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Narrative Review

Cauda Equina Syndrome Clinical Guidelines Review.

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Abstract

In the wake of the COVID-19 pandemic, the national health services (NHS) had to adopt certain measures to amicably respond to the pandemic on the domestic front. Among these was the suspension of direct patient and physician interface to the extent possible, and the consultations were minimized to telecommunication. This review article aims to share the critical insights of current urgent care practice at the forefront of the advanced practice agenda that deals with complex issues both systematically and creatively, makes sound judgments in the absence of complete data, and communicates conclusions. Moreover, this review also highlights the originality in the application of knowledge, together with a practical understanding of local and national policy and drivers to support and develop an advanced practice that helps to critically evaluate current research and advanced scholarship in advanced practice.

Keywords

COVID 19, Pandemic, Cauda Equina Syndrome, Clinical Guidelines, National Health Services.

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Introduction

Red flags recognition and safety netting of rare disabling musculoskeletal (MSK) conditions such as Cauda Equina Syndrome (CES) became an exceedingly challenging process under the recent COVID-19 pandemic due to some supply and demand side factors. Among these, following a working diagnosis, under support from secondary care[1], almost all assessments via telephone calls during lockdown[2], and complexities around tele-interviewing the patient's with lower back pain who have more negative thoughts than the healthy population[3] all contributed to these challenges.

Against this backdrop, a critical analysis of CES clinical guidelines 2020, produced by Yorkshire Health Partners, Federation of General Practices (YHPG) in the mid of the pandemic, was analyzed. CES is one of the few most overlooked and underdiagnosed lifelong disabling red flags in patients, affecting health care services both financially and prognostically[4,5].

Cauda equina are motor and sensory nerves supplying the lower limbs, anus, bladder, and perineum area, emerging at couns medularis travel down from the L1 vertebra (filum terminalis) to exit from their corresponding vertebral foramen. No consensus has yet been developed by clinician-researchers so far in significant symptoms relating to CE nerve root compression[6]. The name cauda equina syndrome implies compressive or ischemic presentations due to disc herniation, disc inflammation, tumors, trauma/ fracture, spinal stenosis, and vascular claudication[7,8].

Clinical Guidelines (CGs) are evidence-based statements commonly used in clinical practice in decision-making under given circumstances. The credibility of guidelines comes from the validity of the contents and reliable quality undertaken by professional disciplines. CGs are clinically applicable, flexible, and provide clear information about the conditions. The meticulously documented form of CGs is regularly reviewed to incorporate current evidence and clinical practice-based information[9]. CGs serve clinicians of each specialty to provide evidence-based patient care and collect data to improve understanding of the condition. (NICE 2020- A) They also serve as a tool to set standards and educate professionals during the revalidation of the clinicians of that specialty. From a clinician's perspective, set guidelines justify an investigation. However, this does not mean that this will necessarily improve patient care. Therefore, an implementable guideline includes patient experience, clinical expertise, research base, care pathways, regular updates, and agreement from all stakeholders[10,11].

The Financial Burden on NHS Services

As reviewed by Kapetanakis et al. 2017, CES is a rare musculoskeletal presentation with neurological symptoms resulting from compression of lumbosacral nerves. Presentation is acute or sudden onset with progressive worsening where urgent emergency referral to secondary care services for exclusion and or intervention is required[1]. Significant variability exists among clinicians in management from referral to secondary care and attention received in accident and emergency department (ED)[12]. However, early diagnosis is a key factor in reducing the financial burden on NHS services which is a key agenda of current common pathways development[13]. In the absence of a clinical framework, the patient's quality of care is severely affected[8]. Urgent radiology referral by the clinician prior to neurosurgery is adopted as cost neutral intervention in many areas at present[14].

Framework and Guidelines for NHS Services

YHP CES guidelines (YHPG) 2020 were reviewed in light of the National Back Pain Framework (NBF) of early recognition of CES 2020 and the National Institute for Health and Care Excellence (NICE) guidelines 2020 on chronic back pain. The scope of this study is focused on the YHPG, their use in clinical practice, and deciding if and how they are implementable. Further discussion towards clinical issues in relation to advanced clinical practice[15]. Pubmed, Google Scholar, and NICE searches were used to explore current evidence. The symptoms and signs discussed reached ten in their broad terms and seventeen under subcategories. CGs included varying severity, irritability, and nature of

bladder and bowel control symptoms, rectal fullness, saddle anesthesia, inability to achieve an erection, loss of genital sensation during intercourse, the neurological deficit in lower limbs, and bilateral radicular pain, laxity of sphincter tones and motor weakness. Classification in YHPG is based on the severity of symptoms, namely CES suspected (CESS), incomplete (CESI), retention (CESR), and complete (CESC). NICE Guidelines reviewed in September does not entertain in detail except board symptoms with no clear guidance.

