A review of the electronic two-week rule referrals for head and neck cancer to Western Sussex Hospitals NHS Foundation Trust

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Key points

Raises the awareness of practitioners to the current guidelines for two-week rule (2WR) referrals.	Provides practitioners with statistics from research into the adherence of general dental practitioners to 2WR referral guidelines.	Provokes consideration and discussion of the effectiveness of the two-week rule for improving detection rates for head and neck malignancies.

Abstract

Introduction The two-week rule (2WR) for referring suspected malignancies aims to improve access and outcomes for cancer patients. However, there has been criticism of the rule in the literature. GDPs have an important role in spotting head and neck cancer (HNC) and using the 2WR appropriately to ensure their patients get fast and effective treatment.

Aims 1) To evaluate adherence to guidelines of electronic 2WR referrals for HNC sent to Western Sussex Hospitals Trust from GDPs in Sussex; 2) to determine the detection rate of oral malignancies from these referrals; 3) to determine the success of the maxillofacial unit in seeing referred patients within two weeks.

Materials and methods Two hundred and nineteen randomised electronic 2WR referrals were analysed for adherence to the guidelines for referral of suspected oral cancer. Patient waiting times, subsequent correspondence and pathology results were analysed.

Results One hundred and thirty-five referrals (62%) were deemed to be compliant with the NICE NG12 guidelines, while 186 referred patients (85%) were seen within the two-week time frame. Six referrals (2%) resulted in a positive detection of malignancy (a lower rate compared to similar previous studies).

Discussion There are several possible reasons for the poor rate of guideline adherence from GDPs, such as pressure to refer defensively and a lack of knowledge of referral guidelines or oral pathology. This may contribute to a poor detection rate, although there may be other contributing factors.

Conclusions Thirty-eight percent of electronic 2WR referrals from GDPs were deemed inappropriate; ongoing education is required to minimise these inappropriate referrals. Patients must be made aware of the reason for their referral to promote attendance. Further studies are required to identify the reasons for such a low detection rate.

Introduction

The 'two-week' rule (2WR) for suspected cancer referral is used throughout the National Health Service (NHS). It was first proposed in the UK in 1997 by the Department of Health (DoH) in its white paper *The new NHS:*

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modern, dependable,[1] to ensure urgent referrals of suspected cancer were appropriately managed and followed up (DoH, 1997). That is, to endeavour to provide all referred patients with a consultation appointment within two weeks of the date of referral. The 2WR pathway differs from the referral pathway for non-urgent 'soft tissue lesions' which can be triaged and rejected (if deemed inappropriate) and do not have a time limit for when they need to be examined by a specialist.

The DoH guidance for suspected head and neck cancer (HNC) was published in 2000 to inform primary care practitioners of the criteria for potential malignancy and thus prompting a two-week rule referral (DoH, 2000).[2] It identified ten clinical signs for HNC that should raise concern (Box 1).

The aim of such universal direction is to increase the detection rate and promote the early diagnosis of oral cancer, thus ensuring that lesions are treated early to improve morbidity and mortality rates. This DoH guidance has since been superseded by *Suspected cancer: recognition and referral* (NG12), a document published by the National Institute for Health and Care Excellence (NICE, 2015).[3] These guidelines have several sections categorised by type of cancer, by symptoms and by findings from investigations within primary care. The section for HNC directs primary care clinicians to refer patients via the two-week rule if they

suspect oral cancer due to any of the signs listed in Box 2.

HNC forms 3% of all reported cancer cases in the UK, with an incidence rate of 11,449 new cases in 2014, an increase of more than 30% since 1993. This recent increase could be partially due to a rise in oropharyngeal squamous cell carcinoma which has been attributed to increasing rates of human papilloma virus (HPV) 16 infection in white males under the age of 50 years.[4] An average of approximately 50% of cases consistently manifest themselves in patients of 65 years and above. In 2014 mortality from oral cancer alone was 2,386 deaths.[5] The main risk factors for developing HNC include:[6,7,8,9,10]

1. Smoking or chewing tobacco
2. Alcohol consumption
3. Human papilloma virus (HPV) type 16
4. Deficiency in dietary fruit and vegetables
5. Human immunodeficiency virus (HIV)/ AIDS.

