Ultrasound imaging to tailor treatment of shoulder pain in general practice

Valorisation

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Valorisation is the process of creating value out of knowledge, by making this knowledge suitable and available for economic or societal utilisation and to translate this knowledge into products, services, processes and new business. Valorisation should bring science closer to society, and has become a new maxim of modern research.[1] Clearly, the scientific findings presented in this thesis have societal value. The specific societal value is discussed within their respective chapters. In this valorisation section we summarise the overall implications of the major findings and provide additional information how our scientific findings can be transferred to and utilised in practice. The societal value will be reflected on from four different perspectives: relevance for practice; target groups to whom the findings are relevant; translation of the findings in concrete activities and products; planning of the valorisation.

Relevance for practice

Accurate diagnosis and timely treatment of patients with shoulder pain seems necessary to prevent the development of a potential chronic disorder with subsequent high costs. Musculoskeletal disorders are the second most expensive disease group for healthcare costs in the Netherlands.[2] In 2011 total healthcare costs for musculoskeletal disorders in the Netherlands was € 5.2 billion, which was approximately 5.8% of total healthcare costs, and € 1.1 billion (21%) can be attributed to primary care.[3] It is not known which part can be attributed to shoulder pain. Although shoulder pain related costs during six months after presentation do not seem alarmingly high, approximately €700 per patient, it is suggested that prolonged and recurrent episodes generate additional costs for expensive care and sick leave.[4] In general, costs due to sick leave (productivity losses) are substantial and represent a higher burden to the economy than healthcare costs.[5]

Unfortunately, accurate diagnosis of shoulder pain is difficult because findings from medical history and physical examination often poorly correlate with the underlying disorder.[6-13] The systematic review presented in Chapter 2 shows that ultrasound imaging is accurate in diagnosing subacromial disorders in patients seen in secondary care settings for whom conservative treatment fails. This implies that ultrasound imaging enables to establish a more specific diagnosis, also in general practice patients as these disorders are present earlier in the course. The relevance of our findings are addressed for both settings.

General practice

As discussed in Chapter 7, the results of our trial indicate that general practitioners (GPs) should refrain from ordering ultrasound imaging in patients with acute shoulder pain without previous treatment as it does not improve prognosis after one year. However, as shown in Chapters 3 and 4, ultrasound imaging is frequently applied in patients with acute shoulder pain.[14,15] The results of our trial imply that the total number of ultrasound examinations can be reduced. From a healthcare perspective, this reduction will save costs. On the other hand, an economic evaluation performed from a societal perspective, which implies that all relevant costs are taken into account (for example healthcare costs and costs due to sick leave), regardless of who pays for them, will be more informative. We anticipate an economic evaluation of our trial to follow, in which analyses will be performed from a societal perspective, meaning that healthcare costs, patient and family costs, as well as productivity losses will be included.

In patients with therapy resistance, ultrasound imaging may yield a more specific diagnosis, provide a rationale for further treatment, and inform patients about the prognosis of their disorder. Two examples are given to show the benefit of ultrasound imaging in patients with persistent pain. First, calcific tendonitis is the most prevalent observed disorder in patients with shoulder pain (Chapters 4 and 6).[15,16] In these cases, GPs can inform patients about the natural course, which is considered to be self-limiting with recurrent painful episodes. The self-limiting nature of this disorder may be reassuring for patients, and might prevent further treatment. If painful episodes are bothersome, treatment choice should be guided by shared decision-making based on information as to both the effectiveness and adverse events of each treatment option. Secondly, ultrasound imaging prevents unnecessary referrals to secondary care, as it enables GPs to refer patients targeted to secondary care. Preferably, patients are referred to an orthopedic surgeon in case surgery is needed, for example in case of full-thickness tendon tears. However, Chapters 4 and 6 show that full-thickness tendon tears are infrequently present in patients with acute and chronic shoulder pain, who present in general practice.[15]

Secondary care

Management of shoulder pain in secondary care involves various medical disciplines, for example orthopedic surgery, rheumatology, sports medicine, rehabilitation medicine, and radiology. Also for each of these disciplines the diagnosis of patients with shoulder pain is a complex problem.[6-12] Especially in secondary care, an accurate

diagnosis is essential to ensure that patients receive appropriate and timely treatment and correct information regarding their prognosis.

The results of the systematic review provided in Chapter 2 suggest that ultrasound imaging can have a positive impact on establishing a more accurate diagnosis in patients with shoulder complaints seen in a secondary care setting. Magnetic resonance imaging (MRI) and magnetic resonance arthrography (MR arthrography) can also be used to evaluate the painful shoulder. In addition, the results of Chapter 2 confirm the evidence that ultrasound imaging offers at least similar performance to MRI in diagnosing full-thickness tears. Evidence has shown that ultrasound imaging is the more cost-effective test in secondary care to diagnose full- and partial thickness tears.[6,17] This implies that ultrasound imaging can be the method of choice in evaluating patients with shoulder pain, and MRI can be reserved for diagnosing concomitant abnormalities in those identified for surgery, or for those patients with suspected intra-articular disorders, for example labrum lesions.[18] MR arthrography is more accurate in ruling out a partial-thickness tear.[17] This implies that MR arthrography can be performed in cases in which ultrasound imaging is not definitive. The combination of medical history, physical examination and ultrasound imaging fulfil the need for diagnostic certainty and enables physicians to tailor treatment in most cases. For example, ultrasound imaging is able to rule in and rule out full-thickness tears and hence allows for rapid identification of those eligible to cuff repair surgery.