Under the current pandemic face to face consultations are replaced with telephone triages, and lack of MSK-trained clinicians, difficulty with hospital admission, and burden of care seem to be among the barriers to early diagnosis[12]. NICE guideline of chronic pain in over 16 assessment and management August (2020) has completely overlooked ever debatable CES. These issues highlight the severity and complexity of the issue and the sensitivity of clinicians in developing a clear pathway, moreover, probably due to litigation matters[46].

YHP considers CES as medical emergency and aims to develop CGs to ensure timely and appropriate treatment. The rationale is the lack of access to the radiology department, which has no clinical significance, as reviewed by Crooker et al. 2008. Furthermore, according to Gardener et, al. 2011, 4-6 hours of severe central disc prolapse can lead to CESR. On the other hand, Todd 2016, CESR with or without sacral nerve function does not consider same-day surgery. Therefore, the presentation is not a primary care-related issue from the assessment to early intervention perspective. As reviewed by Gleave & Macfarlane (2002), complete reversal of neurological symptoms is not possible after surgery; therefore, surgical intervention is still a matter of debate[16].

Red Flag Symptoms

As reviewed by Reito et al. 2018, the low accuracy of red flag symptoms in back pain warrants suspicion of specific spinal pathology for the low threshold of referral and radiological investigation[17]. As Dionne et al. 2019, CES symptoms red flags are more specific than sensitive, which means that signs and symptoms have poor diagnostic accuracy[18]. As reviewed by Fraser et al. 2009, for investigation for CES in acute back pain must have either of the symptoms; loss of bladder/ bowel function, saddle anesthesia with neurologic dysfunction[13]. The sensitivity of symptoms for cauda equina in cases of urinary retention is 0.90, unilateral or bilateral sciatica > 0.80, and sensory or motor deficit and reduced lies at > 0.80[19]. On the other hand, Zusman et al. 2019, in a retrospective cohort study, found rectal tone 80% and 86%, perianal sensation 60% and 68%, postvoid residual bladder (PVR) 80% and 59%, and B bulbocavernosus reflex (BCR)100% and 100% sensitive and specific respectively. This clearly explains that BCR alone has high accuracy in diagnosing CES. They agreed with Ahad et al. 2015 that no clinical feature could predict CES.

Although Quaile 2019 recommended a comprehensive multifactorial assessment outlined in AYHP and signs and symptoms of cauda equina have NBP in diagnosing CES[20], however, a systematic review by Fairband et al. 2011, failed to prove the combination of symptoms history and physical examination can be used in the diagnosis of CES. Korse et al. 2017 review reported that symptoms of CES on initial presentation in the clinic were sciatica in 97%, saddle anesthesia in 93%, micturition dysfunction in 92%, and 97 % of patients. Therefore, no clinical presentation, psychophysiological mechanism, or broad statement can comprehend CES[21].

Timothy et al. 1999 recommended digital rectal examination (DER) in pregnant women suspecting CES[22]. However, as reviewed by Gooding et al. 2003, DRE has no clinical significance in diagnosing CES. YHPG recommends DRE, which creates ambiguity and extra stain on trainee ACPs to justify if not performed. NBP, however, considers DRE a secondary care agenda, and this may warrant attention to other bowel dysfunctions to be considered in CES[23].

As reviewed by Domen et al. 2009, urinary retention of more than 500 ml alone is an

important predictor of CES. However, YHPG and NBP do not emphasize bowel dysfunction and give equal weightage to symptoms with the least relevance[24].

As reviewed by Todd et al. 2016, in the case of bilateral radiculopathy, CESS is not recognized in either of the guidelines. The author are aware that Connect Health Care (neighboring locality MSK service provider) has a regular protocol to warrant emergency MRI on the same day, informing patients and making them aware of surgical interventions in case of large central disc prolapse or cauda equina incomplete (CESI). NBF failed to differentiate such hypotheses of suspicions, clinical presentation, and emergency circumstances[25].