Cancer Research UK reported that 91–93% of HNC cases are seen as preventable if the patient had modified certain lifestyle risk factors earlier.[5] The general dental practitioner (GDP), therefore, has a highly important role in being able to spot at-risk behaviours for oral cancer in their patients and give appropriate preventative advice.

Aim and objectives

Aim

To determine the quality of the 2WR process for patients referred with suspected HNC from their GDPs to the maxillofacial unit of an NHS trust in Sussex, in order to promote the best use of available secondary care consultations.

Objectives

1. To review the adherence and accuracy of a random sample of electronic 2WR referrals to Western Sussex Hospitals Trust (WSHT) submitted from GDPs in Sussex since April 2016, in accordance with the NICE NG12 guidelines and to draw on common themes of error and good practice
2. To determine the waiting times for 2WR patients referred via their GDPs to the maxillofacial unit at Western Sussex Hospitals Trust
3. To determine the detection rate of oropharyngeal/head and neck malignancies via the 2WR
4. pathway.

Box 1 Department of Health referral criteria* for suspected oral cancer

1. Hoarseness persisting for >6 weeks
2. Ulceration of oral mucosa persisting for >3 weeks
3. Oral swelling persisting for >3 weeks
4. All red and white patches of the oral mucosa
5. Dysphagia persisting for 3 weeks
6. Unilateral nasal obstruction particularly when associated with purulent discharge
7. Unexplained tooth mobility not associated with periodontal disease
8. Unresolving neck masses for >3 weeks
9. Cranial neuropathies

*See reference:[2]

Box 2 NG12*

Unexplained oral ulceration persisting >3 weeks

A persistent and unexplained neck lump

A lump on the lip or in the oral cavity consistent with oral cancer

A red or red and white patch in the oral cavity consistent with erythroplakia or erythroleukoplakia

*See reference:[3]

Materials and methods

A random sample of 214 electronic 2WR referrals was generated from a total of 480 electronic 2WR referrals sent from GDPs in Sussex from 5 April 2016 to 26 May 2017. Since April 2016, all 2WR referrals from GDPs in Kent, Surrey and Sussex have been submitted via an online electronic referral system and referrals are no longer accepted via previous conventional methods such as written referrals. Data concerning the referrals' compliance with the NG12 guidelines,[3] the reasons for referral (including the anatomical site of interest), the waiting times for referred patients to be seen in hospital and the eventual diagnosis were then collected using a Google Form, with a variety of online and hospital trust databases accessed. The data were then analysed and collated using an Excel spreadsheet.

Consent and confidentiality

The investigator obtained consent from the head of department in the maxillofacial unit at Western Sussex Hospitals Trust and also from the trust's audit officer. No participant consent was required for this study as there were no human participants and no personal details included in the write-up.

Ethical and R&D approval

NHS ethics approval was not required as this study was purely an analysis of hospital data. This was confirmed by the decision tool of the Health Research Authority. Ethical approval was sought and subsequently obtained from the ethics committee of the University of Kent's Centre for Professional Practice.

Results

Reason for referral

The electronic referral system used provides GDPs with a drop-down list of reasons for suspecting a head and neck malignancy. This list corresponds closely with the DoH's guidance for suspected head and neck cancer,[2] with some alterations. Figure 1 displays the distribution of the reasons given by GDPs for referring their patient via the 2WR pathway. It demonstrates that the most common reasons for referral were 'ulceration of tongue/oral mucosa >3 weeks' and 'red or red and white patch of oral mucosa with pain or bleeding', with both reasons making up 65% of the total. GDPs did not provide a reason for referral in 14% of cases.

