A multi-perspective approach to cauda equina syndrome dedicated to sex, micturition and defecation

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CHAPTER 9

Summary

Summary in Dutch (samenvatting)

Curriculum Vitae

Dankwoord

SUMMARY

The cauda equina (Latin: 'horse tail') is the bundle of nerve roots shooting from the conus medullaris, generally starting at the level L1-L2 and running down to the sacral bone. The cauda equina nerve roots innervate the area of the 'saddle' (hips, thighs and buttocks) and the legs, as well as the vesical and anal (internal and external) sphincter, the bladder, the perineum and the genitals. Cauda equina syndrome (CES) is a rare neurologic condition caused by compression of these nerve roots. The complaints of this syndrome differ per patient. For diagnosis, at least one or more of the following should be present: 1) problems with micturition and/or defecation; 2) diminished/altered/absent sensation of the saddle area; 3) sexual dysfunction. In addition, neurologic complaints of the legs are often present, such as motoric or sensoric loss, sciatica and/or reflex changes. Lumbar herniated disc is the most common cause of caudal compression, with 2-6% of lumbar herniated disc patients developing CES. Emergency decompressive surgery is advocated for CES to increase the risks of recovery.

Research about CES traditionally focuses on the effects of time to decompression on outcome. Outcomes are not seldom dichotomous classified and often use dysfunction of micturition as most important indicator of outcome. Defecation and sexual function are only rarely evaluated next to micturition.

In the literature review (15 articles, 464 CES patients), it was demonstrated that dysfunction of micturition, defecation and sexual function are common in CES patients but are not all three regularly evaluated, not pre- nor postoperative (**chapter 2**). Dysfunction of micturition was evaluated in all studies and was present in 89% of patients at presentation. Dysfunction of defecation was evaluated in 8 out of 15 studies and was present in 47% of patients at presentation. Pre-operative documentation of sexual function was only available for three out of 464 patients. Many patients were demonstrated to have persisting complaints after spinal surgery: after a mean follow up period of 1.4 years postoperatively, 43% still had micturition dysfunction, 50% defecation dysfunction and 44% sexual dysfunction. Sexual dysfunction was documented the least: only in two studies, every patient was screened for sexual dysfunction postoperatively.

These findings led to a questionnaire survey among Dutch neurosurgeons about discussing sexual health and fertility with spinal patients (**chapter 3, chapter 4**). Seventy-two percent of the neurosurgeons indicated to (almost) never discuss sexual health and 88% indicated to (almost) never discuss fertility. In case of CES, 13% of neurosurgeons indicated to (almost) never discuss sexual health and 30% indicated to (almost) never discuss fertility. Neurosurgeons are thus aware of the risks for sexual and reproductive health in CES patients, yet do not routinely screen for these problems in CES patients. Barriers indicated to not discuss sexual dysfunction were: more advanced age of the pa-

tient (42%), lack of knowledge of the doctor regarding this topic (38%), lack of patients' initiative to bring up the subject (36%) and lack of time (26%).

Fertility was significantly more often discussed with male patients than with female patients (p=0.006), regardless of doctor's gender. In addition, fertility was discussed up to a higher age with male patients than with female patients (mean until 57 years versus mean until 47 years, p<0.001), irrespective of the age of the doctor.

To compare the results found in literature with the patient population from Leiden University Medical Centre (LUMC: referral hospital for spinal surgery), patients with CES due to lumbar herniated disc, operated in LUMC, were evaluated (**chapter 5**). CES patients were selected by screening all patients which were operated in LUMC between 1995 and 2010 because of lumbar herniated disc. Out of 744 surgeries for 696 patients, 75 patients had CES (11%). At the first presentation to the neurosurgeon, 92% had urinary complaints and 74% defecation problems. Of the 26 patients that were screened for sexual dysfunction prior to surgery, 25 had sexual dysfunction (96%). At postoperative follow up moment (mean 9 weeks after surgery), 48% had dysfunction of micturition, 42% had dysfunction of defecation and 53% indicated to have sexual dysfunction. Preoperative predictors for worse outcome could not be identified in this cohort.

Even though magnetic resonance imaging (MRI) is done for all patients suspect for CES, the correlation between MRI features and clinical presentation and outcome of CES is not known. To evaluate this correlation, MRI scans of the aforementioned LUMC cohort were assessed (available for n=48) and correlated with the pre- and postoperative clinical features (**chapter 6**). Analyses did not find an association between MRI characteristics and clinical characteristics (not at presentation nor at follow up).

To explore the influence of the pre-existing size of the lumbar spinal canal on the development of CES among herniated disc patients, MRI scans of CES patients were used to measure the anteroposterior diameters of the lumbar spinal canal, both at mid-vertebral level and at disc level. For comparison, the anteroposterior diameters of the lumbar spinal canal of lumbar herniated disc patients without CES, operated in LUMC because of sciatica, were measured. Comparing those two groups (n=28 and n=31) demonstrated that the herniated disc patients with CES had significant smaller spinal canal diameters than the herniated disc patients without CES, which were operated because of sciatica. This was found at all levels (L1 until L5-S1), both at mid-vertebral level as well as at disc level (largest p=0.002). Additionally, diameters of both groups were compared with average anteroposterior spinal canal diameters described in literature. This comparison displayed again that diameters of CES patients were significantly smaller than average at all levels (L1 until L5-S1) compared to the diameters of the herniated disc patients without CES, operated because of sciatica (largest p=0.021). The size of the lumbar spinal canal of CES patients has not been reported before, neither was it compared to that of herniated disc patients without CES, operated because of sciatica. This finding

might lead to important clinical consequences: if herniated disc patient with a smaller spinal canal indeed are more at risk for CES, then spinal canal diameter might become an argument for surgical intervention in case of sciatica, without (yet) evidence of CES. Since the presented number of patients is relatively small, further (prospective) research is needed to validate these results and to justify clinical consequences.

It is known from literature that complaints of micturition, defecation and sexual function due to CES might improve even years after surgery. Therefore, a follow up study of the LUMC cohort was carried out to evaluate dysfunction of micturition, defecation and sexual function several years postoperatively (**chapter 7**). The attitude of patients towards delivered hospital care with regard to these complaints was evaluated as well. Thirty-seven patients participated in this questionnaire survey (response rate 71%, inclusion rate 56%). Median time after surgery at follow up moment was 13.8 years (range 5.8 – 21.8 years). A high proportion of patients was found to still suffer from complaints of CES: 38% micturition dysfunction, 43% defecation dysfunction and 54% sexual dysfunction. Compared to the data of the follow up moment at the outpatient department (mean 8 weeks postoperatively), micturition dysfunction had significantly decreased (p=0.008). Two-third of the patients mentioned that they would have liked to gain more and/or better information from the neurosurgeon about the recovery of micturition, defecation and sexual function. These alarming high prevalences of complaints years after spinal surgery provide an insight into the harsh reality of long term recovery of micturition, defecation and sexual function in CES patients. At the same time, they offer the spinal clinician the opportunity to provide CES patients with a – much wanted – realistic prospect of recovery of functions.