OPERATSION MIKROSKOP ZEISS OPMI MDU XY S5 DA OPTIK DEGREDATSIYA PARAMETRLARINI TADQIQ QILISH

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Annotatsiya: Ushbu maqolada biz operatsion mikroskoplar fotolyuminisensiya uchun ko'k va oq yorug'lik intensivligini va PpIX vizualizatsiyasi uchun ishlatiladigan klinik darajadagi operatsion mikroskoplarning yorug'lik nurlari profilini batafsil baholashni amalga oshirdik.

Annotation: In this article, we performed a detailed evaluation of the blue and white light intensities for photoluminescence of operating microscopes and the light beam profile of clinical-grade operating microscopes used for PpIX visualization.

KIRISH

Operatsion mikroskoplar neyroxirurgik operatsiya xonasida keng tarqalgan bo'lib, miya shishini olib tashlash uchun jarrohlik muolajalarning asosiy qismi hisoblanadi. Neyroxirurgiya uchun kundalik foydalanishda eng muhim vizualizatsiya vositasi sifatida operatsion mikroskoplar innovatsion yoritish rejimlari orqali ilg'or funksionallikka ega bo'lmoqda. Jarrohlik muvaffaqiyatini ta'minlash uchun neyroxirurg mikroskopning yorug'lik xususiyatlarini va funksionalligini, ayniqsa fluorosensiya ostida to'qimani rezektsiya qilish kontekstida to'liq tushunishi kerak.

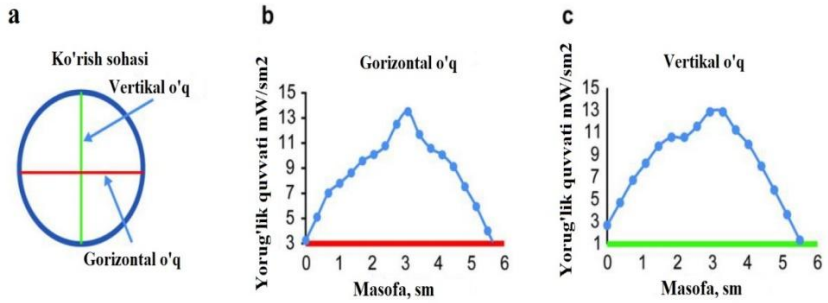
To'qimani fluorosensiya yordamida rezektsiya qilish printsipi operatsiyadan oldin yoki operatsiya vaqtida bemorlarga qo'llanilishi mumkin bo'lgan fluorosensiya xususiyatlarga ega maqsadli vositalardan foydalanishga asoslanadi. Ushbu agentlar floroforning selektivligi va ta'siriga qarab to'qima to'qimalari ichida va atrofida yoki to'qima hujayralari ichida to'planish uchun mo'ljallangan. Operatsiya paytida asosiy talab etiladigan diagnostika tahlil bu fluorosensiyaga asoslangan vizual farqlashni kuchaytirish va o'sma to'qimalarining chegaralarini aniqlashdir. Neyroxirurgiyada o'smalarni aniqlash uchun ishlab chiqilgan lyuminestsent agentning eng mashhur namunasi 5-aminolevulin kislotasi (5-ALA) bo'lib, u o'smalar va malign gliomalarning chegara hududlarini ko'rsatish uchun ishlatiladi.

Asosiy qism. Tijorat darajasidagi operatsion mikroskoplar turli to'lqin uzunliklarida fluorosensiya emissiyasini aniqlash: Ushbu maxsus yoritish modullari serebrovaskulyar kasalliklar uchun neyroxirurgiya paytida odatiy holga aylangan va miya o'smalarini rezektsiya qilish uchun tobora ko'proq foydalanilmoqda. Mikroskopning yorug'lik chiqishi, lyuminestsentlik va fotooqartirishni tushunish