Apart from six referrals, it was generally possible to decipher in which anatomical site the suspicious lesion or area of interest was. The GDP either made this clear by selecting the anatomical site from a drop-down list in the electronic referral or in their supplementary information. If this information was not provided, then it was up to the secondary care clinician to investigate for the site of interest during their examination and confirm their findings in correspondence with the GDP. Figure 2 displays the distribution of anatomical sites of interest which made up

Fig. 1 Distribution of reasons given for electronic 2WR referral from GDPs referring to maxillofacial unit at Western Sussex Hospitals Trust
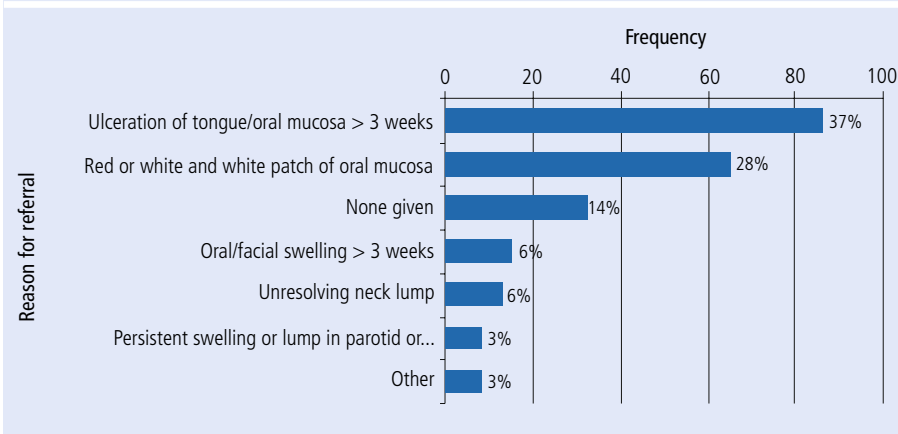

Fig. 2 Anatomical site of interest for electronic 2WR referrals from GDPs referring to Western Sussex Hospitals Trust
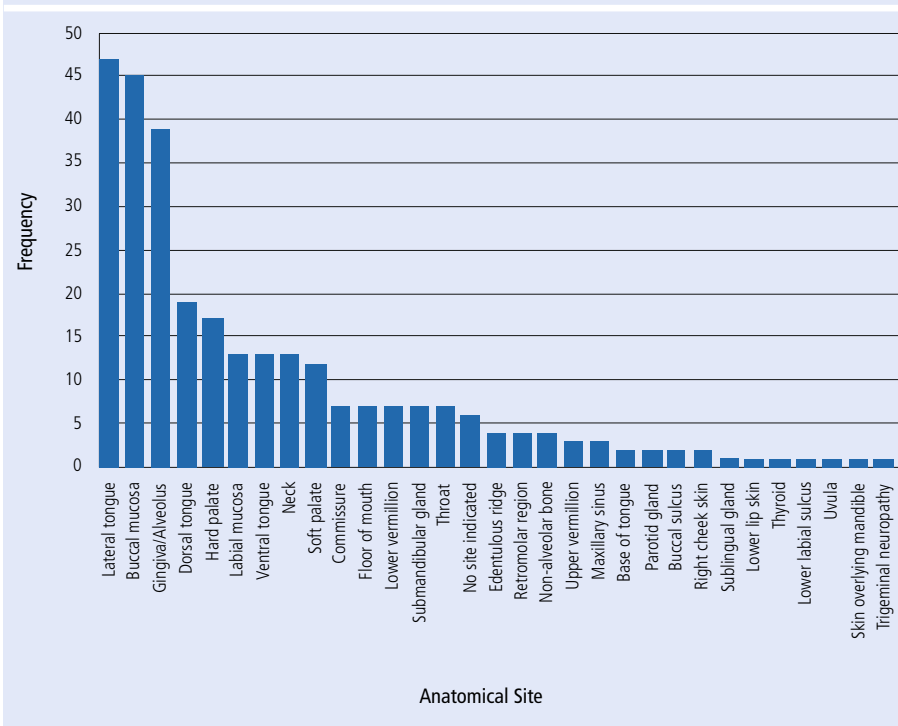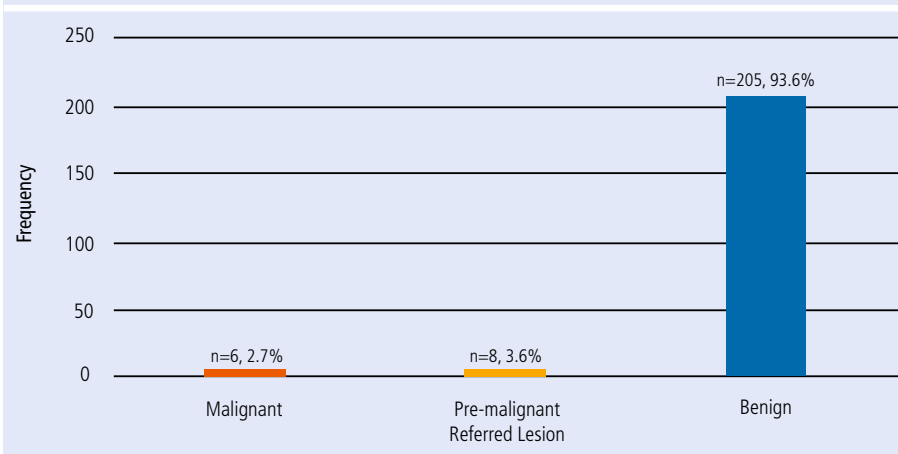