Patients with pre-existing abnormal MRI report developing signs of CES have shown a good correlation to clinical presentation[26]. As reviewed by Gitelman 2008, 2% of cases with previous disc herniation develop CES. As reviewed by McNamee et al. in 2013, Spinal stenosis and previous degenerative disc pathologies also lead to symptoms. YHPG and NBP consistently argue acute presentation but do not correlate with a history of pathophysiological changes. If the cauda equina nerve (CEN) damage has already occured, surgical intervention does not make any difference to the patient's quality of life. Therefore, at that stage, such symptoms are classed as white flags[16]. A scenario-based discussion would have aided the clinician in considering asymptomatic CES, which can easily be ignored.

Todd's 2017 in his review reported bilateral radiculopathy and progressive neurological deficit in the legs are red flags. He considers urinary retention, bowel incontinence, and saddle anesthesia as grey areas between red and white flags. He deducts that impaired saddle anesthesia, reduced anal tone, and unspecified urinary disturbance are red flags to suspect CES. On the other hand, Todd rejects that surgical intervention is CESR can improve such symptoms. While YHPG and NBF took out wisely, recommending clinical presentation must guide clinical judgment, will not support the clinician in the court of law[16]. In law, care standards are measured by what is done rather than what could have been done. Therefore, an expert witness statement is considered in law, reflecting that guidance has a subsidiary role[27,28].

Sexual dysfunction is classified as a red flag, but its severity level and objective examination are not elaborated on. PCP with limited MSK experience may not assess true dysfunction. However, Ponder et al. 2002 varied numbers of sexual dysfunction (Severe 35%, moderate 24%, slight and normal sexual 15%) established significance in CES, but a careful differential diagnosis was required. From an objective finding perspective, so far, BCR can only be objectively tested, showing 33 to 34 % specificity[29] and 81-83 % sensitivity[31]. On the other hand, Zusman 2019 et al. found 100% specificity and sensitivity. But they admitted not all patients can be assessed for BCR in the clinic for varying reasons.

Advocating for Patients

Advocating for patients is part of the clinician's duty of care for patients, and this advocacy comes from empathy and patient protection. YHPG does not discuss the medicolegal consequences of CES in greater depth while dealing with such patients. Fair dealing with such cases by advocating for the patient should start with the clinician[31]. Therefore, this document is more of clinician guidance, as proclaimed. NBF does not comment on patient advocacy, showing its low canvas from guidelines to a clinical decision matrix, in its composition[32].

Litigation issues are primarily complicated due to a lack of clear documentation. Advanced communication skills, including documentation, clear communication, information leaflet, and online tools, are important. However, staff training, flags on the online patient record system to follow up in busy GP practice, and workshops with role play and feedback are not discussed at all[33].

Metal implants, in the previous surgery of a patient, would contraindicate the use of an MRI Scan. Quaile 2019 recommended computerized tomography (CT) myelogram as the best alternate investigation of choice[20]. However, YHPG and NBF,

when discussing investigations, ignore patients' limitations to having an urgent instrumental investigation. Such information saves clinical time and is highly significant in a medical emergency, secondary care, and cases where an investigation is requested before a referral/ patient visit to A&E/ neurosurgery department.

Altered physiology, for example, in the elderly and pregnant women, creates a distraction from considering CES. Pregnant women commonly present with lower back pain, mechanical bladder, and bowel symptoms. There is a growing risk of missing such symptoms in pregnant women. Sudden disabling back pain and/or radiating leg pain should be considered red flags. Although in pregnancy, most support is provided by secondary or tertiary care, patients are still seen in primary care, and the timing of presentation and surgical intervention is crucial, as discussed earlier[34]. Hyperglycemic patients often suffer from polyuria and, in some cases, reduced control of bladder function. Superimposed with back pain can create a difficult situation to specify and/ or suspect CES[35].

Although rare, CES can complicate spinal surgery and even spinal epidural anesthesia. Therefore, recent neurosurgery intervention does not automatically exclude CES[36]. Rare forms of vascular in origin, for example, abdominal aneurysm with 50% distention, are also presented with lower back pain and can lead to CES from its vascular origin; however, no element of assessment is included[36]. Vascular presentation with or without ischemia is often delayed due to the focus on MSK by clinicians when assessing such patients[7]. As reviewed by Bednar 2016, 30 % of patients may present with sudden onset numbness, which may escalate leg weakness or difficulty walking there YHPG and BPN are mute on such presentations.

