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

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CHAPTER 1

Introduction

INTRODUCTION

Cauda equina syndrome (CES) is a rare neurological condition which is caused by compression of several of the nerve roots of the cauda equina. In 1929, Dandy was the first in English literature to publish about CES-like complaints, describing two patients with CES which were surgically decompressed, stating that it was disc material causing CES in those cases, and not, as was suggested before, spinal tumour.[1] Mixter and Barr raised much more attention with their publication five years later in which they demonstrated the effects of surgical decompression in 19 patients with CES due to lumbar herniated disc and thus advocated timely surgical intervention in all such cases.[2]

Although CES can be instigated by any pathological process compressing the cauda equina, e.g. epidural hematoma, tumour, trauma or infection,[3] a herniated lumbar disc is the most common cause of caudal compression in literature (45%).[4] The incidence of CES in operated lumbar herniated disc patients is about 2-6%.[5] Due to the strong indication for (emergency) decompression, CES incidence is believed to be much lower in the total group of sciatica patients.

Clinically, CES is suspected by a combination of complaints, which are not necessarily all manifest at the time of presentation, and which may vary greatly per patient. The most widespread definition of CES is the one proposed by Fraser et al. after reviewing hundreds of CES articles, stating that at least one or more of the following items must be present for diagnosis: 1) bladder and/or bowel dysfunction, 2) reduced sensation in the saddle area, 3) dysfunction of sexuality, with possible neurologic deficit in the lower limb (motor/sensory loss, reflex changes).[4]

Historically, CES is considered to be a strong indication for prompt surgical intervention.[2] Thus, in supporting this conception with scientific evidence, CES research has traditionally concentrated on the effects of time between presentation and surgical decompression (time to decompression). Probably one of the most influential publications in this respect was the meta-analysis of Ahn et al. (2000), concluding a significant worse outcome in case time to decompression exceeded 48 hours.[6] It was however criticized because of methodological flaws and its stringent conclusion about the 48 hour time frame, which was believed to be too strong since figures suggested that early surgery was more beneficial than late surgery, even within the 48 hours group. Critics mentioned that the conclusion of the safety of the 48 hours time frame could lead to devaluation of the benefits of earlier surgery.[7] In any case, Ahn's publication and the reactions it provoked strengthened the indication for emergency surgery in CES more than ever.

This focus on timing has allowed for a gap in current knowledge of CES: even though micturition, defecation and/or sexual function are by definition affected in CES patients, exact data about prevalence of these problems at presentation or at follow up after surgery are seriously lacking. Although most studies about CES evaluate outcome of

micturition, only several studies do so for defecation and sexual function. In addition, patient numbers of those studies are small – due to rarity of disease – and follow up rarely exceeds two years, even though outcome is thought to improve up to even several years after surgery.[8] In other medical fields, it has been shown that especially sexual dysfunction is rarely evaluated.[9,10] There are no reasons to believe that this is different for spinal care patients, even though spinal patients, not in the least CES patients – are at high risk of facing sexual dysfunction and reproductive health problems.[11]

Apart from time to decompression, other potential predictors for worse outcome in CES have been studied. However, those results are not unanimous, making it (yet) impossible to identify CES patients with high risk for adverse outcome. A differentiation may lead to more personalized postoperative care. In this light, it is worth mentioning that the predicting value of imaging characteristics in CES patients have never been studied either.