Fig. 3 Malignancy detection rate from electronic 2WR referrals to Western Sussex Hospitals Trust

the 219 referrals. The most common sites were lateral tongue (16%), buccal mucosa (15%), and gingiva/alveolus (13%). The sum of frequencies is 292, as individual referrals could often contain references to multiple lesions or sites of interest.

Differential diagnoses and malignancy detection rate

Table 1 gives the distribution of differential diagnoses that resulted from the 219 2WR referrals sent to WSHT (no patients failed to attend their consultation). The most common diagnosis was a lesion of traumatic origin (for example, traumatic keratosis or ulceration) which represented 34 of the lesions referred. No abnormality was detected in 23 referrals, while nine lesions that were seen as pathological (and presumably potentially malignant) in primary care, were actually described as 'anatomical' by the secondary care clinician.

The majority of the 219 lesions referred by GDPs were benign (93.6%), while 3.6% were classed as premalignant lesions: erosive lichen planus (n = 3), actinic keratosis/cheilitis (n = 3), chronic hyperplastic candidiasis (n = 1) and dysplasia (n = 1). This left a 2.7% malignancy detection rate from the remaining referred lesions, as displayed in Figure 3.

Discussion

Compliance with NICE NG12 guidelines

A total of 84 referrals (38%) were considered to be non-compliant with the NICE guidelines for 2WR referral.[3] Previous studies had assessed levels of compliance with previous guidance from CG27 (NICE, 2005) and the Department of Health (DoH, 2000); a comparison is displayed in Table 2.[2,11]

Data analysis found that white/keratotic lesions were frequently referred to WSHT, with the resulting diagnosis most commonly being traumatic (n = 34). It appears that GDPs are tending to follow the DoH guidelines[2] and CG27[11] for 2WR referrals, which direct clinicians to refer 'all red and white patches of the oral mucosa'. The NICE NG12 guidelines instruct clinicians to instead refer 'a red or red and white patch in the oral cavity consistent with erythroplakia and erythroleukoplakia'.[3] This message is partially consistent with the electronic referral software's 2WR referral pathway which has 'red or red and white patch of oral mucosa with pain or bleeding' as one of its criteria for referral (as of October 2018).

According to the World Health Organisation, 'leukoplakia' can only be diagnosed as such if a white plaque is deemed 'of questionable risk' and other potential benign causes have been considered and excluded.[24] On analysis of the data, many of the white lesions referred in by 2WR had an obvious traumatic cause such as a jagged tooth, an ill-fitting denture or signs of bruxismal parafunction. GDPs need to be more aware of possible traumatic causes of oral lesions (including ulcers) and address these in primary care to see if the lesions resolve before referring in to secondary care. Such lesions should then only be sent in based on their merit as a 'soft tissue lesion' rather than via 2WR.

