Accuracy of frozen section biopsy in non-melanoma skin cancer

Acurácia da biópsia de congelação no câncer de pele não-melanoma

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ABSTRACT

Together, basal cell and squamous carcinomas account for more than 50% of all new cases of cancer. Frozen section biopsy is often used in areas such as the head and neck, in which a wide margin could cause disfiguring scars or difficulties with reconstruction, but the results of frozen biopsy do not always correspond to the results of paraffin sections. This paper aims to review existing literature on the correlation between the results of intraoperative frozen biopsy and final pathological examination of surgical specimens (examination of paraffin sections), because of the importance of frozen biopsy in curative resection and reconstruction of affected sites. A literature review was conducted, based on scientific articles published over the previous 10 years about the accuracy of intraoperative frozen sections. Frozen section biopsy is an efficient and reliable method that should be applied in areas where resection should be as economical as possible. However, in cases with small tumors and excess skin, the results of frozen biopsy are poor, dispensable, and not meaningful. Frozen biopsy is an efficient, affordable, and reproducible method when performed by experienced staff in well-selected cases.

Keywords: Skin neoplasms. Biopsy. Frozen sections. Sensitivity and specificity.

RESUMO

Os carcinomas basocelular e espinocelular juntos respondem por mais da metade dos casos novos de câncer. A biópsia de congelação é frequentemente usada em áreas como cabeça e pescoço, nas quais uma margem ampla poderia ocasionar cicatrizes desfigurantes ou dificuldades de reconstrução, porém o resultado da biópsia de congelação nem sempre corresponde ao da parafina. O presente trabalho tem como objetivo fazer uma revisão bibliográfica sobre a correlação do resultado da biópsia de congelação intraoperatória e o resultado final do exame anatomopatológico da peça cirúrgica (exame de parafina), pela sua importância na ressecção curativa e na reconstrução do local acometido. Foi realizado levantamento bibliográfico, tendo como base artigos científicos publicados a respeito da acurácia da biópsia de congelação nos últimos 10 anos. A biópsia de congelação é um método eficiente e confiável, que deve ser aplicado em áreas em que a ressecção deve ser a mais econômica possível. Em áreas com tumor pequeno e sobra de pele a biópsia de congelação é pobre, dispensável e não altera resultados. A biópsia de congelação se mostrou um método eficiente, de custo acessível e de boa reprodutibilidade quando realizada por profissionais experientes e em casos bem indicados.

Descritores: Neoplasias cutâneas. Biópsia. Secções congeladas. Sensibilidade e especificidade.

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INTRODUCTION

Non-melanoma skin cancer is the most common type of cancer in the world[1]. Total excision of the lesion and reconstruction during surgery is currently the standard treatment for these tumors and is considered to be curative.

Tumors located in areas of greater aesthetic importance, such as the head and neck, require careful analysis; surgeons should aim to remove all tumor tissue with adequate margins and also remove the minimum amount of tissue possible. Conservative resections can result in incomplete removal of the tumor and local recurrence, while excision with wide margins can cause disfigurement and large scars[2,3]. In such cases, frozen section biopsy has been widely used to try to ensure disease-free margins and satisfactory primary reconstruction.

The accuracy of intraoperative frozen sections has already been the subject of many studies, because of their importance and clinical applicability. In this study, the term "accuracy" was used as a measure of the correlation between the estimated value and the values of source information, namely, as far as the estimate obtained was related to the "true value" of the parameter.

This paper aims to review existing literature on the correlation between the results of intraoperative frozen biopsy and final pathological examination of surgical specimens (examination of paraffin sections), because of the importance of frozen biopsy in curative resection and reconstruction of affected sites. Ultimately, the study seeks to provide surgeons a greater degree of security and reliability in the removal and reconstruction of non-melanoma skin cancer.

METHODS

This is a literature review, based on scientific articles published in the previous 10 years about the accuracy of intraoperative frozen biopsy in squamous cell and basal cell carcinomas.

Comparative analysis was performed, considering the results of frozen sections and final pathologic examination of surgical specimens (examination of paraffin sections) in non-melanoma skin cancer.

