Commentary

A constant issue when trying to read the MR of the thoracic spine is to determine the correct spinal level. Various centres solve this issue in several ways. The most robust is to include an acquisition that extends up to the cranio-cervical junction. This adds time and therefore cost to the basic thoracic MR exam. Other approaches depend recognition of anatomical landmarks to determine the appropriate level.While there have always been apprehensions about the accuracy of this approach Connor et al's effort established beyond doubt the unreliability of these landmarks. As the author's suggest always image the cranio cervical junction and count down.

With the wide spread implementation of multi detector row CT, it is now possible to routinely visualise the vermiform appendix. With this ability has come the realisation that this vestigial structure (that appears only to exist to help train surgical residents) comes in all shapes and sizes. As we all know size matters. While there is a good correlate with the maximum diameter and pathology, the same relationship with the length has not been established. Interestingly Pickhardt et al show that neither very short nor very long lengths are risk factors or markers of pathology. It is the average middle of the road appendices that suffer.

As the population ages the prevalence of cognitive impairment also increases. An increasing number of patients with suspected dementia are investigated with MR and CT scans. At this point in time most Interpretations of the scans are based around exclusion of additional precipitating factors such as stroke, infection and malignancy. Very little effort is generally made to characterise the pattern of involution. While this may have been acceptable a decade ago this is no longer the case. With specific treatments available that may at least halt the progression of the dementia it is important to identify the various defined patterns as not all forms respond to the therapy. In this context Sven Haller et al's paper should be essential reading for all radiologists reading CT or MR scans of the brain. After reading this article they may also be interested in Bhogal et al's pictorial review of the radiological presentations of the common dementias published in the same issue of European Radiology.

Also in the issue is Sanz-Requena et al's article on high-grade gliomas. These tumours have uniformly bad outcomes but varied rates of progression. Various parameters have been used to try and predict this rate of progression to allow prognostication. These techniques are especially important for our practice as a l;arge number of patients either refuse, don't have access to or cannot afford a biopsy and adjunct information may be very helpful. Sanz-Requena et al use perfusion parameters to try to do this. Of the various perfusion parameters studied only the high transfer coefficient appears to be of any value.

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MRI-based anatomical landmarks for the identification of thoracic vertebral levels

AIM: To identify soft-tissue and bony anatomical landmarks on dedicated thoracic spine magnetic resonance imaging (MRI), and to assess their detectability, reproducibility, and accuracy in predicting specific thoracic vertebral levels.

MATERIALS AND METHODS: One hundred dedicated thoracic MRI studies were retrospectively analysed by two radiologists independently. Ten bone and soft-tissue landmarks were localized to the adjacent vertebral level. The true numerical thoracic vertebral level was subsequently determined and recorded by cross referencing with a sagittal cervico-thoracic "counting scan".

RESULTS: Six landmarks were defined in $\geq$ 98% cases; however, there was a low interobserver percentage agreement for the defined vertebral levels (>70% for only one landmark). The most useful land-mark for defining a specific vertebral level was the most superior rib (98% detection, 95% interobserver agreement, 98% at a single vertebral level, 0.07 SD). Eight landmarks localized to a specific thoracic segment in only 16–44% of cases, with a standard deviation of >0.5 vertebral levels and with a range which was greater than four vertebral levels.

CONCLUSION: The C2 vertebra must be identified and cross referenced to the dedicated thoracic spine MRI, as other MRI-based anatomical landmarks are unreliable in determining the correct thoracic vertebral level.

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Appendiceal length as an independent risk factor for acute appendicitis

OBJECTIVES: To determine if appendiceal lengths differ between adults with acute appendicitis and asymptomatic controls.

METHODS: In vivo appendiceal length at computed tomography (CT) in 321 adults with surgically proven appendicitis was compared with that in 321 consecutive asymptomatic adult controls. CT length was derived using curved multiplanar reformats along the long axis. Gross pathological length provided external validation for appendectomy cases.