Nine normal anatomical features were referred in as suspected malignancies, four of which were for normal salivary gland tissue, two for normal tonsillar tissue, two for lingual varices and one case of mandibular tori. Such use of the 2WR system suggests that there is a need for further ongoing education to avoid such referrals in the future.

The most common reason for referral for GDPs was 'ulceration of tongue/oral mucosa >3 weeks' (n = 36, 37%). During the data collection it appeared to the investigator that many of these 'ulcers' did not contain the typical features of which one would suspect malignancy, such as induration of the base, rolled borders, bleeding, irregular margins, raised lesion, rapid increase in size, secondary infection of surrounding tissue, painless etc.[25] In 13 cases the lesion had healed by the time the patient was assessed in clinic, making it highly unlikely that the original lesion presented such sinister features to warrant an urgent referral. The GDP could instead have reviewed the patient a week or two later to check the ulcer was indeed non-healing before referring.

Another reason for GDPs referring patients with non-urgent lesions via the 2WR pathway is that they were more concerned with high-risk behaviours/history of the patient (for example, smoking/alcohol or previous malignancy). This has been shown as the usual behaviour of GDPs by Brocklehurst et al.[26] It could also be a symptom of the so-called 'worried well' concept[19] which describes anxious but healthy patients that may influence their primary care practitioners into urgently referring them to secondary care with undue concern over benign lesions or non-specific signs and symptoms. Although an urgent appointment with a specialist may offer reassurance to some patients, it does

Table 1 Distribution of diagnoses generated from the electronic 2WR referrals to Western Sussex Hospitals Trust	
Diagnosis	**Frequency**
Traumatic	34
Benign keratosis/hyperkeratosis	25
No abnormality detected	23
Oral lichen planus (asymptomatic)	20
Dentoalveolar pathology	19
Non-specific inflammation	13
Lesion resolved	13
Squamous hyperplasia	12
Cystic	10
Pre-malignant lesion	10
Anatomical	9
Candidiasis	9
Unknown	8
Fibroepithelial polyp	7
Vascular malformation	6
Malignancy	6
Benign bony lesion	5
Oral lichen planus (erosive)	4
Erythema migrans	4
Oral lichen planus (symptomatic)	4
Lichenoid inflammatory process	3
Aphthous ulceration	3
Actinic keratosis/cheilitis	3
Reactive lymphadenopathy	2
Mucocele	2
Myofascial pain	2
Benign pigmented lesion	2
Vesiculobullous disease	2
Granular cell tumour	1
Referred for further investigations	1
Lymphoid hyperplasia	1
Chronic hyperplastic candidiasis	1
High-grade dysplasia	1
Inflammatory papillary hyperplasia	1
Foreign body	1
Calcification	1
Odontogenic tumour	1
Angina bullosa haemorrhagica	1
Pyogenic granuloma	1

Table 2 Compliance with relevant guidelines for suspected HNC, compliance with the 14-day waiting limit for 2WR referrals and the malignancy-detection rate of HNC from several retrospective studies in a variety of locations from 2WR referrals of several retrospective studies in a variety of locations