Comer (2020) reviewed that the Growing prevalence of lumber spinal stenosis in the elderly population due to anatomical, pathological changes can compromise cauda equina nerve roots. They also suggested the acute onset of worsening symptoms can be considered a red flag; however, they admitted no evidence is available to support this hypothesis[37]. Gandhi et al., 2018, reported that erectile dysfunction in the elderly population is age-related in the presence of diabetes, high blood pressure, and other cardiovascular diseases. Although MRI is a gold standard in confirming CES and lumber spine stenosis, its sensitivity for CES is only 96 %, and specificity lies at 68 %, which can be blurred due to interpretation and reporting[38]. Neither of the guidelines and pathways addressed the issue of this ever-growing aging population nor acknowledged further investigation.

There is an advancing trend from trained to educated professionals among allied health care professionals. This is well recognized in future NHS interim plans with the defined addition of advanced clinical practitioner roles. All elements of advanced clinical practice are measurable, including research and development[39]. ACP can use their clinical, research, and analytical skills in health care to improve the quality of care[40]. ACP are recognized as experts in their area of practice with research, training, mentoring, and leadership qualities that enable them to participate in clinical guidelines development[40].

Developing Clinical Guidelines

Developing clinical guidelines is challenging and requires strong research and analytical approach to identifying and refining the subject area in question. Clinical guidelines development groups are established to assess the evidenced-based systemic reviews. Primary care Practitioner (PCP) core pillars of practice include critical appraising implementability of guidelines and initiating research-based activities to develop an evidenced-based piece of work[41]. This evidence is cross-examined in current clinical practice in a wider spectrum within health care services. Once a solid piece of evidence is formulated, before implementation, the quality of evidence and approaches to enforcement are checked by the external reviewer[42]. Clinical guidelines need a regular update with changing circumstances, needs, and technological development in light of ongoing research and appraisals[43].

The authors understood that CGs are unadorned advice to ensure all essential aspects are fulfilled, although not patient or service centered in their composition. To some extent, CG may create uniformity of care among professionals in their clinical judgment. Guidelines are not replacing the advanced clinical decision-making process but help reach a logical decision. In developing guidelines, diversity of opinion, expertise, and training background is required to produce an effective piece of work. Certainly, ACP with diverse clinical backgrounds has a positive addition to health care organizations. ACP has leadership training and a role in facilitating advanced communication, clinical decision-making, and taking the initiative for service improvement. The leadership role entails additional responsibility to involve in the research and development process, from literature review, critical appraisal, and clinical guidelines development to pathways development[41,43].

Patients have variations in their clinical presentation, phenotypic and genotypic characteristics, and psychosocial behavior. Therefore, patient preference, tolerance to treatment, and or concordance issues arise, which need alternative approaches. AHPG, NICE, and NBF are among many pieces of work produced by different organizations; not all clinicians are aware of their existence, trained in utilizing them, or may disagree with them based on personal practice and service user feedback. Services occasionally have limitations, for example, if they are not commissioned to use a clinical tool, lack of recourses, clinical expertise, or demographic limitation[44,45]. Therefore, a balanced approach is required in the use of guidelines and practice-based procedures, and service-based pathways development.

The author's GP practice has staff with different skills and clinical backgrounds, including Practice Nurses, Nurse Practitioners, Community Pharmacists, Social Prescribers, First contact Practitioners, Advanced Clinical Practitioners, and GPs. Practice also uses the services of Emergency Care Practitioners to prevent hospital admissions. In-house Zoom meeting scheduled to enforce CES safety netting in the light of YHPG. The forum will generate opinions of other professionals and highlight training needs, uniformity in care provision, and staff awareness to access resources and care pathways. Practice is already working on Campaign to Reduce Opioid Prescribing (CROP) and admin staff telephone triage training. Therefore, it is a matter of interest to all staff members to ensure safe care provision to the service user.

Conclusion

In conclusion, CES CG does not cover all patient groups, all specific and sensitive assessment tools are impregnated in general lower back assessment consideration matters. In the lower back, patients' bilateral lower leg neurological symptoms are true red flags; however, early signs of bladder, bowel and reduced sensations are the grey area between white flags in which surgical interventions can reduce / long-term suffering. The symptoms where the prognosis is poor still need a secondary care urgent ED referral to exclude non-MSK pathologies. CGs are just a consolidated piece of evidenced-based information, providing clinician resource packs to validate their practice in the light of current evidence. Therefore, patient cantered approach should be advocated to provide safe and effective care and avoid litigation issues.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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