An example of how ultrasound imaging affects diagnosis and timely treatment is provided in a study by Rutten et al.[19] This secondary care study showed that patients with posttraumatic shoulder pain have a high prevalence of unsuspected and initially missed rotator cuff tears, and ultrasound imaging was accurate in the detection of clinically relevant trauma-related shoulder disorders.[19] In this study, ultrasound imaging changed the initial working diagnosis in 74% of patients with posttraumatic pain and the treatment strategy in more than half of the patients. The authors conclude that active referral for ultrasound imaging may identify these abnormalities in an earlier phase and that this might improve clinical outcome.

Target groups

The results presented in this thesis are of relevance for several target groups. First of all, GPs and their patients directly benefit from the findings from this thesis. In patients with acute shoulder pain, ultrasound imaging does not improve recovery after one year. So, GPs should follow the advice stated in the shoulder pain guidelines issued by the Dutch College of General Practitioners, and should refrain from applying ultrasound imaging in patients with acute shoulder pain.[20] This implies that costs can be saved for

an individual patient. In The Netherlands all patients have healthcare insurance, however in 2015, they have a mandatory deductible of € 375. An ultrasound exam costs about € 80, which therefore can be saved.

Secondly, the results are relevant to other professionals who are involved in patients with shoulder pain. The benefits for secondary care disciplines are outlined above. Also, physiotherapists can benefit from these results. In Chapter 3 we showed that GPs refer patients to physiotherapists to establish a diagnosis.[14] Another study showed that two-thirds of patients referred by a GP was given the referral during the first GP consultation without further treatment by the GP.[21] These findings imply that GPs and patients have confidence in the process of physiotherapists. The confidence of patients is also illustrated by the number of self-referrals, direct access, to physiotherapy. In the Netherlands, patients can access physiotherapists directly; this is known as direct access or self-referral. Of all shoulder pain patients seen in physiotherapy practice, 12% use direct access.[21] Nowadays, ultrasound imaging is increasingly used by physiotherapists in The Netherlands.[22]

Thirdly, the results presented in Chapter 7 are relevant for diagnostic centers and radiology departments offering ultrasound imaging of the shoulder. They should inform GPs in their adherence area about the effectiveness of ultrasound imaging in patients with acute shoulder pain.

Fourthly, the findings are relevant to guideline developers. The Dutch College of General Practitioners issues guidelines for general practitioners. The most recent shoulder pain guidelines were issued in 2008.[20] Based on our findings, we recommend several adjustments. In order to inform patients about the natural course of a specific disorder and evidence-based treatments, GPs require more information than is currently available in the shoulder pain guidelines. Currently, the guidelines lack information about the natural course and treatments of the specific subacromial disorders. We recommend that this should be incorporated in the update of the guidelines, especially given that ultrasound imaging is frequently ordered by GPs (Chapters 3 and 4).[14,15] We also recommend the introduction of a clear and unequivocal classification of shoulder pain (Chapter 3).[14] Uniform classifications are essential for the timely diagnosis and treatment of shoulder pain conditions by various healthcare professionals such as GPs, physiotherapists, orthopedic surgeons and rheumatologists. Despite the shoulder pain guidelines advising GPs to classify patients based on pain and physical examination findings, GPs use a variety of classifications. This lack of uniformity is not limited to general practice, but also exists among physiotherapists, orthopedic surgeons and researchers.[23,24] In 2012, the Netherlands Orthopedic Association introduced the term “Subacromial pain syndrome (SAPS)” in the eponymous “Guideline for diagnosis and treatment of subacromial pain syndrome”.[25] We therefore

recommend the use of the term SAPS in the shoulder pain guidelines of the Dutch College of General Practitioners, especially considering the guidelines for physiotherapists, released by the Royal Dutch Society for Physical Therapy, are known as “Evidence Statement for Subacromial pain”.[20,26] In cases where the specific disorders are known, SAPS can be replaced by this specific disorder.
Finally, the results are of importance for providers of training for GPs. They should not focus only on the diagnostic work-up and therapeutic strategies as outlined in the guidelines, but should also address how to combine the guidelines, their own experience and expertise, and their patients’ preferences in decision-making concerning diagnostic work-up (Chapter 3). As other factors influence patient’s reassurance, GPs might benefit form training in tolerating diagnostic uncertainty, and the use of other reassuring strategies. Consequently, ultrasound imaging will be more adequately applied.[14]

Activities and products

Several activities have been performed and products have been developed, or will be developed in the near future. Chapters 2 to 7 are presented on national or international congresses. The evidence-based treatment protocol presented in Chapter 5 provides GPs a handle to cope with specific shoulder disorders, however, an update incorporating new evidence is recommended.
As outlined in the General Discussion of this thesis, we developed an evidence based flowchart to specify when a GP should advise ultrasound imaging to shoulder patients. This flowchart is incorporated in the application form released by Medical Coordination Centre Omnes (Omnes) for which GPs have to complete when ordering ultrasound exams. We anticipate an update of this flowchart to follow.

Planning and realisation

On a regional level, Omnes will be informed so that the flowchart to specify when a GP should advise ultrasound imaging to shoulder patients can be modified, and a regional training for GPs, addressing the topics described earlier, can be scheduled.
On a national level, further distribution can be realised by the Federation of Medical Coordination Centers, as Omnes is a member of this federation.
In addition, updating the shoulder pain guidelines is coordinated by the Dutch College of General Practitioners.

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