AIMS AND OUTLINE OF THIS THESIS

1) Data about problems of micturition, defecation and sexual function both at presentation and at follow up in patients with cauda equina syndrome (CES) seem to be lacking in literature, even though those functions are by definition affected in CES. The first aim of this thesis is to systematically evaluate literature about prevalence of micturition, defecation and sexual dysfunction in patients with CES due to lumbar herniated disc, both at presentation and at follow up after surgery.
2) Sexual dysfunction and fertility were proven in other medical fields to be not regularly discussed by doctors. This topic has not been studied for spinal patients. The second aim of this thesis is to evaluate the knowledge, attitude and practice of neurosurgeons with regard to discussing sexual function and fertility in spinal care, especially in patients with CES.
3) Existing studies about CES rarely evaluate outcome and predictors of defecation and sexual function next to micturition. The fact that these figures are missing, prevents the clinician from offering CES patients a realistic prognosis and makes it impossible to indicate which selective group of patients are likely to need additional (multidisciplinary) postoperative care. The third aim of this thesis is therefore to evaluate mode of presentation, outcome and predictors focussed on micturition, defecation and sexual function in a cohort of patients with CES due to lumbar herniated disc.
4) Magnetic resonance imaging (MRI) of the spinal canal is done by default in case of (suspected) CES. However, there are no studies evaluating the correlation between clinical and MRI features in CES. In addition, from a pathophysiological perspective, some features deductible from MRI, such as spinal canal size, might indicate

a higher risk for CES; again, however, this association has never been studied. The fourth aim of this thesis is twofold: 1) to evaluate the correlation between clinical and MRI features in a cohort of patients with CES due to lumbar herniated disc and 2) to compare spinal canal diameters of operated herniated disc CES patients with those of herniated disc patients without CES, operated because of sciatica.

5) Follow up of CES patients normally does not exceed two years postoperatively. Existing studies that do evaluate (very) long term outcome, are severely limited by minimal inclusion numbers and incomplete evaluation of defecation and/or sexual function. In addition, it is unknown how CES patients look back at the care they received. The fifth aim of this thesis is twofold: 1) evaluating the long term outcome (e.g. at least five years after decompressive surgery) and predictors of a cohort of patients with CES due to lumbar herniated disc focussed on micturition, defecation and sexual function and 2) evaluating the attitude of CES patients towards delivered hospital care focussed on dysfunction of micturition, defecation and sexual function.

REFERENCES

1. Dandy WE. Loose cartilage from intervertebral disk simulating tumor of the spinal cord. Arch Surg. 1929;19(4):660-672.
2. Mixter WJ, Barr JS. Rupture of the intervertebral disc with involvement of the spinal canal. N Engl J Med. 1934;210(5):210-5.
3. Spector LR, Madigan L, Rhyne A, Darden B, Kim D. Cauda equina syndrome. J Am Acad Orthop Surg. 2008;16(8):471-9.
4. Fraser S, Roberts L, Murphy E. Cauda equina syndrome: a literature review of its definition and clinical presentation. Arch Phys Med Rehabil. 2009;90(11):1964-8.
5. Kostuik JP. Medicolegal consequences of cauda equina syndrome: an overview. Neurosurg Focus. 2004;16(6):39-41.
6. Ahn UM. Ahn NU, Buchowski JM, Garret ES, Sieber AN, Kostuik JP. Cauda equina syndrome secondary to lumbar disc herniation. A meta-analysis of surgical outcomes. Spine (Phila Pa 1976). 2000;25(12):1515-23.
7. Kohles SS, Kohles DA, Karp AP, Erlich VM, Polissar NL. Time-dependent surgical outcomes following cauda equina syndrome diagnosis: comments on a meta-analysis. Spine (Phila Pa 1976). 2004;29(11):1281-7.
8. Jennet WB. A study of 25 cases of compression of the cauda equina by prolapsed intervertebral discs. J Neurol Neurosurg Psychiat. 1956;19(2):109-16.
9. Nicolai MPJ, Both S, Liem SS, Pelger RCM, Putter H, Schalij MJ, Elzevier HW. Discussing sexual function in the cardiology practice. Clin Res Cardiol. 2013;102(5):329-36.
10. Van Ek GF, Krouwel EM, Nicolai MP, Bouwsma H, Ringers J, Putter H, Pelger RCM, Elzevier HW. Discussing sexual dysfunction with chronic kidney disease patients: practice patterns in the office of the nephrologist. J Sex Med. 2015;12(12):2350-63.
11. Larsen E, Hejgaard N. Sexual dysfunction after spinal cord or cauda equina lesions. Paraplegia. 1984;22(2):66-74.