neyroxirurg to'qimalarni rezektsiya qilish uchun mos keladigan protokolga chuqur ta'sir ko'rsatishi mumkin. Past va yuqori darajadagi gliomalar uchun rezektsiya darajasi bemorning umr ko'rish davomiyligiga katta ta'sir ko'rsatadi. Ushbu tamoyillarini nafaqat fiziklar va ishlab chiqaruvchilar, balki neyroxirurglar ham tushunishlari kerak, ular jarrohlikda va miya o'smalarini davolashning boshqa usullarida qo'llanilishi mumkin bo'lgan fluorosensiya mikroskop modullarining imkoniyatlari va cheklovlari haqida ma'lumotga ega bo'lishi kerak. Shunday qilib, standartlashtirilgan usullarni ishlab chiqish, neoplastik miya to'qimalarini rezektsiya qilish paytida intraoperativ lyuminestsent usullarda jarrohlik mikroskop yordamida o'lchovlar yoki kuzatuvlarni oladigan klinik sinovlar va tadqiqotlar uchun tobora muhim ahamiyat kasb etmoqda

Biz baholagan barcha operatsion mikroskoplarning oq yorug'lik va ko'k chiroq (BLUE 400 lyuminestsent rejimi) optik quvvati ko'rish maydoni (FOV) bo'ylab turlicha edi. Gorizontal va vertikal o'q bo'ylab yorug'likning tarqalishi qo'ng'iroq shaklida bo'lgan (1a-c-rasm). Mikroskopning sirtga nisbatan burchagi tufayli yorug'lik intensivligi profili vertikal o'q bo'ylab bir tomonga biroz egilgan.

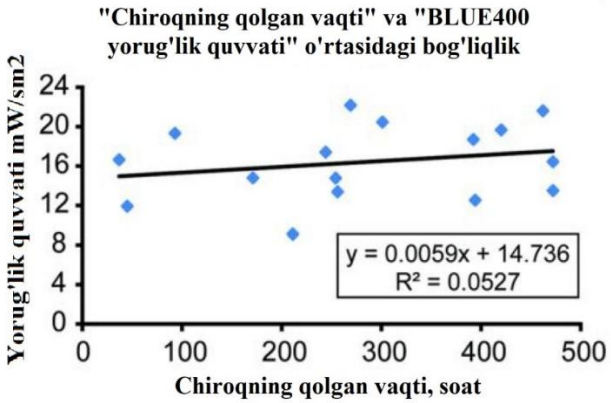
Qizig'i shundaki, keyingi tahlillar "chap chiroq soati" qiymati va ko'k chiroq optik quvvati o'rtasida hech qanday bog'liqlik yo'qligini aniqladi (2-rasm). "Chiroq soati" parametri o'zgarganligi sababli, ko'k chiroq optik quvvatining intensivligining o'zgarish darajasi mos kelmadi.



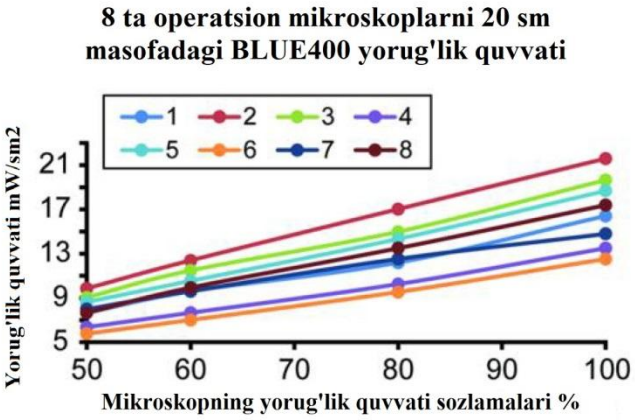
1-rasm. Optik quvvatni o'lchash tajribalari. BLUE 400 rejimini operatsion mikroskopning ko'rish maydoni bo'ylab optik quvvat profili. Agar boshqacha berilmagan bo'lsa, o'lchovlar 20 mm fokus masofasida va 100% mikroskop yorug'lik quvvati sozlamalarida ES120C Piroelektrik termal optik quvvatni o'lchovchi sensor yordamida amalga oshirildi. (a) o'lchovlar olingan joyni ko'rsatadigan diagramma (b) Ko'rish maydonining gorizontal o'qi bo'ylab yorug'lik intensivligi profili. (c) Ko'rish maydonining vertikal o'qi bo'ylab yorug'lik intensivligi profili.

