLETZ- Versus A Knife Conization

Results clearly favour the loop conization

Through an effective gynecological check-up, cell degeneration of the cervix uteri can be detected and treated even before the development of an invasive cervical carcinoma. The current standard treatment of a higher grade or low to moderate persistent neoplasm of the cervix uteri (CIN) represents the conization in which a conical shaped piece of tissue is removed from the cervical canal. Various conization techniques can be used. The original knife conization method has been replaced in the Western industrial countries, in most cases by the loop conization ("Large loop excision of the transformation zone" – LLETZ). Other methods such as laser conization, needle excision or ablative procedures are rarely used. With the LLETZ conization, the conus is not removed with a knife, but with a high frequency loop. A wide variety of studies showed that the LLETZ cone biopsy, due to the significantly lower peri- and postoperative complications, is superior to the knife conization. Nevertheless, in Austria the knife conization is still frequently performed.

Success rate and morbidity

With regards to the success rate of the conization, meaning the excision in healthy tissue the LLETZ conization and the knife conization can be regarded as equivalent. This is described by Martin-Hirsch et al. in a systematic Cochrane Review from 23 studies. The peri- and postoperative morbidity of the conization is, regardless of which operation technique, overall low. Nevertheless the knife conization compared to the LLETZ conization has a noticeable higher intra-operative loss of blood (79.1 +/- 74.6 ml vs. 3.3 +/- 2.8 ml, $p < 0.01$) and a significantly longer operation time (14 +/- 18.6 min vs. 2.8 +/- 2.9 min Oyesanya et al., 1993).

Obstetrical complications

The average age of patients with an appearance of a Cervical Intraepithelial Neoplasia (CIN) and thus indications for a conization is between 25 and 35 years. Most patients still have the desire to have children. The resection at the cervix uteri can however lead to an increased risk of complications in subsequent pregnancies. In a large meta-analysis of 27 studies that were published between 1960 and 2007, Arbyn et al. evaluated perinatal morbidity and mortality after an operative removal of a CIN with knife, laser or LLETZ conization. Thereby it was shown that the knife conization in comparison to a LLETZ-conization showed a much higher perinatal complication rate. The knife conization, in comparison to patients with no previous surgery, shows a higher rate of premature births before the 32nd week of pregnancy (RR 2.78; 95 % CI 1.72-4.51), extreme premature births before the 28th week of pregnancy (RR 5.33; 95 % CI 1.63-17.4) and a low birth weight of less than 2000 g (RR 2.86; 95 % CI 1.37-5.97). In general the knife conization raises the risk significantly of perinatal mortality (RR 2.87; 95 % CI 1.42-5.81). The LLETZ conization does not significantly raise the risk of perinatal morbidity or mortality.

Higher premature birth rates

The reason for the higher premature birth rates after conization has not been definitively clarified. The lack of regenerative capacity of the cervix, and therefore, lack of mechanical support during a pregnancy, could also play a role.

Some studies describe a positive correlation between the excision depth and the obstetric complication rates. Sadler et al. described a triple risk for a premature rupture of the amnion with a conus depth of 1.7 cm. Arbyn et al., postulate that even more than the excision depth, the volume of the removed conus is decisive for the high premature birth risk rates.

Under the assumption of a demi- ellipsoidal shape of the cone Phadnis et al. calculated a mathematical formula to evaluate the conus volume. They compared the conus volume after laser and LLETZ conization, which showed that after the laser conization the volume was significantly larger. Based on this study we conducted a multi centre study at the University Hospital Department for Gynecology in Vienna, using the data of three Viennese hospitals to compare the difference between the cone volumes of LLETZ conization and knife conization. Included were 804 cone biopsies (412 LLETZ conizations and 392 knife conizations) that were performed between 2004 and 2009 in the University Hospital for Gynecology in Vienna as well as in two secondary hospitals, also in Vienna. We were able to show that the average conus volume after a LLETZ conization was significantly less than after a knife conization. The percentage of endo- and ectocervical in-sano resections was comparable in both groups. Most knife conizations were carried out in the secondary hospitals, mainly in the early years of the study.

Summary

Principally, an indication for surgery because of a CIN should, according to current knowledge, be made very carefully. If there is the need for conization, care should be taken to remove as little tissue as possible. The exact description of the preoperative lesion by colposcopy and biopsy and the choice of an appropriate surgical technique are essential.

Today we know that with the LLETZ conization significantly lesser tissue is removed as with a knife conization, whereby the in-sano-resection rate of both methods should be considered as the same. Due to the significantly lower perioperative complications rate and, in particular, due to the significantly lower risk of obstetric complications in a subsequent pregnancy the LLETZ conization, is therefore the "gold standard" of surgical treatment of CIN and should be chosen in preference to a knife conization, especially with younger women(*see chart*).

	Available Data on Conization Techniques Comparison of Knife and LLETZ Conization	
	Knife Conization	LLETZ Conization
Operation time in minutes	14 ± 18.6	2.8 ± 2.9
Resection not in healthy tissue	13%	7%
Postoperative bleeding	8.5% (1.1-16.3)	4.1% (0.3-5.5)
Postoperative infection	1 – 6.8%	0 – 4.3%
	Relative risk (95 %-confidence interval)of obstetric complications	
Premature births < 34 weeks	2.78 (1.72-4.51)	1.20 (0.5-1.89)
Low birth weight < 1500g	2.3 (0.73-7.25)	0.81 (0.11-5.81)
Caesarean section rate	3.17 (1.07-9.4)	0.88 (0.71-1.09)
Perinatal mortality	2.87 (1.42-5.81)	1.17 (0.74-1.87)

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