RESULTS: Appendiceal length at CT correlated well with appendicitis specimens (mean length, 6.8 cm vs 6.6 cm; 79 % within 1.5 cm). For asymptomatic controls, mean CT appendiceal length was 7.9 cm, longer in men (8.4 ± 3.8 vs 7.4 ± 3.1 cm; P = 0.02), matching closely historical normative post-mortem data. The mean and standard deviation of appendiceal length at CT were significantly greater among negative controls than in the positive appendicitis group (7.9 ± 3.5 vs 6.8 ± 1.9 cm; P = 0.03). Of appendicitis cases, 90 % (288/321) fell within the range 4.0–10.0 cm, compared with 59 % (189/321) of negative controls (P < 0.001). Among controls, a fivefold increase in appendixes >10 cm and a twofold increase in appendixes < 4 cm were observed. Half (9/18) of long appendicitis cases showed tip appendicitis at CT.

CONCLUSIONS: "Intermediate" appendiceal lengths (4–10 cm) are more frequently complicated by acute appendicitis, whereas both "long" (>10 cm) and "short" (< 4 cm) lengths are more frequently observed in unaffected adults.

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Neuroimaging of dementia in 2013: what radiologists need to know

The structural and functional neuroimaging of dementia have substantially evolved over the last few years. The most common forms of dementia, Alzheimer disease (AD), Lewy body dementia (LBD) and fronto-temporal lobar degeneration (FTLD), have distinct patterns of cortical atrophy and hypometabolism that evolve over time, as reviewed in the first part of this article. The second part discusses unspecific white matter alterations on T2-weighted and fluid-attenuated inversion recovery (FLAIR) images as well as cerebral microbleeds, which often occur during normal aging and may affect cognition. The third part summarises molecular neuroimaging biomarkers recently developed to visualise amyloid deposits, tau protein deposits and neurotransmitter systems. The fourth section reviews the utility of advanced image analysis techniques as predictive biomarkers of cognitive decline in individuals with early symptoms compatible with mild cognitive impairment (MCI). As only about half of MCI cases will progress to clinically overt dementia, whereas the other half remain stable or might even improve, the discrimination of stable versus progressive MCI is of paramount importance for both individual patient treatment and patient selection for clinical trials. The fifth and final part discusses the inter-individual variation in the neurocognitive reserve, which is a potential constraint for all proposed methods.

Roberto Sanz-Requena, Antonio Revert-Ventura, Luis Martí-Bonmatí, ÁngelAlberich-Bayarri, GraciánGarcía-MartíAbstract

Quantitative MR perfusion parameters related to survival time in high-grade gliomas

OBJECTIVES: To evaluate the quantitative parameters obtained from dynamic MR T2*-weighted images as predictors of survival taking into consideration the biasing effects of other survival-related covariates.

METHODS: Thirty-nine patients (60 ± 14 years; survival 267 ± 191 days) with high-grade gliomas (8 grade III, 31 grade IV) were retrospectively included in the study. Additional data incorporated Karnofsky performance scale, tumour resection extension after surgery and type of treatment. Dynamic T2*-weighted MRI was acquired before treatment. Tumour curves were extracted for each voxel, and several quantitative parameters were obtained from the whole tumour volume and the 10 % maximum values. Additional image covariates included the presence of necrosis, single or multiple lesions, and tumour and oedema volumes. The relationship between quantitative parameters and survival was assessed using clusterisation techniques and the log-rank method. Cox regression analysis was used to evaluate each parameter's predictive value.

RESULTS: Only the mean of the 10 % maximum values of the transfer coefficient showed an independent relationship with patient survival (log-rank chi-squared test <0.001, Cox regression P = 0.015), with higher values corresponding to lower survival rates.

CONCLUSIONS: High maximum transfer coefficient values show an independent statistical relationship with low survival in high-grade glioma patients. This imaging biomarker can be used as a predictor of prognosis.