Shuningdek, biz fokus masofasi va yorug'lik quvvati sozlamalarining FOV bo'ylab o'lchangan yorug'lik quvvati zichligiga ta'sirini tahlil qildik. Tahlil shuni ko'rsatdiki, 20 sm fokus masofasida o'lchangan ko'k yorug'lik optik quvvat zichligi mikroskopning yorug'lik quvvati sozlamalari bilan to'g'ridan-to'g'ri va ijobiy korrelyatsiyaga ega (3-rasm). Xuddi shunday korrelyatsiya 30 sm fokus masofasida

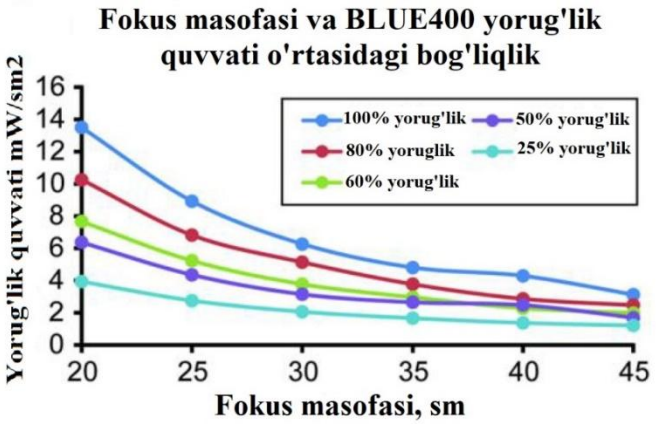
ham topilgan. Keyingi tahlillar, kutilganidek, BLUE 400 ish rejimida fokus masofasi va o'lchangan yorug'lik quvvati zichligi o'rtasidagi teskari munosabatni aniqladi (4-rasm). Oq yorug'lik rejimidan foydalangan holda optik quvvat o'lchovlari turli yorug'lik quvvati sozlamalari orasida fokus masofasi va optik quvvat zichligi o'rtasidagi o'xshash bog'liqlikni ko'rsatdi. Misol uchun, mikroskop BLUE 400 rejimida 100% yorug'lik quvvatida va 30 sm fokusda ishlaganda, optik quvvat zichligi taxminan bir xil mikroskopni BLUE 400 rejimida 50% yorug'lik quvvatida 20% yorug'lik quvvati bilan ishlatishga teng. Fokus masofasi va o'lchangan yorug'lik quvvati zichligi o'rtasidagi munosabat ko'k va oq yorug'lik yoritilishi uchun chiziqli bo'lmagan.



2- rasm. BLUE400 rejimida chiroqning resursini ishlatilgan soatlari va ko'rish maydonining markazida o'lchangan optik quvvat o'rtasidagi bog'liqligi.



3-rasm. 8 ta mikroskopda 20 sm fokus masofasida mikroskopning optik quvvat sozlamalari va o'lchangan tushuvchi optik quvvat o'rtasidagi bog'liqligi.



4-rasm. 5 xil mikroskop yorug'lik quvvati sozlamalarida fokus masofasi va o'lchangan tushuvchi optik quvvat o'rtasidagi bog'liqlik.

XULOSA

Ushbu tadqiqotda biz standart oq yorug'lik va ko'k yorug'lik rejimlarida tijorat neyroxirurgik operatsion mikroskoplarining fazoviy yoritish intensivligini o'lchadik. Yoritish intensivligi namuna to'qimasigacha bo'lgan masofaga, mikroskop yorug'lik quvvati sozlamalariga va ko'rish maydonidagi joylashuvga bog'liqligi o'rganildi.

Bundan tashqari, turli mikroskoplar bir xil tizim sozlamalarida sezilarli darajada turli xil yorug'lik optik quvvatlarini namoyon etishi o'rganildi. 500 soatlik vaqtga asoslangan ksenonli yoy chiroqning qolgan vaqtlari, o'lchangan optik quvvatdagi o'zgarishlarga hech qanday bog'liqlik ko'rsatmadi; ammo qolgan vaqtning o'zgaruvchanlikka qo'shgan hissasini to'liq bartaraf bo'lmasligi aniqlandi

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