DISCUSSION

Together, basal and squamous cell skin cancers are the most common types of cancer. Although the outcome of these cancers is rarely fatal, they affect large numbers of patients and morbidity can be high[4]. Moreover, the financial resources used to treat these cancers with surgical excision are also significant.

Basal and squamous cell skin cancers are treated with excision, and most defects can be closed primarily or with preparation of a local graft. In crucial areas, however, such as the head and neck, resection should be more economical, aiming at the smallest possible defect for a more aesthetic reconstruction. In such cases, frozen biopsy should be used, since it increases the chance of ensuring free margins[3,5-7].

Among the studies analyzed, there were no significant differences with respect to gender, age, tumor size, location, and skin damage caused by the sun. Most tumors (89.3%) were basal, 10% were squamous, and 0.7% showed an undetermined histological type[1,3,5,6,8].

Frozen biopsy has a negative predictive value (NPV) that may range from 27.3% to 98% depending on the study. The higher the percentage, the better the chance of having negative results in patients with clear margins; this corresponds with greater accuracy and a lower incidence of false-negative results. Lesions in which previous biopsies were performed had higher NPV rates, which were probably caused by tumor destruction as a result of the healing process generated by biopsy. In these specimens, the final result of paraffin examination was cancer in only 25–30% of cases, showing that this NPV may be high and biased[7,9-11].

The correspondence of results of intraoperative frozen sections with those of final pathological examination of the surgical specimen (examination on paraffin sections) was 80.4% on average in the studies surveyed; 30% of patients required a second approach and of these, 7% needed a third surgery. Among patients who underwent a second surgery, 5.2% had free margins on frozen sections and the final specimen[1,3,4,6,8,9].

Frozen biopsy showed a statistically significant difference ($P < 0.05$) in the studies evaluated, and the result was more significant when used for lesions of imprecise limits, in reoperations, or in aesthetically important areas[1,3,5,8,9].

Most studies have used frozen biopsy before performing more extensive reconstructions or flap rotation. In the absence of intraoperative frozen sections, 73% of surgeons chose reconstruction with grafts and a new surgical procedure after final pathological examination of the surgical specimen (examination on paraffin sections). This percentage was almost 92% when performing a re-approach[1,12,13].

These studies also highlighted that collaboration between surgeons and pathologists is a determinant factor for increased NPV and therefore may optimize the accuracy of intraoperative frozen sections. The surgeon must make a correctly identified resection, beyond the four quadrants, to facilitate the determination of margins in pathology; the surgeon should also remove the piece and avoid full bevel so that the pathologist can work in optimal conditions, increasing the rate of NPV and test sensitivity. Given the identification of positive margins, a new en bloc resection with appropriate markings should be made, following the same principles of resection used before[2].

Where frozen sections present false-negative results and pathological examination of the surgical specimen (paraffin examination) demonstrates positive margins, the approach adopted in most studies was as follows:

- one lateral margin compromised - only monitoring of the lesion as a minority of patients will present with disease recurrence (in case of relapse, in most cases, it will be benign, slow growing, and susceptible to new resection, which would justify such less aggressive conduct)[1,3,14,15];
- two lateral margins or deep margin compromised – re-approach[14,15].

The low recurrence rate in tumors with a single compromised lateral margin has been attributed to the local inflammatory process caused by healing and also to the more indolent nature of these neoplasias[1,2].

Frozen biopsy is not suitable for all cases. Small tumors in areas with excess skin and easy primary closure with adequate margins should not be subjected to freezing because it increases surgical time and cost, and does not translate into meaningful results, both immediately and later on postoperatively. These tumors represent the majority of cases; therefore, in most tumors, it is not necessary to perform a frozen biopsy[1].

CONCLUSIONS

Frozen biopsy proved to be an efficient, affordable, and reproducible technique when performed by experienced professionals.

The indications for frozen biopsy are restricted to tumors in important aesthetic areas in which the resection must be as economical as possible. Therefore, it can be indicated in some cases, but is not necessary in most patients.

The results are accurate in most cases. Frozen biopsy is a simple and safe method that offers good reliability and should be used in selected cases.

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