Study (period of research)	Location	Number of referrals	Number of patients seen in clinic	Guidelines used as standard	Compliance with guidelines (%)	% of patients seen within 14-day limit	Average wait time (days)	Malignancy detection rate from 2WR referrals (%)
Present study 2018	Western Sussex Hospitals Trust	219	219	NICE NG12, 2015[3]	62%	85%	12	2.7%
East et al. 2005[12]	James Cook University Hospital, Middlesbrough	48		DoH, 2000[2]				6.3%
Shah et al. 2006[13]	Southmead Hospital, Bristol	150	147	DoH, 2000[2]		98%	6	6%
Singh et al. 2006[14]	King's College Hospital, London	76	69	DoH, 2000[2]	66%	86%		8%
McKie et al. 2008[15]	Freeman Hospital, Newcastle	1,079		DoH, 2000[2]	71.5%	-		10.9%
Hobson et al. 2008[16]	Stepping Hill Hospital, Stockport	177		DoH, 2000[2]	60%	95%	15.5 (median)	12%
Miller et al. 2012[17]	Newcastle General and Dental Hospitals	63	63	DoH, 2000[2]	95%	90%	10	11%
Rimmer et al. 2012[18]	'A dedicated 2WR clinic at a large teaching hospital'	400	400	DoH, 2000[2]	60%	80.7%		9%
Pracy et al. 2013[19]	Birmingham, tertiary university teaching hospital	622	622	DoH, 2000[2]	40%	92%		5.6%
Begum et al. 2015[20]	Worcestershire Royal Hospital (WRH) and New Cross Hospital (NXH)	100		DoH, 2000[2]	45% (WRH) 42% (NXH)	79% (WRH) 98% (NXH)		
Hong et al. 2016[21]	Royal Cornwall Hospital NHS Trust	243	220	NICE CG27, 2015[3]	56%			6.2%
Tikka et al. 2016[22]	Newcastle upon Tyne Hospitals and Queen Elizabeth Hospital, Birmingham	4,715 (referrals analysed)		NICE CG27, 2005[11] NICE NG12, 2015[3]	66.3% 60.2%			9.2%
Roy et al. 2018[23]	Royal Preston Hospital NHS Trust	141	141	NICE NG12, 2015[3]	33.4%			2.8%

not represent the true purpose of the 2WR system. In the highly litigious world of today, GDPs may also feel pressured into upgrading a benign-looking lesion to 2WR in order to avoid a potentially career-ending 'missed or delayed diagnosis'.

Compliance with the two-week rule

Western Sussex Hospitals Trust offers 100% of 2WR patients electronically referred by their primary care practitioners an appointment within two weeks of referral. However, failure to attend (n = 5) and lack of patient availability (n = 28) meant that only 85% (n = 186) of referred patients were seen in consultant clinic within the 14-day limit, with an average wait of 12 days from the date the referral was received. This percentage is similar to other studies into waiting times for referred 2WR head and neck patients (Table 2).

Of the 33 patients that did not attend within 14 days, 19 (58%) were male while 14 (42%) were female. The average age of these patients was 56 years. Western Sussex Hospitals Trust has a 100% record of offering 2WR patients electronically-referred by their primary care practitioners an appointment within two weeks of referral. However, the maxillofacial unit is required to create a significant number of 2WR slots to match the demand set by the number of 2WR referrals sent to WSHT. This potentially has a damaging impact on the provision of appointments for non-urgent referrals. This concern has been voiced in the literature by Pulleyblank et al.[27] and Potter et al.[28] who found the number of 2WR referrals had risen by 42% between 1999–2004, and by Rai et al.[29] who reported a 60% rise between 2001–2004. These studies noted that patients who were routinely referred to some specialities were waiting twice

as long for appointments since the 2WR system had been introduced, suggesting that supply was struggling to cope with an increased demand. This is a problem that seems likely to remain, as patients referred by the 2WR (whether appropriately or not) will always be prioritised over patients referred through other pathways who will therefore be delayed despite potentially having more pressing need for treatment than the so-called 'worried well'.

Fifteen percent of patients referred in this study failed to attend their specialist appointment within two weeks. Statistical analysis of this data was conducted using a 'goodness of fit' chi-squared test against the national average failed attendance rate for all cancer patients in 2016–17 of 5.6%.[30] This test revealed a p-value of p <0.001, meaning a statistically significant difference (p ≤0.05) between the failed attendance rate of the

present study (15%) and that of the national average (5.6%). This indicates a possible lack of understanding of patients to the prospect of a 2WR referral. GDPs should, therefore, endeavour to discuss properly a 2WR referral with their patients to ensure a potentially malignant lesion does not remain un-investigated.

Malignancy detection rate

The detection rate for malignancy from 2WR referrals in the present study (2.7%) falls well below that of previous studies in the UK (Table 2). When analysing the malignancies individually, two of the six cases were basal cell carcinomas of the skin (one on the nape of the neck, the other on the right cheek), while four were oral squamous cell carcinoma, therefore leaving the rate of oral cancer detection from these 2WR referrals at a mere 1.8%.

