

Cite this article as:

Taylor SA, Carucci LR. The role of imaging in obesity special feature. *Br J Radiol* 2018; **91**: 20189002.

## THE ROLE OF IMAGING IN OBESITY SPECIAL FEATURE: EDITORIAL

### The role of imaging in obesity special feature

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The rapidly rising prevalence of obesity is having a major impact on health care systems across the world. Medical imaging is by no means immune and faces many challenges. Our equipment must be fit for purpose such that diagnostic quality images can be acquired routinely, and we need to devise evidence-based protocols that evaluate the effects of obesity, as well the complications of treatment, particularly surgery.

There are however opportunities for imaging to drive more tailored approaches to patient care. Imaging technology can non-invasively (and increasingly automatically) quantify fat deposition in the body and within individual organs. Such data allows us to better phenotype patients which may allow us to personalise care, and thereafter monitor the efficacy of therapeutic interventions.

This special issue of the BJR explores some of these challenges, reviews the latest research on imaging body and organ fat, and presents new research data in the field.

In the first article, Makaronidis and Batterham<sup>1</sup> review some of the fundamental clinical aspects of obesity including body weight regulation, and the so called “gut-brain axis”. They discuss how fMRI studies of the brain are providing new insights into the aetiology of obesity, therapeutic targeting, and the mechanism of action of treatment.

Three reviews then consider the challenges of imaging the obese patient and evaluating disease and treatment related complications. Uppot reviews the technical challenges faced by various imaging modalities and image-guided interventions with regards to obesity and presents ways of optimising image quality.<sup>2</sup> Surgery is one of the most effective treatments in obesity and radiologists need to be familiar with post-operative anatomy. Clayton and Carucci review the various imaging appearances following surgical intervention for obesity and discuss how to recognise associated complications.<sup>3</sup> Venous thrombosis is a common complication faced by patients with obesity, and Cascio and colleagues review this topic in depth.<sup>4</sup>

The next section of the special feature focusses on quantifying organ fat. Imaging’s ability to non-invasively quantify organ fat is providing new insights into diagnosis, phenotyping, prognostication and treatment evaluation and is a major focus of current research endeavour. Zhang and colleagues present an overview of the role of the various imaging modalities in quantifying liver fat,<sup>5</sup> while Chouhan and colleagues specifically consider the pancreas<sup>6</sup> where MRI is helping unravel the complex association between obesity, diabetes and metabolic disorders. Bray and colleagues then review fat fraction mapping in depth and how it is providing new insights into pathophysiology of obesity and a range of other disorders.<sup>7</sup> The review considers the effect of obesity on bone, a relatively forgotten organ to date. Finally, in this section, Borga and colleagues present a state of the art review on automated measurement of body fat composition using MRI.<sup>8</sup>

There then follows a series of research articles which present new data on a variety of topics around the theme of obesity. The incidence of abdominal wall hernias is also closely linked to the obesity epidemic and Halligan and colleagues present a detailed systematic review on imaging of ventral hernias.<sup>9</sup>

The next articles examine the effect of obesity on the imaging appearance of organs beyond the abdomen. In a short communication Alexander and colleagues present mammographic data suggesting increased dimensions of axillary lymph nodes in females with higher body mass index (BMI).<sup>10</sup> Harrington and colleagues then report that the degree of thymic fatty infiltration is also related to BMI.<sup>11</sup>

The link between MRI derived measures of visceral and subcutaneous fat is then explored by Bamberg and colleagues in a population study including 384 subjects.<sup>12</sup> They report volume ratios between the two fat types may be associated with impaired glucose tolerance. Two articles then present new research into imaging segmentation of body fat. Lee and colleagues present the results of adipose tissue segmentation using CT in a screening population,<sup>13</sup> while Kiefer and colleagues report on inter

and intra observer agreement for skeletal muscle fat content and area using MRI.<sup>14</sup> Won Jun and colleagues investigate the reliability proton density fat fraction quantification of liver fat and report good agreement with both MR spectroscopy and liver biopsy.<sup>15</sup>

The final research article of the special issue focuses on sleeve gastrectomy. Levy and colleagues present a study of barium

fluoroscopy in the diagnosis of sleeve stenosis, comparing with endoscopic findings and patient symptoms.<sup>16</sup>

It is clear that obesity provides both challenges and opportunities for the medical imaging community. This special issue presents state of the art reviews as well as cutting edge research in this field and we hope will both aid BJR readers in their own clinical practice and stimulate new research in this rapidly evolving field.

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