The poor and falling conversion rate for 2WR referrals is a criticism of the pathway by a number of studies across a variety of cancer types (Langton et al.,[31] Potter et al.,[29] Thorne et al.[32]). It appears that since its introduction in 2001, the number of 2WR referrals sent has increased, however the conversion rate of these referrals to a diagnosis of cancer has fallen.

It is difficult to determine reliably the reason for such a comparably low detection rate in the present study without further research. The investigator will, however, suggest several theories, as follows.

1. A greater proportion of malignancies sent to the maxillofacial unit at WSHT are from GMPs

Hong et al.[22] found that, of 220 patients referred to the Royal Cornwall Hospital NHS Trust, those referrals from general medical practitioners (GMPs) produced a much higher rate of malignancy detection (9.5%) than those from GDPs (1.4%). Rodgers et al.[33] discovered the majority (59%) of its sampled patients would visit their GMP before their GDP (29%). They suggested that patients with signs or symptoms of HNC are visiting their GMP rather than their GDP for a variety of reasons; these include a lack of access to dental care, financial reasons, dental anxiety, and a lack of awareness of the dentist's role in HNC management.

A follow-up to the present study is currently in progress with a comparison of malignancy detection from 2WR referrals via GMPs to WSHT over the same time period to see if they yield a better detection rate than GDPs.

2. GDP awareness of oral medicine and the NICE guidelines for 2WR referral is deficient

This issue is evident with the degree of inappropriate referrals (38%) sent to the trust, as demonstrated in the results. More initiatives such as Mouth Cancer Action Month[34] are required to re-educate GDPs on referral guidelines, 'red-flag' signs and the patient pathways in secondary care. The consultants and other reporting clinicians at WSHT often highlight to GDPs whether their referral was an inappropriate use of the 2WR pathway. However, this is not standard practice and it is evident that some clinicians are more prepared to inform GDPs of their inappropriate referral than others. If GDPs are not made aware of an inappropriate 2WR referral at the earliest opportunity, then this practice will be reinforced and GDPs may continue to make mistakes using the 2WR system.

3. Patients with HNC are being referred by non-urgent pathways

Data to support this would need to be collected in a future study. In a systematic review by Langton et al.,[32] of 17 studies investigating the 2WR in HNC from 2000–2014, the authors discovered that approximately 60% of the HNCs diagnosed in these studies were referred outside of the 2WR pathway, suggesting that the 2WR may not be an effective route for diagnosing HNC. However, this remains but a theory and is yet to be proven otherwise.

4. A high number of inappropriate referrals

As well as referring the so-called 'worried well', GDPs may endorse a low threshold for 2WR referral: 'practising defensively to protect themselves against a potentially career-ending, delayed or missed diagnosis resulting in a lawsuit and/or GDC action' (a quote from a local practitioner).

5. The guidelines for 2WR referral are not producing the desired results

NICE developed the current NG12 guidelines[3] based on research in primary care. They included organ-related signs and symptoms with a threshold positive predictive value of ≥3% in order to diagnose cancer at earlier stages and to simplify referral for primary care practitioners. There has, however, been criticism of NG12 by Tikka et al.,[23] who

feared that the guidance lacked statistical significance in predicting cancer, and that it oversimplified the referral process by omitting symptoms with a high positive predictive value (that is, dysphagia, odynophagia and persistent otalgia with normal otoscopic examination) meaning that its diagnostic efficacy is sub-optimal.

Conclusions

Thirty-eight percent of electronic 2WR referrals from GDPs to Western Sussex Hospitals Trust were deemed inappropriate according to the current national guidelines for referring suspected oral cancer. Ongoing education of GDPs is required to minimise inappropriate referrals. A statistically significant proportion of referred patients missed the 14-day target to attend a consultation appointment and GDPs must therefore make patients aware that their referral is urgent in order to promote early attendance. Only 2.7% of 2WR referrals to the trust resulted in a malignant diagnosis although the reasons for such a low detection rate are difficult to establish without further research.

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